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Office:

Nicolae Șuțu Street, no. 11 – 15
Central building, second floor, room 9,
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Rector's Allocution

We have the special pleasure to let you know that the Review of our University, „Buletin of Scientific Information”, having ten years of consecutive issue, it achieved the recognition of the National Council of the Higher Education National Research, being comprised in the category „National Reviews – D Category”

So, the Bioterra University review „Buletin of Scientific Information” works as a real platform for the information and exhibition of the most recent and valuable research in the agricultural field and connected sciences (food industry, agro-tourism, ecology, agricultural economics etc.).

This way I express my gratitude the contributors to our review, authoritative academic and univeritary names of whose studies are found in the selection done by the scientific board of the review, co-workers with whom we have strong relations of partnership and mutual support in the development and course of some conjointed research projects.

I wish to the review many and consistent issues.

Prof. Floarea Nicolae, PhD
Rector of the Bioterra University of Bucharest



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¹ National R&D Institute for Textile and Leather of Bucharest

² Bioterra University of Bucharest

³ National R&D Institute for Pedology, Agrochemistry and Environmental Protection of Bucharest

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THE EFFECTS OF USING FERTILIZERS TO WHEAT CROPS

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Abstract: *It is extremely important to achieve optimum economic fertilizer management. Worldwide use "response factors" of fertilizers, resulted in an additional quantity of products produced per kg fertilizer product supplement. It varies between 8 and 12 kg of cereals. While production increases are achieved, these costs remain prohibitive, especially for import dependent countries. Among winter wheat crops are reacting positively to the application of fertilizers in all climatic conditions in Romania.*

Key words: *fertilizers, efficiency, nitrogen*

***I**ntroduction*

The need to increase agricultural production through the use of chemical fertilizers is derived from the objective requirements of social development. Irrational use of chemical fertilizers requires studying the interaction between plants, soil and environmental conditions, analysis of soil fertility status, the establishment of chemical fertilizers. Content in soil N, P and K, the main elements involved in the nutrition of agricultural plants is much less than their requirements for obtaining higher production of quantitatively and qualitatively. Export of nutrients from the soil taken by plants with production, especially in the last 20 years was slightly offset by the application of fertilizers.

Harmonization of ecological factors, rational use and improvement of physical, chemical and biological soil, stimulating the development of income can be achieved by applying new technologies in which the principal element mineral fertilization. Knowing the effects of chemical fertilizers for cereals and industrial crops, depending on climatic conditions, the dose ratio of

fertilizer and nutrients, allows determining the amounts to be allocated judiciously to achieve optimal economic effect, a higher quality of production and viability in terms of energy crops. The results covered by this paper aims to contribute to useful information for economic and energy efficiency for wheat in the specific conditions of experimentation. In this regard, the following are the objectives of the research conducted succinctly:

- Determination of total crop growth and average growth due to unilateral application of compound fertilizers based on phosphorus and nitrogen.
- Effect of NP fertilizers on economic efficiency.
- Effect of NP fertilizers on energy efficiency.

***M**aterials and methods*

Experimental data for wheat crop came from Trajan's Valu Research Station. Experiences led technical, economy and energy efficiency of culture in terms of agrofond 80 kg. P₂O₅/ha and increasing doses of nitrogen (V1 - 0 kg N / ha, V2 - 60 kg N / ha, V3 - 120 kg N / ha, V4 - 180 kg N / ha).



Results and discussions

The data presented in Table 1 clear that under a complete and correct application technologies and normal natural conditions, with 80 kg phosphorus per hectare could be obtained an output of 3890 kg / ha.

Economic results of such a level of production are as follows. Total expenditures are for 1900 lei per hectare, is still lower as a result of reduced fertilizer use.

The cost of a kilogram of wheat production reached 0.49 lei, and one kilogram is profit to 0.16 lei, in a price of only 0.65 lei per one kilogram of wheat in 2007.

In connection with this price, we should mention that he did not fully reflect supply and demand of wheat in 2007. Thus the average price of wheat was 0.65 euro / kg, while a kilo of flour can reach 3 lei. So, it was encouraged or supported producer who wins (still a good production 3890 kg / ha) only 33% of expenses incurred or 0.16 lei per kilogram of wheat, while three intermediaries between the manufacturer and located consumer - wheat buyer, who turns wheat into flour and bread manufacturer, including one who sells it - get a net income of at least 3 lei per kilogram of wheat, so over 18 times more than the manufacturer. From this came exaggerated, some would be re-distributed or shared with the producer in the form of grants.

Another reason to consider the price as unusual, in determining which were not taken into account the principles or the rigors of the market economy is that in 2006 when the price of wheat was 0.50 lei, in 2007 the price of materials used and agricultural work have increased by at least 40% over the previous year, while wheat prices rose by only 30%, which was a part of farmers, especially those who had lower yields, to lose this culture.

In terms of energy consumed and energy produced, the situation is different in a positive way. I mean, all materials used, all mechanical work done by human strength or converted into energy units per hectare amounts to 2984 kWh.

Consumption is low because they did not use nitrogen, which has a very high ratio compared to other materials or energy forces. To obtain a kilogram of nitrogen active substance is consumed 25.7 kWh.

In these circumstances this level of technology and production of grain production was obtained at an energy equivalent of 17,505 kWh. Net energy balance or energy is 14,521 kWh per hectare, with an efficiency of 5.86. That is, energy consumed per unit of 5.86 units were obtained. This is proof that agriculture is not much energy as it would appear as large quantities of oil consumed in the form of diesel for agricultural work performance, but is a big energy producer. In addition to the energy stored in grains, it can get a significant amount of secondary energy. Thus, on average, one hectare of wheat production to obtain a secondary layer of straw, which produces energy equivalent to 1200 liters of oil or 13,000 kWh. To present a more complete picture, the energy consumption per hectare and per tonne was calculated and Mega Mega Joule and Calories.

In other technological options were used constant doses of phosphorus (80 kg / hectare to) and increasing doses of nitrogen (60, 120 and 180 kg. / To per hectare).

In the version with 60 kg nitrogen, growth of production was 1020 kg / ha. So one kg of nitrogen were obtained 17 kg of wheat, which substantially increases the economic efficiency of these inputs.

Production increased by 26.2% as per hectare production cost was reduced from 0.49 lei to 0.45 lei per kilogram.



Profit rose to 0.20 per kilogram lei per hectare profit increased 55% and the profit rate increased from 33.07% to 44.18%.

In terms of energy, what interests us most is the energy or net energy balance, which increased from 17 505 kWh / ha to 22 095 kWh / ha.

Of course, the energy consumed per hectare increases due to nitrogen use. Why is the energy consumed per tonne increase energy efficiency is reduced, but this apparently unfavorable evolution of these indicators is far surpassed by reducing the cost of energy units consumed.

So technological efficiency correlates with energy efficiency and value. That is, the increase produced decreases production costs, increase profits, and increase net energy per hectare, reduced cost of energy units consumed and increase the value of units produced. In terms of cost of a unit of energy consumed is noted that energy consumption increases as its cost decreases, although not related to yields, declined to say that due to increasing production cost.

In this case, the phenomenon is caused by the increase of nitrogen, which has a high coefficient per kilogram.

For example, nitrogen per kilogram S.A. return 25.7 kWh and the price is 0.6 lei/ kg to In a technology with 120 kg nitrogen/ha and it costs 72 lei represents 2.87% of total expenditure and 50% of total energy consumption per hectare.

So, nitrogen is to increase energy consumption per hectare, which reduces cost.

At the same time, the cost of energy units produced is at a much lower and decreases more nitrogen variants.

Once again be stressed that energy from agriculture, besides that it has a special use value as food for human existence, is much cheaper, at least for wheat production.

On doubling the amount of nitrogen, ie 120 kg to per hectare, in variant 3 (V3), increased production reached 1980 kg / ha, achieving a 50.9% increase. In this case the cost fell to 0.42 euro / kg per kilogram profit rose to 0.23 lei. Net profit rose to 1312 lei per hectare, compared to nitrogen-free technological variant (V1) the difference being 683.5. The profit rate reached 52.4%. And if this alternative energy use per hectare and per tonne increase energy efficiency decreases as a result of doubling the amount of nitrogen, but the net energy increase from 17,506 kWh to 20,193 kWh. In version 4 with 180 kg S.A. nitrogen per hectare, increased production reached 2430 kg / ha increased by 62.5%. So growth is not growth in the proportion of variants 2 and 3 but shows an increase in economic and energy efficiency. In version 2 with 60 kg nitrogen, the increase was 1020 kg / ha, 17 kg wheat back to 1 kg nitrogen. In version 3 the increase was 1980 kg wheat, returning 16.5 kg wheat 1 kg nitrogen, and variant 4 was 2430 kg gain, returning 13.5 kg wheat 1 kg nitrogen.

Another calculation shows that in version 3 with 60 kg nitrogen addition (the difference between V3 and V2 version is 60 kg nitrogen) were produced only 960 kg wheat, 1020 kg compared to those obtained with only 60 kg in version 2, for 16 kg of wheat for 1 kg nitrogen per hectare as production increases and 1 kg nitrogen very close.

But, to triple the amount of nitrogen, its effect starts to decrease, so that the third quantity of 60 kg nitrogen to obtain an increase of only 450 kg per hectare and 7.5 kg wheat per 1 kg of nitrogen variant 3.

In total, 180 kg nitrogen, however, increased production from 62.5% came from version control (without nitrogen), and 1 kg nitrogen and 13.5 kg wheat were made, which resulted in the reduction of production cost and increase profit porphyria rate.



In terms of energy indicators, applying fertilizer consumption per hectare is increasing, consumption per tonne increase energy efficiency decreases. But what is most important, expressing the energy efficiency

indicators are positive. This increases the energy produced per hectare, net energy increase and the cost of consumed energy unit also decreases.

Table 1

Economic indicators and energy to wheat crop

Nr. crt.	Specification	U.M.	P ₂ O ₅ 80kg/ha			
			V1 - No	V ₂ - N ₆₀	V ₃ - N ₁₂₀	V ₄ - N ₁₈₀
1.	Average production	kg/ha	3890	4910	5870	6320
2.	Increased production	kg/ha	-	1020	1980	2430
		%	100	126,2	150,9	162,5
3.	Expenditures	lei/ha	1653,00	1925,74	2178,04	2304,18
4.	Labor expenses	lei/ha	80,75	89,20	101,39	105,65
5.	Other expenses (indirect)	lei/ha	166,25	198,56	224,07	231,37
6.	Total production expenses	lei/ha	1900,00	2213,50	2503,50	2641,20
7.	Production cost	lei/kg	0,49	0,45	0,42	0,41
8.	Profit per kg	lei/kg	0,16	0,20	0,23	0,24
9.	Profit per ha	lei/ha	628,50	978,00	1312,00	1466,80
10.	Price per kg	lei/kg	0,65	0,65	0,65	0,65
11.	The value of grain production	lei/ha	2528,50	3191,50	3815,50	4108,00
12.	Profit rate	%	33,07	44,18	52,40	55,53
13.	Productivity labor	days-p/ha	3,35	3,70	4,20	4,40
		hours-p/t d.c.	6,88	6,03	5,72	5,56
		hours-mec./ t	3,65	2,95	2,65	2,40
14.	Consumption fuel (diesel)	l/ha	64,30	69,30	75,60	78,50
		l/t	16,50	14,11	12,87	12,42
15.	Energy consumption per hectare	kWh	2984	4589	6222	7792
16.	Energy consumption per tonne	kWh	767	935	1060	1233
17.	Energy from grain production	kWh /ha	17505	22095	26415	28440
18.	Energy balance (net energy)	kWh /ha	14521	17506	20193	20648
19.	Energy efficiency	eg. obt./ eg.cons.	5.86	4,81	4,24	3,65
20.	Energy consumption per hectare	Mj	10748	16529	22411	28066
21.	Energy consumption per tonne	Mj	2763	3366	3818	4440
22.	Energy consumption per hectare	Mcal.	2405	369	5015	6280
23.	Energy consumption per tonne	Mcal.	618	753	854	993

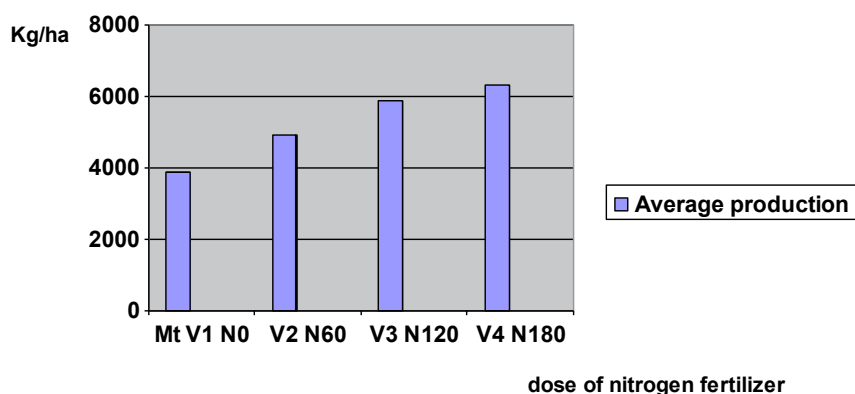


Figure 1 - Average wheat production in S.C.D.C.I. "Valu lui Traian"

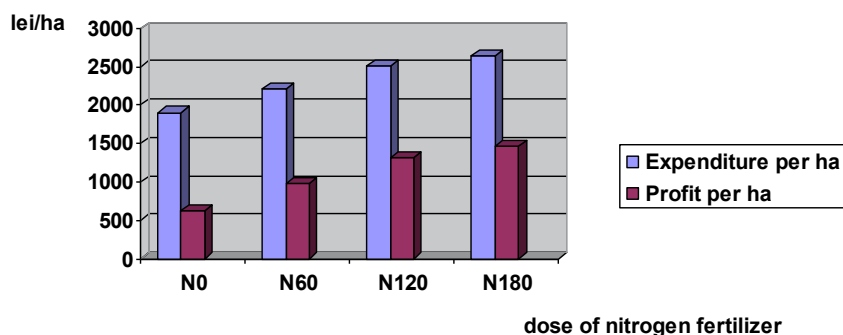


Figure 2 - Expenditure and profit recorded in S.C.D.C.I. "Valu lui Traian" for wheat crop

Conclusions

In terms of a complete technology, properly applied chernozem Dobrogea, constant background of P₂O₅ (80 kg / ha) and increasing doses of N (0 –180 kg / ha), production increased from 3890 kg / ha to 6320 kg / ha to 1 kg N resulting in 13.5 kg of wheat. This resulted in cost reduction production (from 0.49 to 0.41 euro / kg), increased profit (from 0.16 to 0.24 euro / kg) and the profit rate (from 33.07 to 55.53%). At the same time, the energy balance increased (from 14,521 to 20,648 kWh / ha), energy efficiency fell (from 5.86 to 3.65). Results obtained on individual farms and companies highlighted situations advocates - from economically - to cultivate wheat on

large surfaces and can also ensure complete and modern technologies, which lead to obtaining high yields with low cost, that cost.

References

1. Borlan Z., Hera Cr. and colab., 1994 – Soil fertility and fertilization, Ceres Publishing House, Bucharest
2. Cotianu R.D., 2009 - Research on efficient use of fertilizers in Romanian agriculture, Ph.D thesis
3. Hera Cr., Oancea I., 2002 – Rational use and conservation of Romanian soil, Romanian Academy Publishing House, Bucharest



NEW TANNING AGENTS BASED ON TITANIUM AND ZIRCONIUM

Marian Crudu¹, Viorica Deselnicu¹, Mihaela Costache², Floarea Nicolae², Mehmet Mete Mutlu³, Gurbuz Gulumser³, Behzat Oral Bitlisli³, Bahri Basaran³, Arife Candas Adiguzel Zengin³

¹ National Research and Development Institute for Textile and Leather of Bucharest

² Bioterra University of Bucharest

³ EGE University of Izmir

Abstract: This paper presents the study of new solid complexes of Ti(IV) and Zr(IV) derived from the interaction of $\text{TiOSO}_4 \cdot 2\text{H}_2\text{O}$ and $\text{ZrOCl}_2 \cdot 8\text{H}_2\text{O}$ with $\text{C}_4\text{H}_5\text{NO}_3$ (n-hydroxysuccinimide) in central atom:ligand combination ratio of 1:1 and 1:2. To characterize the new compounds in solid state, specific methods have been used: infrared spectrometry, X-ray diffraction, thermodynamic analysis to establish the structure and possibilities of use in leather processing. It has been established that Ti(IV) complexes make up structures by hexacoordination and Zr(IV) makes up dodecahedral structures.

Key words: Ti(IV) complexes, Zr(IV) complexes, X-ray diffraction, TG/TGA.

Introduction

The leather sector is now facing serious environmental problems due to polluting technological processes; a current World Bank report places the leather industry on the ninth position in a ranking of the negative impact on the environment.

From the wide range of chemical products known for their harmfulness and used in leather processing, those containing heavy metals should be given special attention regarding environmental protection due to problems they may cause over time through accumulation. The main source of heavy metals is the mineral tanning operation due to extensively used basic chromium salts (over 80% of world production of soft leather).

The chromium salt tanning system is lately under continuous pressure from environmental groups and international regulation due to pollution and toxicology. Thus, the development of new tanning agents

intended to partially or completely replace chromium salts is more than necessary, especially because lately, the international demand of chromium-free leather (FOC) is constantly increasing due to the advantages granted: lack of Cr(VI) formation risk, chromium-free sludge and waste water, very low formaldehyde content, increased assortment and color diversity, total recycling of leather wastes, etc.

In this sense, the authors have proposed a synthesis and study of new tanning coordination compounds of Ti(IV) and Zr(IV) to be used in natural leather processing technologies to prevent environmental pollution.

Materials and methods

Coordination compounds of Ti(IV) and Zr(IV) with ligands derived from N-hydroxysuccinimide were obtained



by dissolving $\text{TiOSO}_4 \cdot 2\text{H}_2\text{O}$, $\text{ZrOC}_{13} \cdot 8\text{H}_2\text{O}$ and $\text{C}_4\text{H}_5\text{NO}_3$ salts in distilled water, putting them together, under stoichiometric conditions, reactions arising quickly (in a few minutes) as presented in Figure 1.

Reactions presented in Figure 1 are in accordance with Ti(IV) and Zr(IV) : N-hydroxysuccinimide combination ratio of 1:1 and 1:2 respectively, also confirmed by the elemental chemical analysis (C, N, H, Zr, Ti) of compounds in solid state obtained by the classic method of recrystallization.

Results and discussions

The new products have been analyzed to determine the chemical composition, by thermal dynamic analysis, IR spectroscopy, microscopy, X-ray diffraction.

1. The elemental chemical composition of the studied coordination compounds is presented in Table 1.

Figure 1. Chemical reactions of combining Ti(IV) and Zr(IV)

Chemical reactions of combining Ti(IV) and Zr(IV) salts with N-hydroxysuccinimide (L)

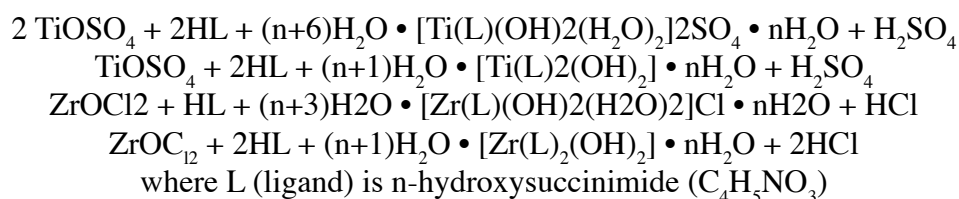


Table 1.
Elemental chemical composition of Zr(IV) and Ti(IV) compounds
with N-hydroxysuccinimide in a ratio of 1:1 and 1:2

No	Ti and Zr complexes	C % Value		H % Value		N % Value		Metals % Value	
		Calculated	Exp.	Calculated	Exp.	Calculated	Exp.	Calculated	Exp.
1	Ti-L (1:1)	15.38	15.08	3.20	3.38	4.48	4.59	15.38	15.50
2	Ti-L (1:2)	30.96	30.88	3.22	3.36	9.03	9.15	15.48	15.31
3	Zr-L (1:1)	13.84	13.70	4.04	4.15	4.04	4.20	26.31	26.40
4	Zr-L (1:2)	24.92	24.80	3.64	3.50	7.26	7.13	23.68	23.49

2. The thermal dynamic analysis of obtained complexes has been carried out to determine reaction rates, but also to obtain information regarding the reaction mechanism at the same time with determination of kinetic parameter values.

The equipment used for the study of chemical reaction kinetics in dynamic temperature conditions (multifunctional thermobalance) was Perkin Elmer's Diamond TG/DTA thermogravimetric analyzer (USA).

In the case of studied Zr and Ti complexes, the recorded thermograms are presented in Figures 2-5.

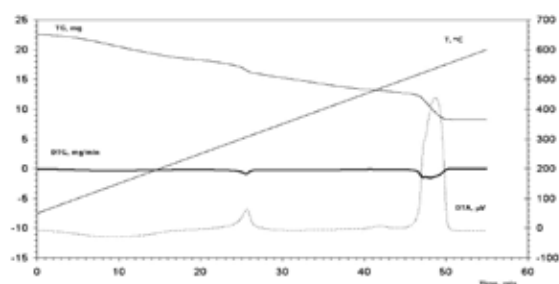


Figure 2. Thermogram of the $[\text{Zr}(\text{C}_4\text{H}_4\text{NO}_3)(\text{OH})_2(\text{H}_2\text{O})_2]\text{Cl}\cdot 2\text{H}_2\text{O}$ complex

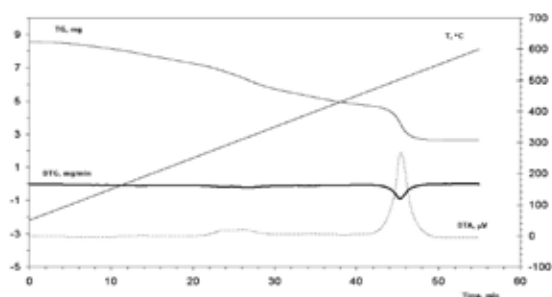


Figure 3. Thermogram of the $[\text{Zr}(\text{C}_4\text{H}_4\text{NO}_3)_2(\text{OH})_2(\text{H}_2\text{O})_2]$ complex

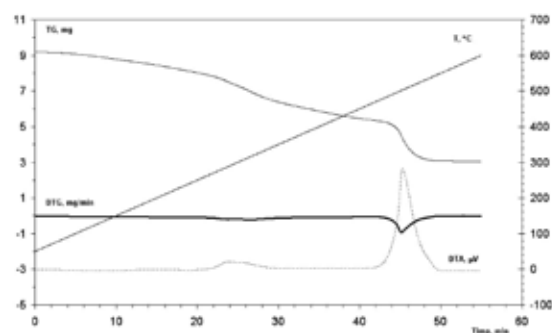


Figure 4. Thermogram of the $[\text{Zr}(\text{C}_4\text{H}_8\text{NO}_2)_2(\text{OH})_2(\text{H}_2\text{O})_2]$ complex

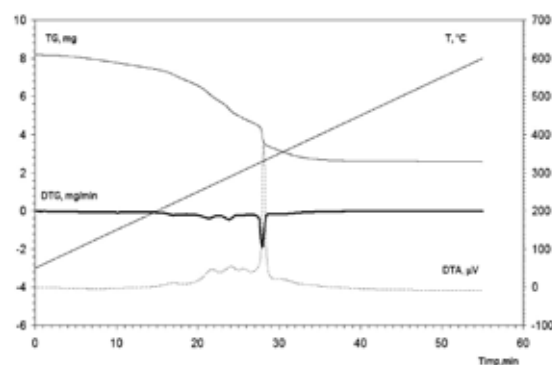


Figure 5. Thermogram of the $[\text{Ti}(\text{C}_4\text{H}_4\text{NO}_3)(\text{OH})_2(\text{H}_2\text{O})_2]$ complex

Of the studied titanium and zirconium complexes, the most thermally stable are complexes $[\text{Zr}(\text{C}_4\text{H}_4\text{NO}_3)(\text{OH})_2(\text{H}_2\text{O})_2]\text{Cl}\cdot 2\text{H}_2\text{O}$, which requires a maximum activation energy of 270 KJ/mol (54.6 Kcal/mol) and $[\text{Ti}(\text{C}_4\text{H}_4\text{NO}_3)(\text{OH})_2(\text{H}_2\text{O})_2]\cdot \text{SO}_4$ which requires an activation energy of 70 Kcal/mol.

3. Infrared absorption spectra of coordination compounds studied and of ligands have been recorded for solid samples in the 200-400 cm^{-1} range by the KBr tablet forming method, using a FT/IR-660 Plus Jasco spectrophotometer – Japan.

In the low frequency area of the IR spectrum (400-1500 cm^{-1}) both bands corresponding

to valence vibrations of simple C-C, C-O, C-N links and bands corresponding to deformation vibrations of various links. It results that in the mentioned area, a large number of bands occur in the IR spectrum. Simple links such as C-C, C-O, C-N that usually occur in most organic molecules, are vibrationally coupled, issuing a multitude of bands, the so-called vibrations of frame of the entire molecule.

Ti and Zr complexes present very intense absorption bands in the ranges of 1130-1080 cm^{-1} and weak bands at 680-610 cm^{-1} due to SO₂ (Figure 6).

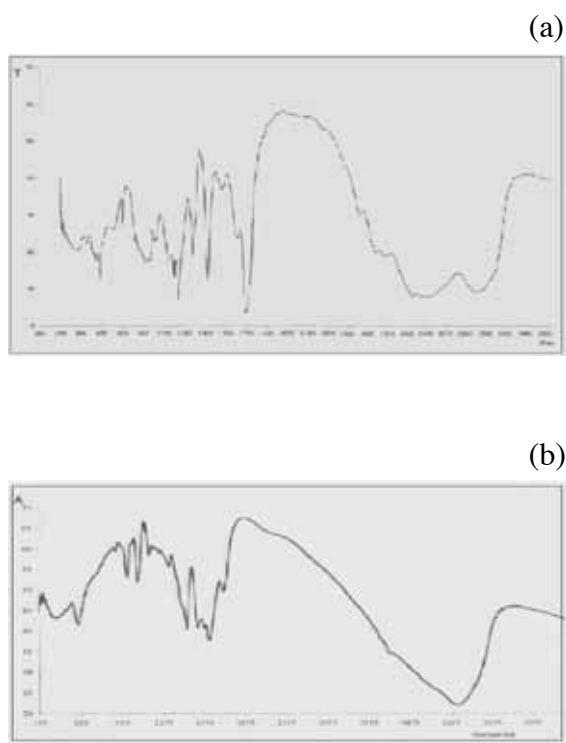


Figure 6. IR absorption spectra of Ti and Zr complexes

(a) Ti-N-hydroxysuccinimide complex (1:1)

(b) Zr-N-hydroxysuccinimide complex (1:1)

4. Characterization of studied compounds, by X-ray diffraction, has been carried out for solid samples on a Bruker D8 ADVANCE diffractometer (Germany), using a nickel filter, Cu anode, radiation Cu-K α ($\lambda=1.54$ Å), anodic tension 36 KV and current of 30 mA. Diffractograms have been recorded in the range of $2\theta=2-60^\circ$, at room temperature.

Indexing diffractograms and experimental data processing have been carried out with the DIFRAC PLUS EVA software according to indications in the literature.

Following the processing of diffractograms it can be concluded that complexes with very high degree of crystallinity have been obtained only in the case of Ti-L (1:1) and Zr-L (1:1) compounds (Figure 7) [1].

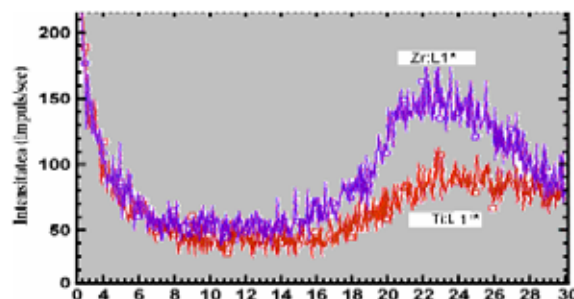
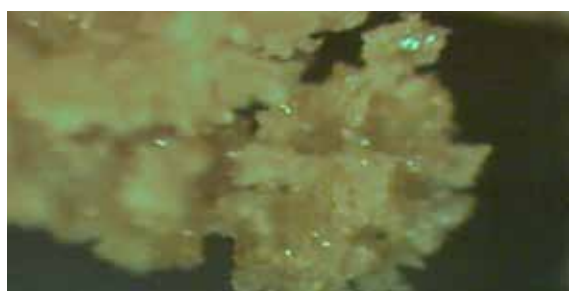


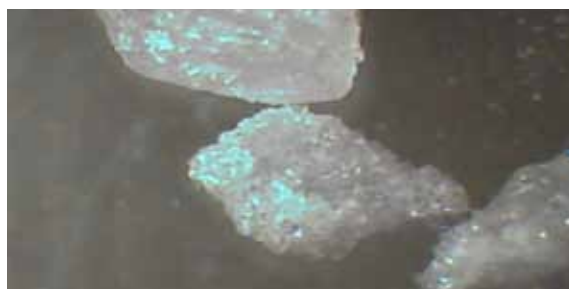
Figure 7.

X-ray diffractograms of Ti-L (1:1) and Zr-L (1:1) complexes

Complexes obtained have a high degree of crystallinity, which has allowed the indexation of X-ray diffractograms and their insertion in the triclinic system. Crystals of complexes are presented in Figure 8 and parameters of crystalline networks in Table 2 [2].



(Zr-L)



(Ti-L)

Figure 8. Crystals of Zr and Ti compounds

Table 2. Parameters of crystalline networks of Ti and Zr complexes

	a(A)	b(A)	c(A)	α	β	γ
Ti-L (1:1)	16.140	22.843	21.941	79°10'	70°20'	125°
Zr-L (1:1)	19.263	26.363	25.881	80°20'	72°30'	130°

The structure of complex combinations presented in this paper has been deduced based on the correlation of experimental data regarding the elemental chemical analysis, IR absorption spectra, X-ray diffraction, thermal analysis and indications in the literature [2-10].

From the elemental chemical analysis results that the combination ratio between the ions: titanium (IV), zirconium (IV), and ligands derived from N-hydroxysuccinimide is 1:1 and 1:2.

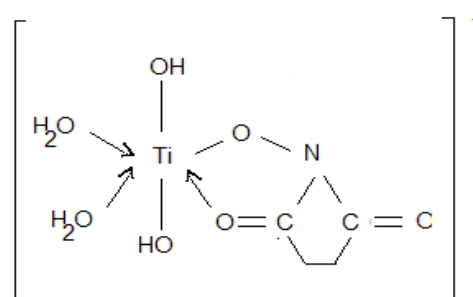
From the chemical analysis in accordance with data regarding IR absorption spectra and processing derivatograms results that most of the studied compounds contain

water molecules in their structure, and some of them contain sulphate anions (Ti-L complexes) or chloride anions (Zr-L complexes) in the outer area of complexed ions.

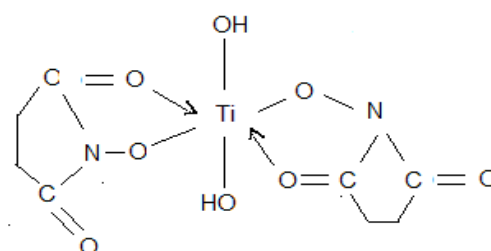
From IR absorption spectra results that each anion derived from the HL ligand (N-hydroxysuccinimide) manifests as bidental. In this case, the links with the central atom are made by replacing the hydrogen atom from the H-O-N group and coordination with the atom from the C=O group.

In all Ti(IV) and Zr(IV) complexes, the central atoms are linked to two OH groups, namely HO-Ti⁴⁺-OH and HO-Zr⁴⁺-OH.

Ti(IV) is hexacoordinated in all compounds studied in this paper, confirmed by experimental results regarding chemical composition, IR absorption spectra and thermal stability.



Ti-L (1:1)



Ti-L (1:2)

Figure 9. Structure of Ti-N-hydroxysuccinimide complexes

Structural formulae for Ti-L (1:1), Ti-L (1:2) complexes, in which hexacoordination of Ti(IV) is noticed, are presented below [1].

In the case of Zr(IV) complexes, their structure is much more difficult to deduce. In the literature there are many indications that justify the preference of Zr(IV) of octacoordinating in dodecahedral structures [11-13].

Starting from experimental data obtained and from indications in the literature, the structure of coordination compounds of octacoordinated zirconium is suggested as being the following [1]:

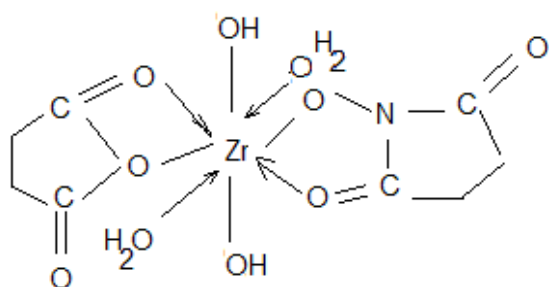
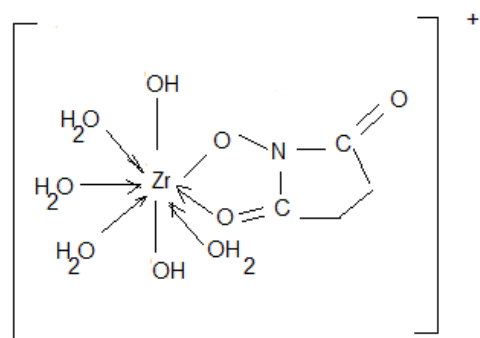


Figure 10.
Structure of Zr-N-hydroxysuccinimide complexes

Conclusions

The paper presents research concerning achievement of new complexes of Ti(IV) and Zr(IV) with N-hydroxysuccinimide as ligand.

The results obtained show that ions of metals Ti(IV) and Zr(IV) together with N-hydroxysuccinimide ligand form two complexes in the combination ratio central atom :ligand is 1:1 and 1:2.

The structure of these complex combinations has been determined: in all Ti(IV) and Zr(IV) complexes, the central atoms are linked to two OH groups, namely $\text{HO} - \text{Ti}^{4+} - \text{OH}$ and $\text{HO} - \text{Zr}^{4+} - \text{OH}$.

Ti(IV) forms complexes by hexacoordination and complexes of Zr(IV) exhibit dodecahedral structure.

Acknowledgements

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References

1. Crudu, M. (2008), "Study Regarding the Use of Inorganic Compounds in Natural Leather Processing in View of Preventing Environmental Pollution", PhD Thesis, "Gh. Asachi" University, Iasi.
2. Berdan, I. (1992), Structure and Reactivity of Inorganic Substances, "A.I.I.Cuza" University Publishing House, Iași.
3. Marcu, G. (1984), Chemistry of Coordinative Compounds (in Romanian), Romanian Academy Publishing House, Bucharest.



4. Marcu, G. (1993), Modern Chemistry of Metallic Elements (in Romanian), Technical Publishing House, Bucharest.
5. Pui, A., Cozma, G. (2001), Foundations of Coordinative Compounds Chemistry (in Romanian), Matrix Romania Publishing House, Bucharest.
6. Berdan, I. (2006), Reactivity and Reaction Mechanisms in Inorganic Chemistry (in Romanian), "Al.I.Cuza" University Publishing House, Iași.
7. Berck, M., Nagypel, I., (1989), Chemistry of Complex Equilibria, Aked Kiado, Budapest.
8. Iordan, A.R., Palamaru, M., Cecal, A. (1995), Introduction in Coordinative Compound Chemistry (in Romanian), "Al.I.Cuza" University Publishing House, Iași.
9. Sutiman, D. (2008), Foundations of inorganic chemistry (in Romanian), Ecozone Publishing House, Iași.
10. Tătaru, V. (1999), "Study on Systems with Metallic Cations and Ligands with Carbonylic and Carboxylic Functions" (in Romanian), PhD Thesis, "Al.I.Cuza" University, Iași.
11. Oprea, L. (2005), "Coordinative Compounds of Cations of Metals in the 3d Series" (in Romanian), PhD Thesis, "Al.I.Cuza" University, Iași.
12. Flondor, M. (2007), "Coordinative Compounds of Cations of Transitional Metals" (in Romanian), PhD Thesis, "Al.I.Cuza" University, Iași.
13. Ferbințescu, M., Cimpoeșu, F. (2003), "Coordinative Compounds with Special Properties" (in Romanian), Bucharest University Publishing House.



TREATMENT PROCEDURE FOR TANNERIES SLUDGE

Gabriel Zainescu ¹, Floarea Nicolae ², Mihaela Costache ², Eugen Albu ³
Lucia Sandru ⁴, Rodica Constantinescu ¹, Voicu Petre ⁵

¹ National R&D Institute for Textile and Leather of Bucharest

² Bioterra University of Bucharest

³ Pielorex S.A of Bucharest

⁴ Research Institute of Plants Protection Bucharest

⁵ National Research and Development Institute for Pedology,
Agrochemistry and Environmental Protection of Bucharest

Abstract: The paper refers to biochemical treatment and enrichment of sludge from tannery wastewater treatment for use in agriculture as fertilizer to grow crop plants and enhancer for conditioning or remediation of degraded soils. Sludge resulted from treatment of wastewater from leather processing contains: organic and inorganic substances and elements such as nitrogen, calcium, sulphur, iron, sodium, etc. In order for the sludge resulted from purification of wastewaters from tanneries to be used as fertilizer in agriculture, it must not contain trivalent chromium. Therefore, this paper presents a procedure of purifying residual floats in the leather tanning phase. Thus, the content of trivalent chromium ions is reduced from 4.5-7g/l to 0.01-0.2 g/l solution from leather tanning. In the final sludge from tannery wastewater purification, the content of trivalent chromium is very much diluted, reaching values below the limit imposed by national and international standards. The development of a technological scheme for obtaining sludge to be used in agriculture is based on the following processes: sludge neutralization and dehydration; sterilization; biochemical treatment and sludge enrichment from treatment with elements necessary for plant growth and bioremediation of soil.

Key words: sludge, wastewaters, tannery, polymers, soil.

Introduction

The project presents the application of innovative technologies of capitalizing sludge resulting from purification of wastewaters from tanneries in agriculture – as biofertilizer for plants and soil conditioning agent for degraded or contaminated soils, with the main objective of obtaining complex products – from sludge resulting from purifying wastewaters from tanneries. The leather industry discharges from tanneries polluted industrial waters difficult to treat. Currently, in our country, depollution technologies in tanneries are based on the

classic chemical procedure of treating with high consumption of reagents, resulting large quantities of sludge. This sludge cannot be used in agriculture as fertilizer due to its trivalent chromium content. This paper presents a method of purifying wastewaters from tanneries, the trivalent chromium obtained from purified solutions being recycled in the leather industry and as additive to mortar in constructions.

The sludge resulting from purifying wastewaters from leather processing contains: organic, inorganic substances and elements such as: nitrogen, calcium, sulphur, sodium etc.

Materials and methods

Elaborating the technological diagram of obtaining sludge which can be used in agriculture is based on the following processes:

- sludge neutralization;
- dehydration and sterilization;
- biochemical treatment and enhancement of sludge from purification with elements necessary to plant growth and bioremediation of soil.

Neutralization is accomplished by means of a neutralizing agent. Calcium hydroxide is particularly advantageous, available as whitewash or it can be obtained by dilution of lime in water. For dehydration – water removal from tannery sludge – it is necessary to add substances that increase the sedimentation rate of flakes. In this sense, a precipitant is used – polyelectrolyte based on high molecular weight polyacrylamide. Polyelectrolytes contain groups that are reactive in aqueous solution and have a strong affinity for the surface of colloids in suspension or toward very fine particles in the aqueous suspension or sludge. Polyelectrolytes compounds act according to their ionic structure, to the interactions between them and solid particles, interactions based on the formation of hydrogen bonds (as in non-ionic polymers) or electrostatic interactions, causing a destabilization on the particle surface (as in anionic– negative charge, or cationic – positive charge). Destabilization and coagulation of a very large number of single particles lead to the formation of large flakes, which are easily separable from the suspension. Praestol organic polymer produced by Stokhausen Germany is a high molecular weight synthetic flake.

Figure 1.
Industrial installation (12-14m³) of residual float exhaustion from leather tanning



Biochemical treatment consists in processing sludge with a set of enzymes, co-enzymes and natural enhancers with “starter” liquids, which modify the toxic reactions of sludge with a corresponding elimination of emissions of hydrogen sulphide, mercaptans, ammonia odours and other specific odours. The technological process utilized a commercial product made in Switzerland. This product contains 2 types of bacterial cultures: *Aspergillus Orizae* and *Bacillus Thuringensis*. Bacterial cultures produced by “selected spontaneous culture” are not pathogenic, salmonella-free and harmless to humans, animals or fish. This product contains: lipase 30.000 MWV; amylase 1.200 units/g, cellulase 900 units/g and protease 10.000 units/g.

In order to enrich using the elements necessary for plant growth and soil bioremediation, it was used with very good results (potassium phosphate). This contributes both to pH adjustment and to improving the nutritional properties through the addition of phosphorus and potassium needed for plant growth and development. Determinations were made both in terms of physical condition (structural hydrostability, state of compactness, aeration, permeability) and chemical condition (reaction, main macronutrient content and heavy metal concentration) of soil materials in which large amounts of tannery sludge have been incorporated, and in terms of quantitative and qualitative assessment of crops produced, performed at the end of the growing season. Plant requirements in terms of nutrient elements vary greatly, causing different reactions to the application of biofertilizers. Plants selected for checking the influence of treated sludge (NTZ) on energy and germination are: sunflower, mustard, red beet, corn, wheat, barley and peas.

Figure 2.
Influence of NTZ on plant germination (1, 2 – treated samples and 3 – untreated sample)





Results and discussions

By applying organic polymer biofertilizers (NTZ in a dose of 25 g/kg and 10 g/kg), the aim is to stimulate metabolic processes both during germination and after seed germination.

Complex, physical and chemical protection treatments of seeds, for the purpose of adjustment of water penetration into the seeds, of correlating this process with the temperature and prevention of "incubation" and of stimulating the processes of germination and seedling growth may be of practical interest in that they allow early seeding, rapid germination of seeds when the necessary physical conditions are met in the soil, mass spring, deep rooting and vigorous plant development, which better exploit vegetation factors and conditions.

Sunflower seeds, beet, corn, wheat, barley and peas showed a very good germination in a dose of 10 g/kg soil, higher than in the dose of 25 g/kg soil, but NTZ had a positive influence on seed germination in both doses, compared with the untreated variant.

Mustard seedlings have a very good germination in the version where NTZ biofertilizer was applied in a dose of 25 g/kg soil, but in the dose of 10g/kg soil also, mustard seed germination was higher compared with untreated seed germination.

On sandy soils, light and warm, biofertilizers are incorporated deeper into the soil (15 to 18 cm depth), where moisture is sufficient for their complete mineralization, having the role of cementing soil particles.

On clayish soils, heavy and cold, and on the loamy and tight ones, fertilization by incorporation at the surface is indicated (5 to 10 cm) having the role of heating and loosening the soil, increasing microbiological activity and restoring soil structure.

On podzols, soils with low fertility, poor in humus and organic matter, the application of biofertilizers is the main source of increasing fertility.

The crops obtained from the land where biofertilizer was applied are organic, the food chain is ecologic, and there is maximum productivity.

Conclusions

The process contributes to both remediating poor and degraded soils in agriculture, and to reduction of environmental pollution by capitalizing sludge which is currently dumped in landfills.

In addition to the favorable ecologic impact, the innovative technologies elaborated will have an impact on the rationalization of water, energy and raw material resource consumption, contributing to setting premises for application of the system of environment management.

Sunflower, beetroot, corn, wheat and pea seeds have presented very good germination in a dose of 10 g/kg soil, better than in a dose of 25g/kg soil, but in both doses, NTZ had a positive influence on germination of seeds as compared to the untreated variant.

Under experimental conditions, it can be said that incorporating large quantities of tannery sludge into the soil has had direct benefic effects on water permeability and the values of saturated hydraulic conductivity have been very high.

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References

1. Aloy, M., Folachier, A. (1993), Vullierment B. Tannerie et pollution Centre Technique du Cuir, Lyon.
2. Zainescu, G. et al. (2005), "Using Sludges from Tannery Wastewaters Decontamination", 15th Annual West Coast Conference on Soils, Sediments, and Water, San Diego, USA.
3. Zainescu, G. et al. (2008), "Sludge Management of the Tanneries Wastewaters", The 2nd International Conference on Advanced Materials and Systems ICAMS 2008, 414, Bucharest, Romania.
4. Zainescu, G. et al. (2008), "The Recovery and Reutilization of the Sludge from the Tanneries Wastewaters" ECSM'08 European Conference on Sludge Management, Liege Belgium.
5. Zainescu, G. et al. (2009), "Remediation of Soils Using Sludge from Tannery Wastewaters", The 19th National Conference for Soil Science, Iasi, Romania.
6. Zainescu, G. et al. (2009), "Process of Treatment and Enhancing Sludge from Tanneries", Patent Application A00991/2009.



BIOPOLYMERS SYSTEMS FROM LEATHER WASTES FOR AGRICULTURE

Gabriel Zainescu ¹, Mihaela Costache ², Floarea Nicolae ², Voicu Petre ³,
Rodica Constantinescu ¹, Lucia Sandru ⁴, Olga Vizitiu ³, Emil Barna ⁵

¹ National R&D Institute for Textile and Leather of Bucharest

² Bioterra University of Bucharest

³ National R&D Institute for Pedology, Agrochemistry and Environmental Protection of Bucharest

⁴ Research Institute of Plants Protection of Bucharest

⁵ University of Bucharest

Abstract: A large number of tanneries are facing serious problems regarding waste disposal, the more so as their storage in landfills leads to negative effects on the ecosystem. Organic biopolymers are a source of raw material for agriculture, whereas the composition of protean wastes provides sufficient elements to improve the composition and remediation of degraded soils and plants can exploit some elements, such as nitrogen, calcium, magnesium, sodium, potassium etc. As a result of the existing large quantities of organic waste, it is known from technological practice that from processing one tonne of raw hide, 75% is discarded, of which 50% can be used as organic fertilizer. Protean biopolymers were obtained by means of an innovative enzymatic procedure of processing protean waste, which in combination with other polymers (polyacrylamide, acrylic, maleic, cellulose, starch, etc.) will be used in agriculture. This scientific paper presents the characterization of protean biopolymers by methods specific for morpho-structural analysis (UV-VIS, IR spectroscopy, thermal analyses, X-ray diffraction, microscopy, etc.). The novelty of this work is this process of biochemical combination of synthetic polymers with organic biopolymers from tanneries with applications in agriculture.

Key words: biopolymer, protean wastes, tannery, soil, structural analysis.

Introduction

Recent studies carried on in Central and Eastern Europe showed that in these countries, the main degradation processes induced by human activity consist in reduced soil fertility, crust-formation, water and wind erosion, landslides and chemical pollution. Many industries, including leather industry, are faced with high expenditure for solid organic waste treatment and disposal. Therefore, the tannery protein wastes are required to be subjected to biochemical treatments with the view of recycling in the agriculture.

The use of untanned wastes presents a special interest, because it provides almost total fleshing waste discharge while obtaining qualitatively and economically valuable products.

The main target of this scientific paper is investigating the development possibilities for various multicomponent systems of biodegradable polymers and studying the effects of these complex products on the structure and chemical and physical characteristics of degraded or contaminated soils (having a poor level of organic matter or submitted to a strong erosion process).



Materials and methods

Protean biopolymers were obtained by means of an innovative enzymatic procedure of processing protean waste, which in combination with other polymers (polyacrylamide, acrylic, maleic, cellulose, starch, etc.) will be used in agriculture.

The novelty is based first of all on the fact that the promoted technologies have as a starting point obtaining of new complex products by processing tannery organic wastes which can be applied in agriculture. Complex characteristics of proteic wastes from the leather industry are approached by accurately determining waste hide chemical composition and various possibilities of recovery and recycling using biotechnologies.

Using untanned wastes from tanneries is of particular interest because it offers the opportunity to eliminate nearly all wastes from fleshing, while obtaining qualitatively and economically valuable products.

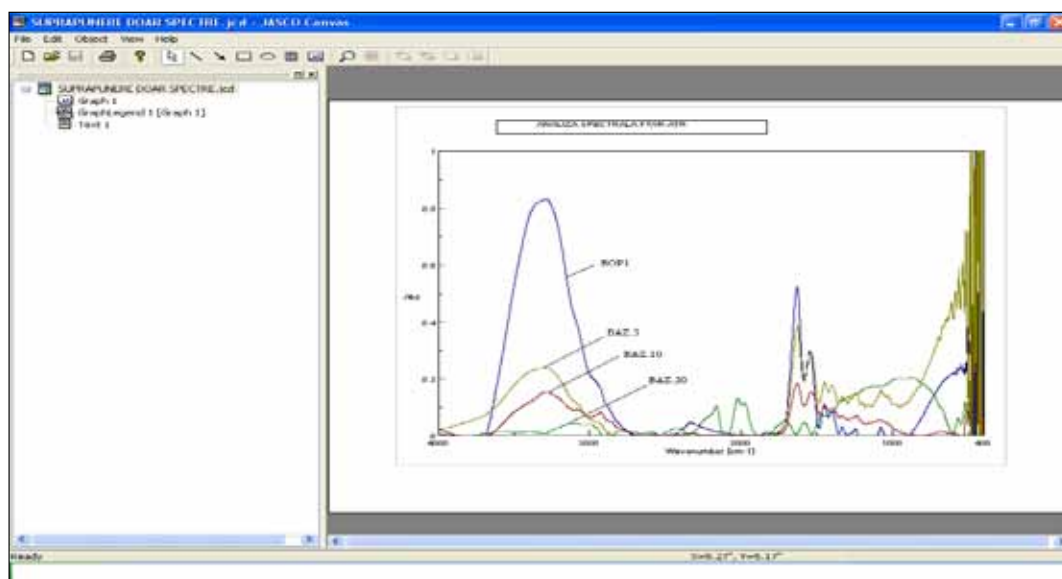
Soil conditioning consists of improving the physical properties by using substances with varied origins, known in literature as “soil conditioners”.

Soil contamination represents a moderate increase in the concentration of certain substances which are not harmful for plant growth and development, but which can represent the initial phase of the pollution process.

Decreasing the effects of soil weathering/contamination/ pollution involves the use of certain methods which contribute to a decrease in the intensity of the negative effects of the degradation of soil fertility and of the effects of contamination or pollution. The process of biochemical combination of synthetic polymers with organic biopolymers from tanneries has innovative applications in pedology. Gelatin hide wastes were obtained from SC Pielorex Jilava, Ilfov county tannery. In this study, wastes from bovine hide shavings and trimmings are treated by chemical and enzymatic process.

Figure 1.

FT/IR-ATR spectra of biopolymer samples (BOP1- hydrolyzed leather waste, BAZ- protean biopolymers 5, 10, 50% synthetic polymer)



Results and discussions

ICPI together with the National Research & Development Institute for Pedology, Agrochemistry and Environment Protection Bucharest and the R&D Institute for Plant Culture and Protection Bucharest have tested protean biopolymer systems on degraded soils and for greenhouse and field plant growth.

Figure 2. Images of biopolymers obtained by optical microscopy



In general terms, polyelectrolytes and other polymer classes, contribute to the improvement of soil properties, through one or more of the following effects:

- an increase in the aggregation of soil structural elements in weathered soils;
- prevention of crust formation in the period between sowing and spring, especially for plants with small seeds, which are very vulnerable;
- an increase in resistance to water and wind erosion of soils located on slopes and coarse grained soils (less than 12% clay).

Micromorphology analyses were conducted on a glazed, loamy-clayish chernozem,

on leossoide deposits in the north area of Bucharest, on which the protean biopolymers (BAZ. 50) was applied.

The micromorphology analysis on thin sections of the way of distribution in the soil of bioenhancer (BAZ.50) and its relationship with different components of soil was made possible using a new technique to mark the conditioner with three types of dyes (hematoxylin, fluorescein isothiocyanate).

The bioenhancer (BAZ.50) was experimented on a culture of peas (annual vegetable), to improve the land through soil enrichment with biologically fixed nitrogen and to allow early release of land. The land was then prepared for sowing barley. Beside the

Figure 3.

- a) Phenophase of pea culture (Diana type 2010) when nodosities were counted;
b) Branching barley plants in treated variants (1, 2, 3) compared to untreated variant (4)





nutrients in the soil, it has been shown that peas need nitrogenous fertilizers, especially in the first stage of development.

Subsequently, it grows at the expense of the fixed nitrogen in the air by bacteria that form nodosities on the roots. The most suitable soil reaction for growing peas is neutral or slightly alkaline, which requires that the soil for pea culture be moderately amended with limestone, but not directly, only predecessor plants. In the blooming phenophase, the nodosities on the roots of peas were counted from the treatment before sowing with bioenhancer (BAZ.50) (0.5 kg/m²).

Treatment of soil with bioenhancer (0.25-0.5 kg/m²) "very significantly" influenced the number of nodules developed on plant roots. Roots and organic remainders accumulated in the soil by the peas are an important source of nutrients and energy for soil microorganisms and their decomposition results in a significant amount of elements, especially nitrogen, necessary for nutrition of superior plants.

The scientific paper contributes both to recovery of poor and degraded soils in agriculture and to reduction of environmental pollution by exploiting sludge which is currently disposed of in landfills.

Conclusions

Biopolymers have been obtained by an innovative enzymatic procedure of processing protean waste resulted from leather processing, which in combination with other polymers (polyacrylamide, acrylic polymer, maleic polymer, cellulose, starch, etc.) can be used for remediation of degraded/eroded soils and growth of greenhouse and field plants.

All instrumental analyses (UV-VIS, IR spectroscopy, thermal analyses, X-ray

diffraction, microscopy, etc.) have highlighted both reticulations between the protean polymer and the synthetic one, and the order of the polymer structure, which is due to the enzymatic hydrolysis process.

Acknowledgements

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References

1. Rangel Serrano, A., Maldonado, V.M., Kösters, K. (2003), "Characterization of Waste Materials in Tanneries for Better Ecological Uses", Journal of the American Leather Chemists Association, 98, 43-484.
2. Bajza, Z., Vrucek, V. (2001), "Thermal and Enzymatic Recovering of Proteins from Untanned Leather Waste", Waste Management, 21(1), 79-84.
3. Xianlai, Z. et al. (2007), "Dynamics of Leachate from Municipal Solid Waste Composting", Journal of Agro-Environment Science, (3).
4. Xianlai, Z. et al. (2007), "Leachate Recycling during Municipal Solid Waste Aerobic Composting Process", Journal of Northwest A & F University (Natural Science Edition).
5. Zainescu, G. et al. (2009), "Exploratory Research Regarding the Use of Organic Biopolymers from Tanneries in Agriculture (part I)", Leather and Footwear Journal, 9(4), 159-168.



6. Zainescu, G. et al. (2010), "Exploratory Research Regarding the Use of Organic Biopolymers from Tanneries in Agriculture (part II)", *Leather and Footwear Journal*, 10(1).
7. Zainescu, G. et al., (2009), "Systems of Biodegradable Polymers for the Remediation of Degraded Soils", *The International Conference of ESSC Protection of the Ecological and Productivity Functions of Soil in a PAN European Context – Pruhonice (Prague), Czech Republic, June 2009*.
8. Zainescu, G. et al. (2009), "Microbiologic Procedure of Degrading Leather Wastes", Patent no.122458.



ENTROPY A WAY OF MEASURING THE BIOLOGICAL VALUE OF FOOD

Ioana-Claudia Mencinicopschi ¹, Nicole Livia Atudosiei ², Gheorghe Mencinicopschi ³

¹ University of Agricultural Sciences and Veterinary Medicine Bucharest

² Bioterra University of Bucharest

³ Institute of Food Research Bucharest

Abstract: Elements of both the quantum and the over-atomic Universe form an aliment, thus making it subject to their laws, and transforming it into an information-bearer which generates high or low entropy depending on its quality. The information within food is, in fact, the most profound and important characteristic regarding its quality, as it determines the nutritional effect and the biological value of that certain food. Therefore, this study aims to change our perception considering aliments and their importance in our lives.

Key words: entropy, Value-Entropy Theory (TVE), food's informational matrix, food's intrinsic and extrinsic quality, food's nutritional profile.

Introduction

Each year, the on-growing number of obese persons or of those who suffer from diabetes, cardio-vascular affections and their complications, clearly signal the fact that whilst food and diet may be one of the human being's most important ways – as a live system – of conserving their homeostasis, equilibrium or health and also their main way of “connecting” to their environment (nature); our present society's values and the system we live in, usually don't take into consideration all these aspects of our aliments.

Unfortunately, food is generally looked upon from a superficial point of view, this being the reason for which its true value isn't fully acknowledged. Obviously, this attitude has had clear influences on our eating habits and even our health status. But, before going any further, it is important that we fully understand what the word “food” really stands for.

So, we are going to present some of the meanings of this word in the following definitions:

In the Romanian Language's Explanatory Dictionary (2nd ed., 1998) food is: “a product, in either natural or processed state, which can be eaten”.

The Codex Alimentarius Commission's procedural manual defines food as being: “Any substance, whether processed, semi-processed or raw, which is intended for human consumption, and includes drink, chewing gum and any substance which has been used in the manufacture, preparation or treatment of “food” but does not include cosmetics or tobacco or substances used only as drugs.”

According to the Regulation (EC) No 178/2002 of The European Parliament and of The Council food/foodstuff is: “Any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans.



‘Food’ includes drink, chewing gum and any substance, including water, intentionally incorporated into the food during its manufacture, preparation or treatment.”

Last, but not least, Tremolieres’ definition of food states that aliments are goods containing nutrients (thus being nourishing), capable of satisfying our appetite (thus being appetizing) and considered fit to be eaten by a given community (thus being traditional).

Materials and methods

Taking a closer look at these definitions, we can easily observe the fact that most of them are focused solely on the destination of food (human consumption), leaving aside the quality of aliments and their role as information, energy and substance bearers (containing macro, micro and non-nutrients). Moreover, only one of the definitions takes into consideration the cultural and traditional aspects of our food products (Tremolieres). To put it differently, when we think about food, we tend to overlook the fact that it is also a product of our society, our culture and our religion (biological and cultural aliments). So, while it may be rather unacceptable for a good Muslim to eat pork, a Romanian person could find it difficult not to taste the traditional sărmăluțe (which normally include pork amongst their ingredients) on special occasions such as Christmas holidays.

As a consequence, we find the definition given by the authors of the book: “Food safety – Authenticity and Traceability”, to be better fitted and balanced in describing all our food’s qualities and characteristics. So, according to their studies: “Aliments are usually natural and complex matters (food matrices) which our organisms need in order to satisfy the substance, energy

and information inputs that are required for sustaining life. Furthermore, aliments satisfy personal needs (hunger, thirst, taste, etc), are in accordance with certain beliefs and traditions, and on top of all these, food should also be seen as possessing a certain symbolism”.

Results and discussions

» The Entropy, Information and Biological Value of Food

This having been said, it is easier to proceed with our study and analyze the idea of “food quality” taking into consideration the information within the food matrix (concept which has been developed by Univ. Prof. PhD. Gheorghe Mencinicopschi) and the Value-Entropy Theory – TVE (forwarded by Univ. Prof. PhD. Paul Bran). According to the physics’ law of entropy, live systems (which are neg-entropic), need low entropy inputs in order to sustain a proper functioning and a higher level of organization, better said, in order to follow their characteristic anti-entropic evolution.

If we were to talk about man’s eating habits, then the human beings are the live systems, and the entropy inputs are represented mostly by the food eaten by them. This is justified by the fact that aliments (including water) are an answer to one of our most fundamental necessities, thus every man is inclined to chose them before any other category of goods or services (all these being entropy vectors).

Still, a grave error – derived from the underestimating of food’s quality – is made when people take for granted the fact that all food products carry low entropy (meaning that they have a nutritional/biological value) which is good for our health. The reason, for

which we are mistaken, is generally due to our superficial approach as far as our eating habits are concerned. In other words, we are used to choose our food just by judging its extrinsic quality, without taking into consideration its intrinsic values (Fig. 1).



Fig. 1 – Food quality pyramid

Before proceeding, it is important that we settle what we mean when using the terms: “intrinsic” and “extrinsic” quality of an aliment. The extrinsic value of food refers to its qualities which can be perceived with the help of our senses and which are then analyzed by our brain. More precisely, we are talking about the: taste, aroma, colour, palatability, touch sensation and the “feeling of fullness” which are given to us by the food we are eating (Fig. 2).

Taste is responsible for our differentiating between the: bitter, sweet, sour, salty, fat or umami (typical for meat products) sensations. It also induces the whole chemical digestive reaction in our bodies. This is an essential process for our psychological, intestinal and for our stomach’s functions; we also shouldn’t forget the secretion of hormones

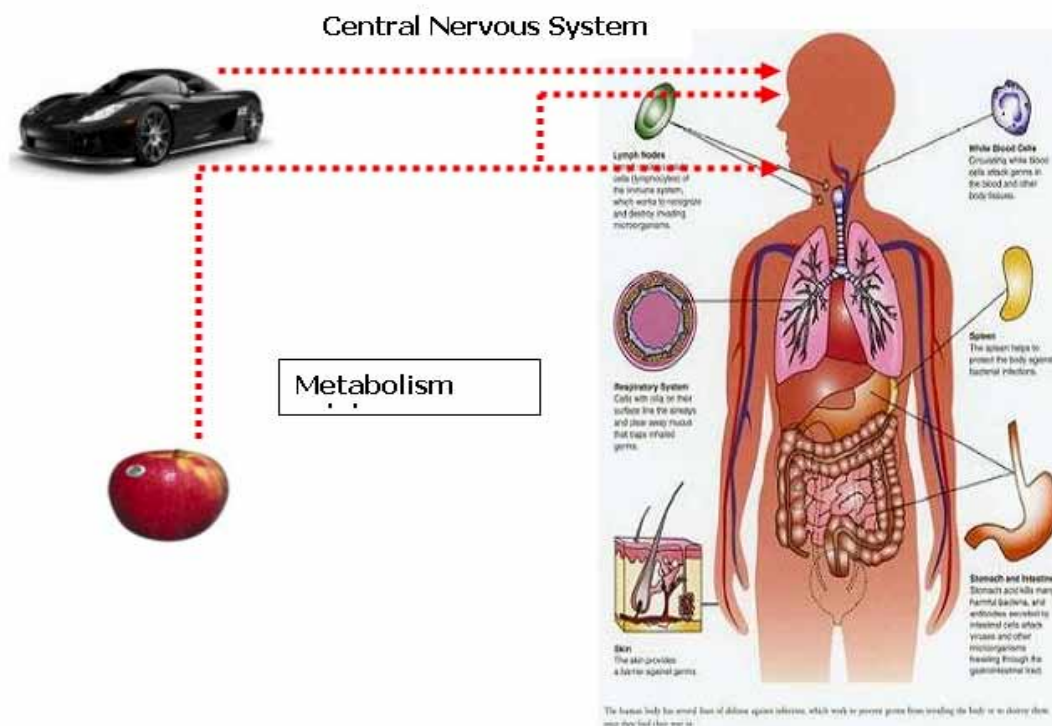


Fig. 2 – Information’s Metabolism



and the absorption of nutrients. Finally, taste can also induce vomiting as an anti-toxic reflex.

Nevertheless, even if taste together with all the other components of the extrinsic quality, are very important when deciding whether to buy or consume a certain aliment, they are NOT and should NOT be the only values to be taken into consideration when doing so! The reason for this statement is the fact that nowadays aliments have become more and more sophisticated (processed) and, thus, more “deceiving” for our basic senses. In other words, our senses have become insufficient in determining the low entropy which our body needs.

This brings us to the intrinsic quality which is also called the biological or nutritional quality of food, and which also includes inoquity (food’s quality of being free of contaminants). These values cannot be analyzed with the help of our senses, though they can be determined by conducting laboratory analysis and can be measured by using nutritional indices.

It should be well noted that an exceptional extrinsic quality does not imply the existence of a similar nutritional quality in a given aliment. Food that may have a great taste and which looks extraordinary does not necessarily possess a high biological value! This is exactly why terms like the “nutritional profile” of food have been created. This is an instrument which helps determine the importance of an aliment for our body. In the E.U., the nutritional profile is mentioned in the CEE Regulation no. 1924/2006, and it indirectly makes reference to the informational matrix’s quality (food’s capacity of generating/supplying low entropy).

The nutritional profile of an aliment can be determined using indices such as: the Nutritional Density Index, the Caloric and

Energy Density, the Glycemic Index (GI) and the Glycemic Load (GL), the Anti-oxidant Value, the Atherogenic Index, the Biochemical Profile or the Bio-availability of that certain food.

As a consequence, a very high intrinsic (nutritional/biological) quality which is verified by the nutritional profile of a certain food, guarantees the aliment’s contribution to our organism’s wellbeing through the input of high quality information (low entropy). As a fact, the integral (unprocessed) natural foods (biological foods) are considered to be a value etalon for the biological quality of all aliments.

Returning to the idea of the entropic input that we get from food, it can be considered that an aliment with an unbalanced nutritional profile (e.g. fast-food products, highly processed and additivated aliments, genetically modified organisms) is a vector for the so-called “high entropy wastes” – term used in TVE. These high entropy vectors destabilize the human organism instead of nourishing it.

If we were to think of food as having an informational matrix, than an aliment which is natural or as close as possible to its natural state, carries an organised informational matrix, which has a harmonious arrangement (it generates low entropy). On the other hand, a profoundly modified food, which has been stripped of all its nutritive values through processing, will carry a chaotic matrix which cannot be recognised by our organisms and which may generate errors on all levels (informational, energetic, material/substantial) and in the morphogenetic field. These errors/destabilisations are very dangerous as they can manifest themselves at later times and without clear, distinctive symptoms as those which appear when suffering from food poisoning, an affection in which the person immediately realises the



poor quality of the food he or she has eaten. A possible explanation for this phenomenon is that the altered informational matrix of a highly processed aliment implies the existence of high entropy residues. The problem is that the human organism in which these residues are introduced, as opposed to other systems, aren't always capable of eliminating these unrecognizable pieces of information, thus being forced to accumulate or even assimilate them in their own structure, but in an erroneous, unnatural manner which leads to the problems mentioned earlier, and even to sickness.

Conclusions

Having said all this, we can see that a superficial way of regarding food, which is not based on its true value, but rather on the accessibility of the price, on ignorance or on the addiction that it creates, are main causes for the decline in our health status. This is why we must reconsider the way in which we perceive our eating habits and their effects, and orientate ourselves towards a more holistic view, as that of TVE or of the informational matrix concept.

If we should fail in doing so, by having irrational eating habits, the negative consequences are going to be felt not only in our health status, but also in the wellbeing of our future generations, of our environment (e.g. the production of GMOs or aliments with a significant impact on the environment due to the high level of processing) and in the preservation of our traditions and cultural values (e.g. novel-foods, the changing of traditional aliments with those imported from other cultures or with those considered to be "trendy").

So, in a nutshell, we should remember the following:

- Food is a major epigenetic factor and has an important integration role.
- The beings – anti-entropic accumulations – are entities which process the information carried by food that is an environmental epigenetic factor important in the maintenance of the system's functionality and in its integration process in superior structures.
- As a result, one of the essential characteristics of food is the quality of the information it supplies the consumer's living system with.
- What's more, because the diet is more important than each aliment on its own, we can conclude that its informational network has the deepest biological significance for the individual's and for its specie's wellbeing.

References

- Bran, P. (2001) – "Economia valorii", ed. ASE, Bucharest
- Mencinicopschi, Gh. (2010) – "Și noi ce mai mâncăm?", vol. I, Coreus Publishing, pp. 10-33, Snagov
- Mencinicopschi, Gh. & Mencinicopschi I.C. (2009) – "Informația Matricei Alimentare – Factor Epigenetic", PEEC International Conference, "Calitatea Acces la Succes" magazine, pp. 32-35
- Mencinicopschi, Gh. & Raba, D. (2005) – "Siguranța alimentară, autenticitate și trasabilitate", ed. Mirton, pp. 275, Bucharest
- Leonte, M. & Florea, T. (1998) – "Chimia alimentelor", ed. Pax Aura Mundi, pp. 360, Galați
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:031:0001:0024:EN:PDF>
ftp://ftp.fao.org/codex/Publications/ProcManuals/Manual_19e.pdf



PRODUCTION AND ENVIRONMENTAL ASPECTS OF ORGANIC PIG LIVESTOCK

Pistoia A., Mani D., Balestri G., Poli P., Casarosa L., Bondi G., Ferruzzi G.

University of Pisa

Abstract: *After about 20 years from EC Reg 1804/99 consumers increased their interest in the organic livestock production. The safety of food associated with the organoleptic characteristics of products and for the greater farmers sensitivity towards natural environment, caused this interest.*

Organic pig livestock, compared with the others, has had difficult to spread for excessive increases of production costs due to Community legislation.

According to the latest official census, organic pigs in the EU in 2008 were about 600.000 units, just 0.64% of the pigs reared in conventional breed and they are distributed mainly in the Nordic countries.

The yield of organic pig livestock depends on several factors like race and rearing technique ("en plain air" or grazing). In this work we report production parameters results about 12 castrated LW male pigs reared on organic pasture. These results were compared with those obtained in conventional breed using the same race. During the trial were also studied some aspects of environmental impact caused by grazing pig.

Results show that organic grazing pigs have lowest growing (entire productive cycle: 0.420 vs 0.700 kg/head/d) and worst food conversion ratios (entire productive cycle: 4.80 vs 3.40 kg DM/WG) compared to pigs reared in intensive system. For this reason organic grazing pig, chosen for the production of sausages, must be slaughtered at weights not exceeding 140kg.

Grazing pig must be made by rational criteria because these animals cause considerable damages to herbaceous and shrub vegetation, but especially to the soil that affected important degradation even respecting the animal density provided by biological regulation.

Key words: *organic breeding, swine, environmental impact, productive performances*

***I*ntroduction**

European Community standards for organic livestock (Reg. CEE 2092/1991) and livestock products (Council Regulation EC 1804/1999), came into force 20 years ago, had a good spread in Europe.

The reasons are to be found in the growing consumer interest in organic foods for organoleptic quality and for hygienic features rising from greater farmers attention to the environment.

The European pig breeding is an industrialized sector, so the conversion to organic production is difficult because there are great differences between the intensive systems and the rigorous rules of legislation. The equality of the intensive pig farming systems in different European countries caused common difficulties to apply the organic regulation. This reason limited the creation of new farms and the conversion from conventional to organic farming.



Most important causes are related to animal density, structural adjustments, health monitoring, furthermore are associated to management problems during conversion period.

Differences in production costs are attributable to:

- high price of organic feed;
- low technical results (difficulties of feeding pigs as indicated in the legislation);
- 40 days weaning period (depresses number of parts per year);
- increased need for agricultural operations (clean stables and prepare litter);
- high investment costs;
- supply of organic piglets

In UE-27 organic farming of pigs have started and diffused especially in Northern Europe as showed recently Statistic in focus (Eurostat, 10/2010). According to that report (table 1), the number of pigs in 2008 was just under 600.000. The result represents only 0.64%, compared to the pigs breed with conventional method.

The management of organic livestock is various and related to the breeding system, however that method is assimilated to the outdoor systems as pasture or “en plain air”. Both techniques are very common for the “philosophy” of organic farming: animal welfare, use of products, low environmental impact (Costantini, 1997).

The chosen race depends on breeding system: “en plain air” system prefers cosmopolite breeds or commercial hybrids (Large White or hybrid females with strong maternal aptitude) and commonly adopted in conventional breeding for high levels of production and reproduction (Giannone, 2000).

The race choice in Mediterranean silvo-pastoral systems, depends on healthy resistance and climatic conditions adaptability. Local races would be better to use because they have a good aptitude to graze, are frugal and have good limbs, inclined to be stressed (Casabianca, 1995).

Table 1: Organic livestock 2008 UE-27 (number of heads).

State	Organic system (thousand)	% UE	Conventional system (million)	organic/conventional index
Danmark	182.449	30.5	12.195	1.50
Netherlands	76.846	12.8	11.735	0.65
U.K.	71.229	11.9	4.550	1.57
Austria	67.238	11.2	3.064	2.19
Greece	60.918	10.2	1.061	5.74
Italy	34.014	5.7	9.252	0.37
Sweden	32.187	5.4	1.702	1.89
Poland	18.307	3.1	14.242	0.13
Spain	17.076	2.9	26.289	0.06
Belgium	11.863	2.0	6.207	0.19
Germany*	-	-	26.718	-
Romania	416	0.1	6.173	0.01
Other UE	26.367	4.4	36.063	0.07
Total UE	598.494		153.081	0.64

*No data available



In recent years, Italian breeders prefer races as Cinta Senese, Casertana, Mora Romagnola, Nero Calabrese and Nero Siciliano, which are particularly suitable to be grown in organic farming (Vulcano, 2000) because they are hardy and able to exploit poor feed and suitable to grazing. Other authors have shown that the use of rustic races, in an organic farming system, improves meat characteristics, that offset a decline in production performance, typical of the organic system (Franci et al., 2000).

Duroc race, pureness or crossbreed, is often used and represents the cosmopolitan breed that, crossing with a rustic breed, improve the quality of meat (Giannone, 2000).

In organic pig farm are important performances as required in conventional system, rusticity, maternal qualities, products quality.

In terms of product quality, organic pig farming give best production both from health point of view and taste and diet. The safety of food is guaranteed by legislation, while the qualitative aspect is optimised by swine species, which is capable to transfer from feed to meat aromas and valuable smells.

The outdoor pig organic farming with use of wood essences, produces meat and salami superior in organoleptic, and with an higher content of polyunsaturated and monounsaturated fatty acids.

About environmental aspects, organic pig farming determines a reduction in pollution of manure management. The low density provided the herd can meet the biological parameters of the Directive transposed by Regulation EEC 676/1991 biological limits to 170kg*ha⁻¹ the amount of nitrogen released into the soil. The stalling system on straw and the presence of grazing areas, facilitate the manure management, like in organic pig

breeding is presents an agriculture base.

The outdoor pig breeding, especially on grazing, causes some negative effects to the environment because this species have particular dietary and behavioural habits.

Pigs eat grass as well as leaves and shoots but also subterranean products (animals and plants). That habit gives furrows (rooting effect) and holes into the ground, with damage soil, turf, roots and underwood shrubs.

Moreover, the pig loves scratching to the trees (barking) trunk to get rid from ectoparasites. The pigs have the habit to walk along preferential paths destroying the turf and compacting the soil (trampling).

Materials and methods

The trial was carried out in a farm situated in a mountainous territory of the Tuscany (Italy).

Were reared in organic farm 12 castrated Large White male pigs of 30 kg of live weight, there was a covered surface of 32 m² with an outdoor paddock of m² 50.

The animals, in favourable weather, were allowed to graze in 10000 m² outdoor fence including a part of wood with many trees in prevalence of chestnut trees and shrubs. The diet was composed of a mixture of organic feed (pea, corn, barley, wheat).

Food rationing, calculated based on age and weight of animals (Table 1), were a progressive decline in the percentage of pea seeds and an increase of corn.

Table 1. Percent composition of diets

LW kg	Protein	Corn	Wheat	Barley
30-60	35	30	20	15
60-90	25	40	20	15
90-110	20	45	20	15
>110	15	50	20	15



The feed was administered once a day after checking the waste into the troughs, to assess the daily consumption of food.

According to Reg 1804/99 small amounts of green fodder and / or hay were given to animals when they don't directly graze.

On October was give to animals 1Kg/ head/d chestnuts in place of 1 kg of maize. During the trial were made sampling of feed (Martillotti et al., 1987). At the beginning, at the end monthly the animals were weighted. Were calculated feed conversion ratios (kg DM / kg IP) on the results of weights and food consumption.

Stages of breeding analysed during the trial were:

- A) 30-60 kg live weight,
- B) 60-90 kg live weight,
- C) 90-110 kg live weight,
- D) 110-140 kg live weight

The group were compared with those obtained to similar tests, same race, but reared with intensive systems.(Average values reported in the literature)

During the trial, experimental findings on grazing plot were carried out to assess the environmental impact by grazing pig.

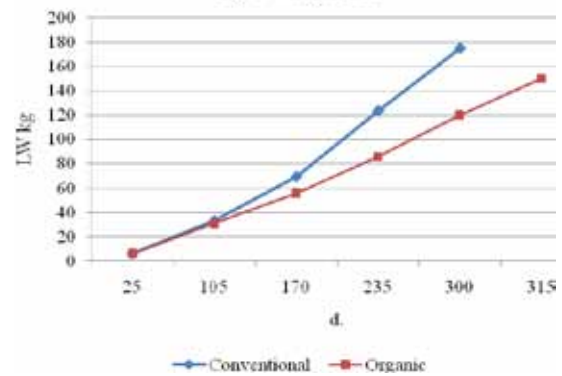
Controls covered observations on phytocoenosis (trees and shrubs and turf) made by photographic surveys.

Were also categorized trees and shrubs in the experimental fence to quantify the damage caused by animals on vegetative predefined portions (branches, trunks and tillers).

At the end of the trial (after 10 months) were collected inside and outside the fence disturbed and undisturbed soil samples. The soil was sampled in three sub-plots of 1 square meter (disturbed and undisturbed) for 3 replicas. On samples were determined the most important physical and structural (Fissures, Aggregate stability), chemical (Total Organic Carbon, Total Nitrogen) and

biochemical (Microbial ATP and breathing, Total β -glucosidase, Extra cellular β -glucosidase) parameters, using SISS

Fig. 1 Weight gain



methods.

Results and discussions

The chemical composition of feed (Table 2) shows that Chestnut has chemical characteristics suitable for pigs, are similar for energy content and starches to commercial ones. The trend of growth curves (Fig. 1) show that animals, breed with organic method, present during the entire breeding cycle, a minor increase than conventional ones. (Campodoni et al. 2003).

The differences in growth, increase with age of pigs, in fact, the weight gain of test group, compared with the literature, shows that the differences are: 57% at the beginning (30-60 kg live weight), while at the end: 73% (110-140 kg live weight) (Table 3)

The weight gain of entire cycle was higher about 66% in animals reared with conventional method (Hansen and al., 2006), compared with experimental ones, who have reached slaughter weights (140kg vs 175kg) in longer time.

The average daily food consumption of organically reared subjects were lower than those reported in the literature for pigs in intensive farming (approximately 20% in all the breeding cycle).



Table 2. Chemical composition of feed

		Corn	Barley	Wheat	Protein Pea	Chestnut
Dry Matter	%	87.34	87.00	88.00	86.00	91.74
Crude Protein	%DM	8.84	11.61	12.50	25.90	6.39
Crude Fiber	"	1.80	5.00	2.61	6.10	5.27
Ether Extract	"	2.54	2.30	2.50	1.50	3.00
Ash	"	0.54	2.70	1.70	3.70	2.90
N-free Extract	"	86.28	78.39	80.68	62.80	82.44
NDF	"	16.03	16.30	17.05	16.70	24.37
ADF	"	3.43	5.93	4.66	7.70	7.04
ADL	"	0.57	1.28	1.14	0.60	1.88
Hemicellulose	"	12.59	10.37	12.39	9.09	17.33
Cellulose	"	2.86	4.66	3.52	7.00	5.16
Digestible Energy	kcal/kg	3814	3159	4091	3726	3254

Organic pigs consume, during grazing period, spontaneous products in addition to the feed (grass, berries, leaves, roots, tubers, insects and small terricolous animals).

These differences in food consumption are lower in the first two phases of farming (about 5%) and increase greatly at the end, because animals prefer spontaneous products rather than traditional feed. The feed supplied consumption reduces when forest products increase.

The feed conversion ratio (FCR) was worse in organic pigs compared with values reported in literature on conventional farms. The average for the entire breeding cycle, is in fact about 40% higher in experimental subjects, with low fluctuations at different phases of rearing.

The environmental aspects show at the end of the trial, that the entire forest area was severely damaged by grazing pigs.

In particular, damages were different for different areas and for the kind of trees and shrubs.

Table 5. Environmental impact of grazing pig

Damage cause	Damage type
Browsing and grazing	Seedlings, leaf and leaf apex
Rooting	Turf and soil
Soil excavation	Turf, roots and soil
Scratch	Debarking
Trampling	Turf, soil compaction

The peripheral zone is the most corrupt because the animals walked along the fence (trampling) and the ground was completely compacted and devoid of vegetation.

Damages at turf and at underwood roots and at the tree were also observed. Damages are caused by some pig behavioural habits (rooting, excavation activities in the soil), connected to search of food and also to make wallows.

Stripping damage to tree and shrubs are connected to leaves and shoots palatability and depends on the presence of some substances (tannins, resins, latex) (Pistoia and Ferruzzi, 2010).

Debarking damage depends on the strength of trunk, because plants such as pine, oak and olive trees have not been damaged, while the elder and the wild apple trees were badly damaged.

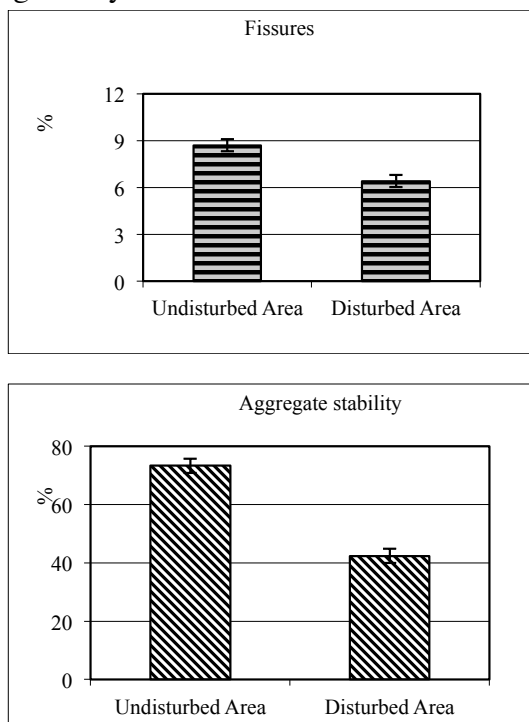
Table 3: Performance traits in different rearing system

	Organic			Conventional		
	ADG (kg/d)	Feed intake (kgDM/d)	FCR (kgDM/kg)	ADG (kg/d)	Feed intake (kgDM/d)	FCR (kgDM/kg)
LW kg						
30-60	0.35	1.23	3.5	0.55	1.3	2.4
60-90	0.42	1.64	3.9	0.72	2.3	3.2
90-110	0.47	2.54	5.4	0.8	3.0	3.8
>110	0.45	2.84	6.3	0.78	3.4	4.3
overall period	0.42	2.02	4.8	0.7	2.4	3.4

ADG: average daily gain; FCR: feed conversion ratio

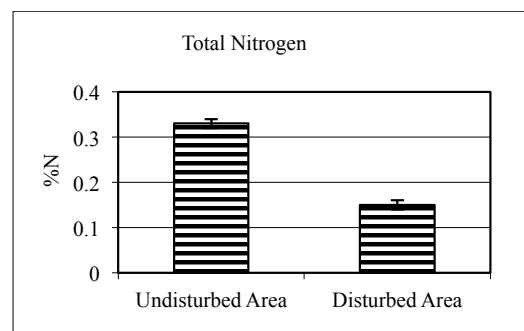
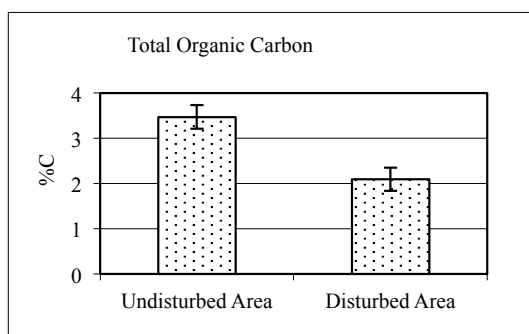
On pig pasture the soil compaction and shifting of surface layers (Fig. 2) make worse physical and structural features (Fissures and Aggregate Stability) (Brandt et al. 1995).

Fig. 2: Physical and structural features in soil



The loss of porosity and lowering water infiltration, especially in sloping areas, caused erosion phenomena with land surface removal and a considerable loss of Organic Matter (Total Organic Carbon and Total Nitrogen) (Fig. 3).

Fig. 3: Chemical features in soil



All that causes microbiological characteristics worsening evaluated by number and activity of microorganism (Microbial ATP and Microbial Breathing decrease) and enzyme parameters reduction (β -glucosidase and Extracellular β -glucosidase) (Fig. 4 and 5) (Ceccanti and Masciandaro 2003)

Fig. 4 Microbiological characteristics in soil

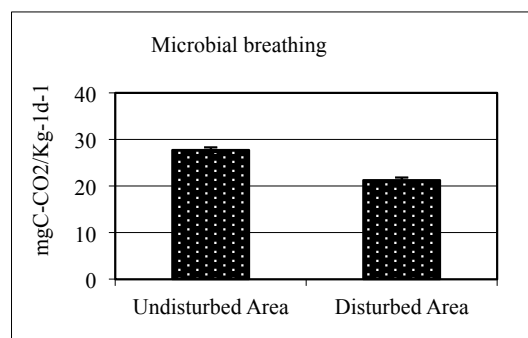
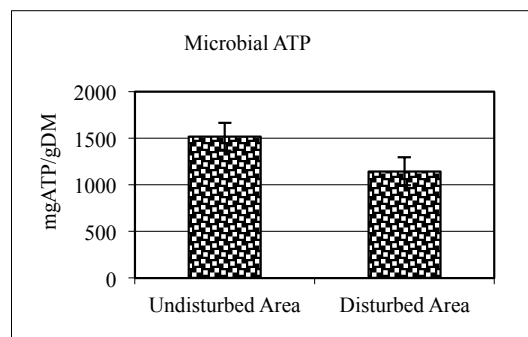
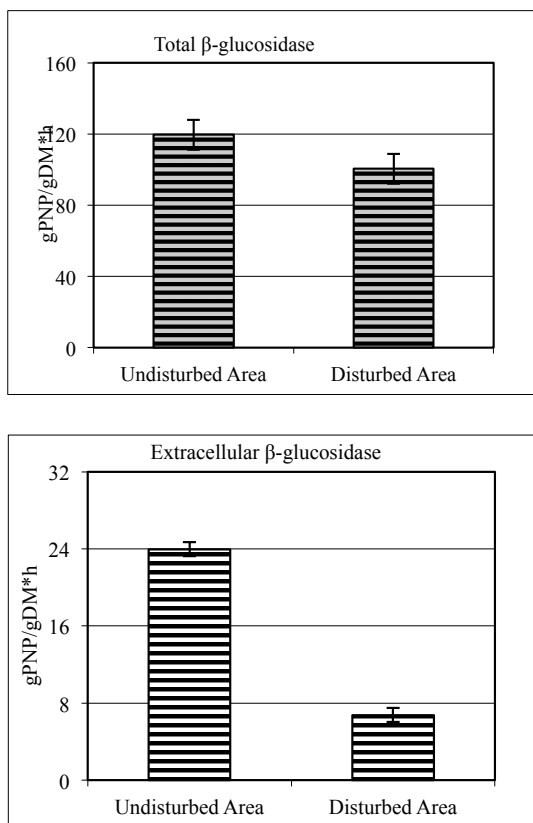


Fig. 5 Enzymatic characteristics in soil



Conclusions

This study confirmed as the grazing pigs, especially in organic farming, exhibit lower increase and lower FCR (Feed Conversion Ratio) than pigs, of the same race, in intensive farming.

Reasons are mainly related to difficulties to correctly feed the pigs in various phases of breeding, according to organic legislation, which restricts the use of some raw materials for feed and food additives typically used in conventional pigs.

The grazing pig eats spontaneous products, often poorly digestible and less energetic, reducing feed consumption, without satisfies their nutritional and vitamin needs and doesn't perform their potential productivity.

Furthermore the animals kept outside consume more energy due to high motor activity. The reduced productive performance of pigs reared in organic farming, are partly offset by improved organoleptic and dietary characteristics of meat.

The pig more than any other animal receives benefits, in terms of product quality, from outdoor breeding. An important model is the Iberian ham (Jamon Iberico), produced by pig outdoor breeding.

The organoleptic characteristics of meat improve especially using autochthonous races, which are breeds endangered and therefore must be safeguarded.

Pigs feeding with grass and other plant products, improve dietary characteristics of meat, because the fatty acid profile, contains an higher percentage of polyunsaturated fatty acid. The PUFA can't exceed 15%, because otherwise the grease is too fluid, creating problems in transformation.

About environmental aspects, must be separate the grazing pig in organic farming from the swine reared "en plain air".

The grazing pig in organic farming requires a careful management to avoid long stays in the same areas (rotation grazing system) especially in wooded areas where the pig causes serious damage to the underwood and trees.

Woodland grazing must be made only when there are spontaneous foods and with low number of animals.

Organic regulation provides 14 heads/ha that are excessive if don't use the rational criteria for grazing (Pistoia and Ferruzzi, 2010).

It is necessary to avoid grazing pig in slope areas, because the phytocenosis and soil damages, with physical-structural characteristics worsening, are the cause of some negative effects on hydro geological situation of the territory (Pistoia et al., 2010).



Farm “en plain air” presents problem to keeping of soil structure to which must be add the nitrate risk pollution due to long presence of animals on the graze.

Therefore it is better to avoid that pigs remain on the same land not more than two years also to avoid health problems particularly to spread of parasites (Rossi et al, 2004).

References

1. Council Regulation (EC) N° 2092/1991 of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs
2. Council Regulation (EC) N° 834/2007 of 28 June 2007 on organic production and labelling of organic products
3. (Eurostat, Statistic-Focus 10/2010).
4. Costantini E. (1997), *Le scrofe all'aperto*. Bioagricoltura n. 67
5. Giannone M. (2000), *Le regole d'oro per produrre suini bio*. Rivista di suinicoltura, N.11, 2000, 54-59.
6. Casabianca, 1995 F, (1995). Optimisation des systèmes d'élevage traditionnels du Porc Méditerranéen Third International Symposium of Mediterranean Pig, Benevento
7. Vulcano G. (2000), *Un centro sperimentale per il Nero Calabrese*. Rivista di suinicoltura, N.10, 2000, 109-114.
8. Franci O., Pugliese C., Bozzi R., Acciaioli A., Campodoni G., Gandini G. (2000), Performance of Cinta Senese pigs and their crosses with Large White. 51st Annual Meeting of E.A.A.P., The Hague, 21-24 August 2000.
9. Matassino D., Grasso F. (1996), *Salvate quei suini sono autoctoni*. Rivista di suinicoltura, XXXVII (10): 69-76.
10. Campodoni G., Fabbio G., Franci O. (2003), Valorizzazione delle risorse boschive con l'allevamento suino. Convegno nazionale, Cuneo, 27-43.
11. L.L. Hansen, C. Claudi-Magnussen, S.K. Jensen, H.J. Andersen, (2006), Effect of organic pig production systems on performance and meat quality Meat Science 74 605–615
12. Brandt, M., Lehmann, B., Selinger, S., Wildhagen, H., (1995), Untersuchungen zur Freilandhaltung von Mastschweinen. In: Beitrag zur 3: 61-64. Petersen, S.O., Kristensen, K., Eriksen, J., 2001. Denitrification losses from outdoor piglet production: spatial and temporal variability. J. Environ. Qual. 30:1051-1058
13. Ceccanti, B., Masciandaro, G. (2003), Stable humus-enzyme nucleus: the last barrier against soil desertification. In Preserving soil quality and soil biodiversity-The role of surrogate indicators. M.C. Lobo & J.J. Ibanez (eds.), pp. 77-82. CSIC-IMIA, Madrid.
14. Pistoia A., Ferruzzi G., (2010), *Impatto ambientale da pascolamento suino*. Fondazione Iniziative Zooprofilattiche e Zootecniche, in “Allevamento animale e riflessi ambientali”, Brascia, 161-175.
15. Pistoia A., Bondi G., Balestri G., Mani D., Masciandaro G., (2010), Soil degradation by grazing pig in Mediterranean environment. VII Congresso Internazionale del suino mediterraneo, 14-16 ottobre, Cordoba, in press
16. Rossi P., Gastaldo A., Ferrari P., (2004)-CRPA Reggio Emilia- Il Divulgatore n° 3/2004 “Suini: guida all'allevamento secondo il metodo biologico) pag. 20-37.



SOFTWARE APPLICATIONS

MICROCAL ORIGIN FOR POLYNOMIAL INTERPOLATION IN RHYTHM OF ACCUMULATION A DRY MATTER OF VINE

Marian Nicolae, Adrian Dulugeac, Elena Nicolae, Simona Dulugeac, Mariana Marica, Cătălin Galan

Bioterra University of Bucharest

Abstract: The dedicated software having in background a powerful mathematical apparatus (specially numerical methods with informatical saucer) was revolution experimental research, having the possibility important anticipation, completing the collection rare data which obtain occasionally with difficulty.

Using numerical simulation can find formulas for calculating (based on a collection of experimental data) using the media as a powerful Matlab programming, LabVIEW, Microcal Origin eliminating many experimental calculations difficult to get. If we compare the results between the two modes of working (and experimental data) shows that the interpolation methods used: spline, cubic, linear, polynomial (on different degrees until 10 degree) have very small errors, the degree of fidelity is almost 100% (95% and 98%). By getting expression of mathematical functions and values with average temperatures during certain periods of time (for example, the average for the past 60 years) we can predict the development of biorhythm by predictions of the accumulation of dry matter without further recourse to dense experimental calculations.

Key words: numerical methods, anticipation, collection data, approximation, interpolation, simulation, process phases.

Introduction

By numerical simulation we can find calculating formulas (on abide by a collection of experimental data) by using strong programming surroundings like Matlab, LabView, Microcal Origin and by elimination of many determinations difficultly to get.

If we compare the results of both way of work (experimental and by computer).

“Microcal Origin” is a programming language likewise a developing system which integrates the calculation, the visualisation and the programming in an easy way. The problems and their solution

are concurred in an available mathematical language. Starting from the experimental data, the accumulation of the dry substance like a function of active temperature ($\Sigma^{\circ}\text{C}$) and time (t), the software gets a function which brings the increase of vine $SU(\Sigma^{\circ}\text{C}, t)$, through interpolations with a very little step; so, this evolution can be determined empiric.

For mathematical thoroughness in the approximation of function - accumulation of dry matter (SU) depending on the temperature have used a variety of functions: exponential, logarithmic, polynomial depending on the type curve nonlinear sometimes fragmenting the diagram on parts.



Simultaneous we can choose the function that proximate the best the experimental data by using dedicated software and we can get the values $y=f(x)$ by interpolation $y_i=f(x_i)$, the interpolation step being very small, 10^{-6} . We can make such calculations of the value of dry matter (SU) not by experimental way, but by using the applied sciences on computer. Where experimental data collection are a disparate values we can complete, however small it would be intervening Variation Δx , can learn at any time variant ΔSU .

Materials and methods

All entry data should be identified and later synoptically presented in a table, all graphics should be made and the formulae should be identified by employing various numerical methods. Interpolations shall be made for x_i data, which are necessary to anticipation and they shall be compared to the experimental ones. Specialized software shall be used, like Matlab, LabView, Origin, Excel, Mathematica, while the results shall be compared and formulae which best approximate reality shall be found.

Results and discussions

Where:

- RR – relative repose
- SF – physiologic start
- VI – vine lachrymal or vine tear
- B - buddind
- U – unfolding
- DI – devolpment of inflorescence
- BI – blossoming
- R – ripe
- M- complete maturation
- LF – leaf fall

The active degrees accumulated in time are as follows:

Figure 1: The evolution of $\Sigma^{\circ}\text{C}(\text{active})$

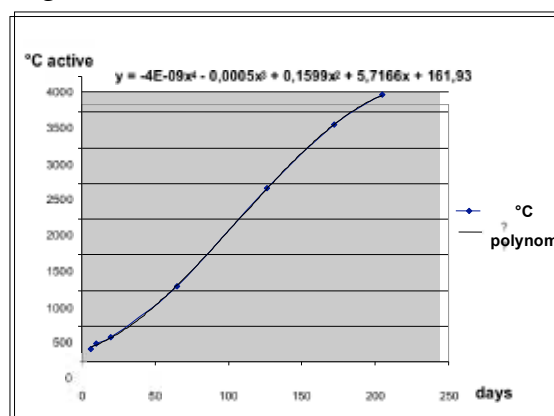


Table no. 1

Evolution of dry substance accumulation depending on the active temperature:

Month	1	2		3	4			5	6	7	8	9	10	11	12
	Jan	Feb		Mar	Apr			May	June	July	Aug	Sept	Oct	Nov	Dec
Date	-	12	20	-	6	10	20	-	5	-	5	21	23	-	-
No of day	-	-	-	-	6	10	20	-	65	-	126	172	205	-	-
Phase	RR	SF	VI	-	B	U	DI	-	BI	-	R	M	LF	RR	RR
Active $\Sigma^{\circ}\text{C}$	-	21	42	-	183	250	346	-	1060	-	2430	3320	3740	-	-
Dry Subst(g)	-	-	-	-	1	6	250		875	-	1600	2380	2685	-	-
-	-	-	-	-	Active period									-	-



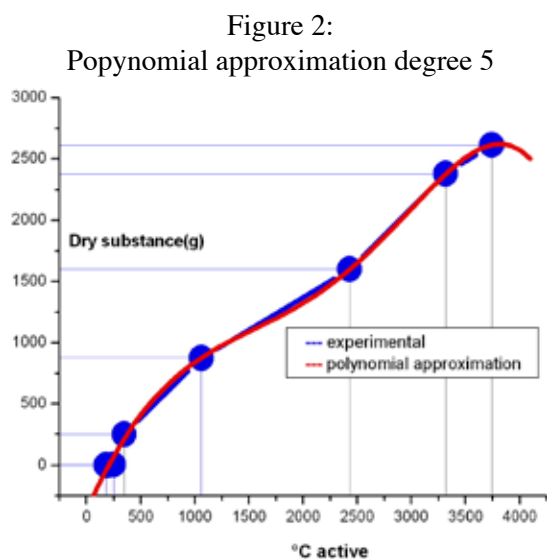
The function that best reflects the evolution of temperature was determined by polynomial approximation, obtaining a IVth degree polynom that is employed to determine the accumulation of daily active degrees.

$$Y(X) = -4 \cdot 10^{-9} X^4 - 0,0005 X^3 + 0,1599 X^2 + 5,7166 X + 161,93$$

Results and discussions

The software allows the graphic to be achieved by points depending on xi, yi pairs which were experimentally determined. Only then the polynomial approximation is performed (95%-98% approximation degree, various degree polynomials).

The approximation shall result in determining a function, namely a polynomial of Vth order, which shall be compared to the one determined through differents means. Afterwards the interpolation is performed in order to quantify the Dry Substance (g) values that were not determined with an experimental method.



$$Y = A + B_1 \cdot X + B_2 \cdot X^2 + B_3 \cdot X^3 + B_4 \cdot X^4 + B_5 \cdot X^5$$

$$Y = A + B_1 \cdot X + B_2 \cdot X^2 + B_3 \cdot X^3 + B_4 \cdot X^4 + B_5 \cdot X^5$$

The function is expressed as:

$$Y = -367,893 + 1,99773 \cdot X - 9,53 \cdot 10^{-4} \cdot X^2 + 1,14 \cdot 10^{-7} \cdot X^3 + 6,34 \cdot 10^{-11} \cdot X^4 - 1,3 \cdot 10^{-14} \cdot X^5$$

Table no. 2
Approximation 95%

Polynomial Regression for Data1_B:				
Y = A + B1*X + B2*X^2 + B3*X^3 + B4*X^4 + B5*X^5				
Parameter	Value	Error	t-Value	Prob> t
A	-367,893	328,9294	-1,11846	0,46444
B1	1,99773	1,95999	1,01926	0,49393
B2	-9,53E-04	0,00305	-0,3129	0,80694
B3	1,14E-07	1,86E-06	0,06105	0,96118
B4	6,34E-11	4,91E-10	0,12901	0,91832
B5	-1,30E-14	4,71E-14	-0,27562	0,82878
R-Square(COD)	Adj. R-Square	Root-MSE(SD)	N	
0,99904	0,99425	83,98796	7	
ANOVA Table:				
	Degrees of	Sum of	Mean	
Item	Freedom	Squares	Square	F Statistic
Model	5	7,35E+06	1,47E+06	208,513
Error	1	7053,977	7053,977	
Total	6	7,36E+06		

$$Y = A + B_1 \cdot X + B_2 \cdot X^2 + B_3 \cdot X^3 + B_4 \cdot X^4 + B_5 \cdot X^5$$

$$Y = -367,893 + 1,997 \cdot X - 9,53 \cdot 10^{-4} \cdot X^2 + 1,14 \cdot 10^{-7} \cdot X^3 + 6,34 \cdot 10^{-11} \cdot X^4 - 1,3 \cdot 10^{-14} \cdot X^5$$

Table no. 3
Approximation 98%

Y = A + B1*X + B2*X^2 + B3*X^3 + B4*X^4 + B5*X^5				
Parameter	Value	Error	t-Value	Prob> t
A	-367,893	1,54E-12	-2,38E+14	<0.0001
B1	1,99773	7,90E-15	2,53E+14	<0.0001
B2	-9,53E-04	1,46E-17	-6,55E+13	<0.0001
B3	1,14E-07	1,01E-20	1,13E+13	<0.0001
B4	6,34E-11	1,00E-20	6,34E+09	<0.0001
B5	-1,30E-14	1,00E-20	-1,30E+06	<0.0001
R-Square(COD)	Adj. R-Square	Root-MSE(SD)	N	
1	1	3,85E-12	50	
ANOVA Table:				
	Degrees of	Sum of	Mean	
Item	Freedom	Squares	Square	F Statistic
Model	5	4,15E+07	8,30E+06	8,30E+26
Error	44	6,51E-22	1,00E-20	
Total	49	4,15E+07		

The interpolated values are presented in the following table.

The experimentally determined values are compared to the ones resulted through interpolation, thus pointing out to the fact that a large number of iterations is possible, in this case 50:



Table no. 4
Approximation 95%

Item	T Measured	Dry Subst. experimental	T Iterated	Interpolated Dry Subst.
1	346	250	349,9612	220,2829
2	1060	875	1046,843	869,2726
3	2430	1600	2440,606	1607,505
4	3320	2380	3311,708	2373,559
5	3740	2685	3747,259	2616,215

Table no. 5
Approximation 98%

Item	T Measured	Dry Subst. experimental	Dry Subst. Iterated	Dry Subst. Value
1	346	250	214,7944	35,20558
2	1060	875	876,966	-1,96595
3	2430	1600	1599,493	0,50743
4	3320	2380	2380,342	-0,34196
5	3740	2615	2614,867	0,13318

The correspondence between the values of the Dry Substance and values of the temperature is obvious and comparable in the two situations (experimental and by interpolation).

Conclusions

Numerical simulation may help in finding calculus formulae (the richer the experimental data set is, the better the numerical determinations shall reflect reality) by employing powerful programming media, like Matlab, LabView, Microcal Origin, which may be used thus eliminating many experimental.

The comparison between the two work methods (informatical and experimental) points out to the fact that the employed interpolation methods, cubic, linear, polynomial, (in various degrees up to the Xth degree) have very small errors, the approximation degree being of almost 100 % (95% și 98%).

After mathematically expressing the functions with the average temperature values during certain periods of time (for example the average for the past

60 years), the evolution of the biorhythm may be anticipated by predicting the dry substance accumulations without employing experimental determinations.

References

1. ATKINSON K., Numerical Analysis, Wiley, New York, 1995
2. DINCA AL., EBANCA D., Calcul Numeric si Aplicatii, Univ. Craiova, 1995.
3. NICOLAE M., Teză de doctorar, U.S.A.M.V București, 2006



NEW EUROPEAN LEGISLATIVE STIPULATIONS REGARDING THE NOTION OF ECOLOGICAL AGRICULTURE AND THEIR INFLUENCE ON THE QUALITY OF FOOD PRODUCT

Galan Catalin, Dumitrescu Carmen, Caretu Georgeta, Atudosiei Nicole-Livia

Bioterra University of Bucharest

Abstract: *The paper makes an analysis of the main European legislative standards regarding ecological agriculture, increasing new stipulation adopted through the rule nr. 271, from 24th of March, 2010. In accordance with the new stipulations, consumers who buy ecological products marked by E. U.'s logo may believe that: least of 95% of ingredients have been made by methods and technologies agreed by the notion of ecological agriculture; product respects rules of official scheme of inspection; product proceeds direct from the producer or processor in a sealed package; product has the name of its producer, processor or seller and name or code of the organism which inspects and certifies.*

Key words: *ecological agriculture, G.M.O., Rules (E.U.) nr.271/2010, label of ecological products.*

Introduction

The notion of ecosystem was introduced by Tansley (1935) who defined it as being made by biotope and biocoenosis.

Ecosystem unites the alive community (biocoenosis) with physical medium (biotope). At the beginning of XXth Century, Rudolf Steiner introduced the notion of biodynamic agriculture. The author proposed the practicing of a biological dynamic agriculture (biodynamic).

According to this notion an agricultural exploitation works like an alive organism, Steiner making a correlation between the tradition of a healthy agriculture with modern methods of applying cultural techniques, justified from the ecological point of view.

In agriculture of the last decade has been spread the notion of agricultural ecosystem which is defined as that functional unit of biosphere created and controlled by people in order to obtain high quality productions

in advantageous economical conditions, but protecting the environment (L. Dejeu and collaborators, 1997; M. Oslobeanu and collaborators, 1994).

So, we talk about everything is developing in air, water, soil and which has a direct or indirect connection with an agricultural area.

Materials and methods

According to current legislation the notion of ecological agriculture named in other countries "organic", "biodynamic" or "biological", it is fundamental different by conventional agriculture through new rules and typical technologies which have as a purpose producing of healthy food, "clean", in correlation with conservation and protection of medium.

"Ecological agriculture" is a protected and attributed term by E. U. to Romania for defining this system of agriculture.



Legislative framework regarding practicing of ecological agriculture and the way of labeling the ecological products is settled by E. U. through:

- Rules (EC) no.834/2007 of the Council regarding ecological production and labeling the ecological products;
- Rules (EC) no. 889/2008 of Committee for establishing of standards of applying of Rules (EC) no. 834/2007;
- Rules (EC) of Council no.967/2008;
- Rules (E.U.) no.271 from 24th March, 2010.

These norms are very exactly and want to increase confidence of consumers for the products with E.U. logo.

Ecological products are obtained according with rules and principles from these regulations, or for the imports according to an equivalent system, with the same rigor.

Results and discussions

Main stages of changing for a classical agricultural exploitation in a certified ecological exploitation are:

1. Contacting an accredited company for certification;

The Company for certification will give the producer in exchange of a fee, all legislative norms and technical standards which must be respected in an ecological exploitation. Also, it will train the personnel to respect traceability of equipments in a farm.

2. Making a preliminary analysis for soil, water and ground water to eliminate the possibility of existence of a pollution factor with great remanence which can compromise reconversion of the plantation;

Surfaces near a major pollution source with great remanence will be excluded,

such as chemical plant, highways, pesticide warehouse etc.

3. Reconversion which means permanent monitoring of bio-chemical parameters of soil, water, plants and agricultural products; Monitoring is made by the company for certification in exchange of a fee paid by producer.

4. Releasing of a “Concordance certificate” by company for certification at the end of the reconversion period.

Agricultors who respected rules of production will receive the certificate of ecological product and will label products with mention “ecological”. Reconversion period is minimum 3 years, indifferent of culture type, in this period the farmer may sell him products with label “reconversion products”.

Another problem approached by the new legislative stipulations is representing by substances approved by ecological agriculture. Ecological agriculture is extremely restrictive regarding substances used for nutrition deficiency, the effect of different pathogens or effects of climatic accidents (hail, drought, frost etc.). For example, in ecological agriculture is accepted the following substances:

- natural fertilizer obtained from alga;
- contact pesticides (bordeleza juice, sulfocalcic juice);
- organic pesticides like “Eco-friendly Meristem S.L.” obtained from phytohormones and plants inhibitors (ex. Tricoderma meristem, Biomer oidio, Biomer botrytis, Chitomer);
- bio-fertilizer based on bacteria which fix nitrogen, genetic unmodified such as Azobacter, Baccilus megaterium, Clostridium (ex. Ecofertil P, Azofertil).



Also, are approved bio-products based on microorganisms useful for crop plants or based on natural compounds (extracts from plants – “botanical”). Because of their biological character, bio-preparations have a complex action on crop plants, the most correct term being: bio-preparations for agricultural usage.

In this context, biotechnologies have an essential role in medium protection by contribution on isolating and extracting vegetable hormones with inhibitor role and antifungal and in selection of useful bacteria from agro technical point of view, products named bio-preparations.

An example is bio-preparations based on antagonist fungus *Trichoderma*. Homologated as bio-fungicides, some bio-preparations stimulate vegetable growth (Baker R. 1988, “*Trichoderma* spp. as plant – growth stimulants”) and this stimulating of plants growth is because of bio-fungicides action in plants nutrition.

Conclusions

In accordance with the new stipulations adopted through the Rule (E.U.) no. 271, from 24th of March, 2010, consumers who buy ecological products marked by E. U.’s logo may believe that:

- least of 95% of ingredients have been made by methods and technologies agreed by the notion of ecological agriculture;
- product respects rules of official scheme of inspection;
- product proceeds direct from the producer or processor in a sealed package;
- product has the name of its producer, processor or seller and name or code of the organism which inspects and certifies;
- products with new ecological label will not

contain any product or subproduct proceeded from genetic modified organisms (GMO).

Also it was introduced a unique system of mandatory labeling valid in all Member States as 1st of July, 2010. New logo for certified organic products is available in two versions: color and black



References

1. Alexandrescu I. C., M. Oslobeanu, L. Jianu, P. Pituc, 1994 – „Small encyclopedia for viticulture”, Edit „Glasul Bucovinei”, Iasi.
2. Dejeu L., Petrescu C., Chira A., 1997 – „Hortiviculture and environment protection”, Edit Didactica si Pedagogica R.A., Bucuresti.
3. Fregoni M., 1989 – „La viticulture biologica: basi scientifiche e prospettive”, Vignevini nr. 12, Bologna.



4. Ionescu Al., 1982 – „Phenomenon of pollution and antipollution measures in agriculture”, Edit Ceres, Bucuresti.
5. Oslobeanu M., Alexandrescu I., Dejeu L., 1978 – „Contribution a l’approche de la viticulture en tant qu’ agroecosysteme”, Symposium international “Ecologie de la vigne”, Constanta;
6. Oprea A., Galan C., 2009 – „General technologies and especially biotechnologies in agriculture”, curs I.S.B.N.978-973-0-06230-4, Bucuresti;
7. Bulletin of scientific information, nr. 19 (January – June 2010), Bioterra University Foundation;
8. Rules (E.C.) no.834/2007 of Council regarding ecological production and labeling of ecological products;
9. Rules (E.C.) no. 889/2008 of Committee of establishing standards of applying Rules (E.C.) no. 834/2007;
10. Rules (E.C.) of Council no. 967/2008;
11. Rules (E.C.) no. 271 since 24th March 2010.



STUDY OF THE TECHNOLOGICAL OPTIMIZED VITICOL PHENOCALENDAR (T.O.V.P.) OF VINE

Marian Nicolae, Mariana Marica, Livia Nicole Atudosiei, Adrian Dulugeac, Elena Nicolae

Bioterra University of Bucharest

Abstract: The fenoclimated researchs on the sorts *vifera* (vineyard region of Drăgășani) had as result the determination of dried substance's acumulation on the trunk and the elaboration of technological optimized viticol calendar (TOVP). Therewith it was establised the biophysical relation between thermal active gradient or the fenological evolution and the dried substance's accumulation on the sprig (wood, leafes, raisins).

Key words: bioritm, dried substance's accumulation, active temperature, phenophase, techological viticol optimized calendar (TOVP)

Introduction

On varieties *finifera* (growing zone Drăgășani) the fenoclimatice research gets the dry matter accumulation on the trunk and the vineyard technology optimized viticol phenocalendar (TOVP).

Materials and methods

Growth processes and the intrabud/extrabud developing were studied along the biological cycle of vegetative and reproductive periods, phases and phenological stages, after the methodology established in the biophysical research (phenoclimatics), the esults referring to the biophysic relationship of active thermal gradient or phenological development and dry matter accumulation on the vine (wood, leaves, grapes).

The original system was used for scoring and coding of (micro)stages phenological and included in Technological Optimized Viticol Phenocalendar (Tovp).





Results and discussions

Table no 1

Item	Period calendar	Code /phases phenology	Code / stages phenology	The phenocalendar of applied technological sequences
1	2	3	4	5
Intrabud physiological processes				
1	May June July Aug-Nov	000/Summer primary bud	001/ latent bud 002/differentiation 1 002/ differentiation 2 002/ differentiation 3	Agrophitotechnic integrated system: Soil sustenance Trataments with bioactiv substances Foliar Fertilization Optimal phytosanitar protection Phytotechnic measures: special and curent operations in green and irigattion
Extrabud physiological processes				
2	Mar Dec-Feb Apr	A/ Vine lachrymal B/Winter bud C/Budding	00/ Vine lachrymal 01/stage 1 02/budding 1 03/budding 2	Spring organomineral fertilisation Dezmuşuroit The sow of the sideral epochal cultures Supply irigation Soil sustenance The revision of the sustenance system Dry cutting String supervision
3	Apr	D/Unbudding	04/ Unbudding 1 05/ Unbudding 1 06/ Unbudding 1	Phytosanitar preventiv trataments (floury, filoxera, nematosies) New vine plantation
4	May June July	E/Sprig increase	07/progressive increasing 08/ intensive increasing 09/regressive increasing	Phytosanitar preventiv or remedial trataments In- green current operations Soil sustenance Foliar fertilisation Irigation



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5	May June	F/ developpment of inflorescence	10/ slow increasing 11/ intensiv increasing of the florescences	Special in – green operations Trataments with bioactive substances Incorporation of the sidental cultures (green fertiliser)
6	May/June	G/Flowery	12/inceput înflorit 13/toi înflorit 14/final înflorit	Trataments with bioactive substances Special in – green operations
7	June Aug	H/Berry's developpment	15/berry's increasing 1 16/ berry's increasing 2 17/ berry's increasing 3 18/ berry's increasing 4 19/ berry's increasing 5 20/ berry's increasing 6	Trataments with bioactive substances Special in – green operations Soil sustenance Foliar fertilisation Irigation Phytosanitar trataments
8	July-Aug	I/Berry's ripe	21/ Berry's ripe - white 22/ Berry's ripe - pink	Trataments with bioactive substances Special and current in – green operations
9	July-Oct	J/Maturation of grapes	23/deolin maturation 24/supramaturation 1 25/supramaturation 2 26/supramaturation 3	The vintage of the grapes and superior and current vines and DOC The vintage of the vine grapes DOCC II The vintage of the vine grapes DOCC I and for raisins
10	July-Nov Sept-Oct Apr-Oct	K/Wood's maturation L/Going to pale and the falling of the leaves M/Root's developpment	27/ Wood's maturation 28/ the falling of the leaves 29/spring and autumn increasing of the roots	Autumn organo- minerală fertilisation Calcar surcharge (acid soil) Soil sustenance Partial sloppy Autumn sidental cultures sowing Sloppy of the soil for new plantations Digging in



11	May-Oct	N/Apparition, developping and the fructify of the bairns	30/fertil bairn	Oust bairns works on the mother plantations Maintenance and sustennce works of the bairns at the low fertil varieties
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Conclusions

The active and mostly the useful temperature ($\geq 10^{\circ}\text{C}$) seem to visibly conduct the daily rhythm of growth and development in vine, confirming thus once more it's sensitivity to the weather conditions.

The technology optimized viticol phenocalendar (TOVP) contains the adequate moments for the implementing of the agrophitotechnic sequences's appropriate technology, by underlying the technology culture through the vine varieties for table, dry raisin and wine current and with designation of checked origin (DCO) and High Quality (DCO-HQ).

References

1. Condei Gh., Ionescu P., Cătănescu V., Ciolacu M., Seiculescu M., Contribuții la studiul ritmului de acumulare de către vița-de-vie a substanței uscate și a compușilor plastici și energetici, cu rol în formarea recoltelor în viticultură (struguri, butași, portaltoi, vițe altoite, Anale ICVV, XII, 109-128;
2. Condei Gh., Ionescu P., Cătănescu V., Ciolacu M., Seiculescu M., Evolution des elements chimiques majeurs dans les organes de la vigne, en relation avec l'accumulation de substance seche au cours d'un cycle vegetatif, Symp. Phys. Vit., 1992, San Michele, 103-108;

3. Ionescu P., Studiul unor procese fiziologice și biochimice la vița-de-vie din podgoria Drăgășani, Rezumat al tezei de doctorat, 1969, Univ. Babeș-Bolyai Cluj-Napoca, 8-32;

4. Nicolae M., Teză de doctorat, U.S.A.M.V București, 2006



BOTULISM FOOD TRANSMISSION BY A POSSIBLE BIOTERRORIST ATTACK

Androne Roxana, Atudosiei Nicole Livia, Marica Mariana Daniela

Bioterra University of Bucharest

Abstract: Botulism also known as botulinus intoxication is a rare but serious paralytic illness caused by botulinum toxin, which is produced by the bacterium *Clostridium botulinum* under anaerobic conditions.

The toxin enters the body in one of four ways: by colonization of the digestive tract by the bacterium in children (infant botulism) or adults (adult intestinal toxemia), by ingestion of toxin from foods (foodborne botulism) or by contamination of a wound by the bacterium (wound botulism).

All forms lead to paralysis that typically starts with the muscles of the face and then spreads towards the limbs. In severe forms, it leads to paralysis of the breathing muscles and causes respiratory failure. In view of this life-threatening complication, all suspected cases of botulism are treated as medical emergencies, and public health officials are usually involved to prevent further cases from the same source.

Botulism can be prevented by killing the spores by cooking at 121 °C (250 °F) for 3 minutes or providing conditions that prevent the spores from growing. Additional precautions for infants include not feeding them honey.

Key words: botulism, bacterium, honey

Introduction

Clostridium botulinum, anaerobic germs, spores, found in soil, where it can be isolated without difficulty. The genetic groups were classified four different which can not be defined as a single species than in that secretes botulinum toxin, the toxin has no color, taste or smell. Toxin is present in 7 distinct antigenic types were designated with letters A, B, C, D, E, F, G and is characterized in that it does not neutralize type B.

- *C. botulinum*, in addition, producing toxins and *C. baratti* and *C. butiricum* ;

- Toxin is completely inactive when heated to > 85 ° for 5 min. Transmitted by food botulism can be prevented if foods are properly cooked.



- toxin type A, B, E produces human diseases; toxins type C and D cause disease in wild and domestic animals in monkeys excipient; toxins C, D, G administered by inhalation, produced botulism.

- human lethal dose of crystalline toxin A for a 70 kg person is approximately:

- 0.09 to 0.15 mg or i.m i.v

- 0.7 to 0.9 mg by inhalation



- 70 mg orally
- 1g of crystalline toxin evenly dispersed in aerosol and inhaled can kill over 1 million people, in terms of theory, uniform dispersion and inhalation are difficult.
- botulinum toxin therapy used in the U.S. is not an alternative as a biological weapon because a vial containing 0.3% lethal dose of inhaled and 0.005% oral lethal dose.

Materials and methods

A. Pathogenesis and clinical manifestations

Appears in three forms, normally:

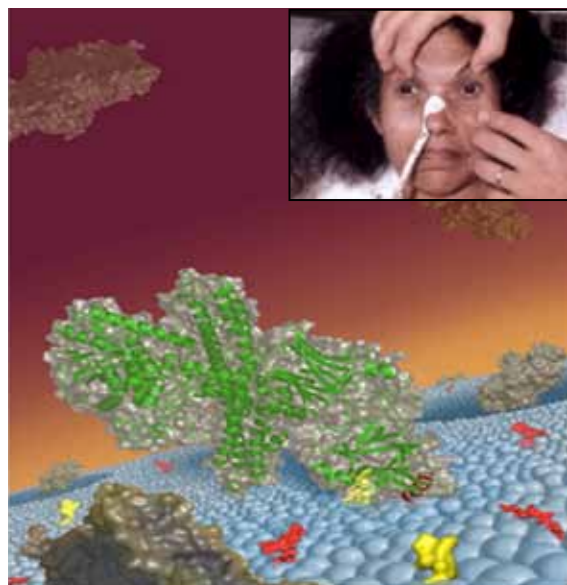
1. Food
2. in lesions
3. intestine (adults and children)

All forms appear in circulation after toxin absorption through mucous membranes. Botulism produced by the intestinal wounds and develop after botulinum toxin was produced in devitalized tissues or the intestinal lumen (in anaerobiosis).

A fourth human clinical form of botulism is the result of inhaling aerolizarii and botulinum toxin.

Fifth form of botulinum toxin is absorbed through blood transported to cholinergic synapse where irreversibly fixed and subsequently block the secretion of acetylcholine, and all forms of botulism are manifested by neurological signs identical. In botulism abdominal digestive plus signs: abdominal cramps, nausea, vomiting, diarrhea.

Clinically speaking: Botulism is an acute disease, afebrile, characterized by paralysis, flaccid, symmetric, descending paralysis that begins invariably with bulbar muscle and cranial nerve palsy. Manifestations are similar regardless of the type of toxin, but differ in intensity and speed of emergence in direct connection with the toxin.



Recovery occurs by reactivation of the paralyzed muscles, a process that adults can take weeks or months.

-Onset problems, vision, speech and swallowing.

-Main neurological all clinical forms of botulism are: blurry, hazy, dilated pupils and reactive (slow, dysarthria, and dysphagia dystrophy)

-Botulinum toxin does not exceed the blood-brain barrier, patients do not show confusion, but difficult to communicate, are lethargic (bulbar palsy)

Botulism can be easily recognized if the patient has:

- symmetrical flaccid paralysis, descent, predominant bulbar paralysis;
- afebrile ;
- clear sensors ;
- Dominance bulbar paralysis can be summarized as follows: dysarthria, dysphagia, dysphonia.

B. Epidemiology

-suspicion is that which can sustain the type of epidemic: natural or international;

-botulinum toxin, is not transmitted interpersonal;



- a genetically modified microbe, intended to produce botulinum toxin can be contagious ;
- incubation period depends on the dynamics of toxin uptake, ie the amount absorbed ;
- Food in botulism, food borne, incubation ranges between 2-8 h after ingestion, usually occurring after 12-72 h when the incriminated meal, other cases in these three days, then reduce the frequency of cases.

Susceptibility to botulism does not differ by sex, and any suspected outbreak of botulism generates inhalation botulism.

The suspicion is supported by the absence of common food among the sick.

C. Diagnosis and therapy

Diagnosis: the confirmation is provided by competent laboratory but they often give the answer after several days, so clinical diagnosis is crucial in the recognition of botulism and response training, including in cases of terrorist attack with botulinum toxin. Differential diagnosis of botulism for decision is a decision that can be sustained only after other clinical manifestations. As measures of response to a biological attack with botulinum toxin should be taken in the shortest time, and time consuming laboratory confirmation, clinical diagnosis and differential positive must be done urgently.

Laboratory diagnosis depends largely on the selection of samples, harvesting, and their hierarchy.

Therapy aims to:

- a) Supportive therapy: helping the vital functions of organisms to infection during the recovery interval paralysis:
 - Providing food and fluid intake;
 - Assist pulmonary ventilation;
 - Application of the therapy or other infectious complications;
- b) passive immunization with antitoxin prepared animal (horse) upportive therapy is

the current use of equipment, highly evolved, to assist the vital functions and complications of therapy, supported technically and in terms of patients assisted individualized, intensive measures are able to drastically reduce mortality.

Intensive care techniques refers to support:

Breath:

- Location in favorable position breathing;
- Suction secretions;
- Mechanical ventilation;
- Preservation of swallowing and coughing reflexes;

Food:

- The nasal-gastric probe;
- Parental;
- The insurer for liquids, proper heat, food principles, vitamins and minerals.

Therapy complications: broad-spectrum antibiotics, parental leave, with bactericide, has no direct effect on botulism but is aimed primarily pulmonary complications. Passive immunization (administration of anti polyvalent antitoxin, B, E) requires:

- Susceptibility testing (above) and the immediate response to protein administration starine (horse);
- If the patient is aware the practice is to avoid desensitization of both major but mostly minor accidents "anaphylaxis."

Results and discussions

- *Prevention, control of infection and decontamination*

Prevention: Botulism can be given by:

- a) Passive immunization:
Administration of botulinum antitoxin prepared in horses;
- Administration of specific hyperimmune immunoglobulins;
- b) Immunization with vaccines :
 - (Toxoid) Botulinum;



Use of antitoxin is limited by the small quantities available and their reactivity area. c) polyvalent toxoid (A, B, C, D, E) does not manage the population due to small quantities in short term deposits and postvaccination protection, a few months.

Decontamination: Botulinum toxin is very easy to kill:

- Heated to 85 ° C for a duration of 5 “ decontaminate food and beverage ;
- Botulinum toxin-adhering persistence in the atmosphere depends on atmospheric conditions and particle size in aerosols;
- Extreme temperatures and humidity-toxin degrades while fine aerosols in the atmosphere dissipates;
- If exposures are anticipated, protective measures can be taken: cover nose and mouth with clothing (scarf, shirt or handkerchief);
- Unlike the mucous membranes, skin is impermeable to botulinum toxin, after exposure to toxin botulinum, skin and clothes should be washed with soap and water.

Decontaminate surfaces and objects contaminated with 1% hypochlorite solution if you can not wait 8-10 days for natural degradation.

Infection control:

- Medical staff caring for patients with botulism will follow standard precautions;
- Suspects botulism, isolated;
- Minimization (treatment, prevention) of botulism as a weapon;
- Lab techniques to quickly highlight a biological attack;
- Immunoenzymatic a technique to replace the biological diagnosis-mouse;
- ELISA determination of the toxin in aerosols and on the battlefields;
- Coal recovery is not enabled in detoxification digestive predominantly lung;

Conclusions

A number of genetically modified viruses or bacteria can acquire virulence properties or potential release the weapons to do so is necessary to improve control laboratories to conduct such projects.

Any suspicion of an unusual clinical presentation, which may indicate the start of a virulent disease should be immediately reported. Between events apart spread deliberate, murderous of its acquisition of infection and a natural way to be remembered:

- Rapid development, unexpected by a disease with airborne transmission, with a curve epidemiologically distinct from the normal evolution of the infection, with a sharp increase in the number of cases, but limited time dispersion of aerosols;
- Severity of disease after respiratory infection (pneumonic plague, anthrax are extreme forms of severe respiratory infection). The same observation can be extended in case of a lethal virus with low to normal healthy adults during transmission by insect vectors (eg, Venezuelan equine encephalitis), but can become very dangerous, complicated evolution in case of infection with atypical respiratory;
- Unusual increase in the number of people who come in for a medical check-febrile syndrome, respiratory or gastrointestinal symptoms;
- Emergence of endemic diseases, with an unusual clinical presentation, in an uncharacteristic period of natural infection with a high number of fatalities recorded in a short time.

Center for Infectious Disease Control and Prevention CDC, Atlanta, U.S. bioterrorist infectious agents classified into three major classes, according to the following criteria:



- Impact on public health in terms of morbidity and mortality rate;
- The potential for mass dissemination in the environment due to the infectious agent of stability, accessibility of large-scale production capacities, interpersonal spread through secondary transmission;
- Disruption of normal functioning of society, due to panic;
- The need for special actions to increase surveillance and diagnostic capacity, and also to provide an important stock of medicines and vaccines.

References

1. Aradavoaipei George Gabriel Naghi, Dan Nita end terrorism? Publishing House "Header", Bucharest, 2002;
2. Atudosiei Nicole N. Balauca - General Microbiology, ed. Bioterra 2003;
3. Bacteria in biological-weapons system, "The Economist", "Official Gazette" from 0.16 to 22 .06.2002;
4. Centers for Disease Control (www.bt.cdc.gov). The bioterrorism section of the main CDC website. Best information is gained by going to "Biological" in the "Agents and Threats" index. Includes extensive links, Patient information sheets, downloadable presentations, press releases and indexed / advisory notes, etc. Separate index listing MMWR reports on anthrax and bioterrorism Other agents at www.cdc.gov/MMWR/indexbt.html;
5. Convention on the prohibition of improvement, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, no. 57.07/07/1979;
6. Costin Cernescu, Simona Ruta, Progress in virus diseases control and prevention of bioterrorist, ed. University "Carol Davila" Bucharest 2004;
7. Lloyd, Andrew; Mathews, Peter bioterrorism, the scourge of the Third Millennium, Ed "Hiperyon, Cluj - Napoca, 2002;
8. Louis Paun - infectious diseases, biological weapons, bioterrorism, ed. Amaltea Creating Web Pages Paul McFedries, Ed "BIC" All ", Timisoara, 2003;
9. Public Health Laboratory Service, Expanding site with full British Several protocols for Biological and chemical agents, general advice, and Patient information Leaflets. Teaching slide sets on secure website still only at time of going to press, (www.phls.co.uk/facts/deliberate_releases.htm)
10. Takei Gugoiu HTML by example, publishing house "theory", Bucharest, 2002;
11. Zajtchuk R, Bellamy RF, eds. Medical Aspects of Chemical and Biological Warfare. Office of the Surgeon General, Department of the Army, USA, 1997;



ORGANIC AGRICULTURE AS AN ALTERNATIVE TO A HEALTHY DIET FOR THE POPULATION

Androne Roxana, Marica Mariana Daniela, Atudosiei Nicole Livia, Poparlan Alina Maria

Bioterra University of Bucharest

Abstract: *Also known as organic farming, organic or biodynamic farming is a production method that takes into account traditional knowledge of farmers and which integrates technical progress in all areas of agronomy. It can respond fully to social and environmental concerns, providing quality products to consumers, both rich and poor countries.*

The role of organic agriculture to produce food is much cleaner, suitable for human body's metabolism but in perfect correlation with environmental conservation and development in respect for nature and its laws. One of the main goals of organic farming is the production of food with taste, texture and authentic and attractive qualities. These foods are obtained in the stage production at the farm through strict prohibition of the use of genetically modified organisms (GMOs and their derivatives) and the severe restrictions on the use of synthetic fertilizers and pesticides, growth regulators and the promoters, hormones, antibiotics and intensive systems livestock.

Ground maintenance agrobiologists given particular attention to everything because they believe that the balance of this complex and depends on the living environment of plants, animals and people.

Key words: *organic agriculture, compost, production of food with taste*

***I*ntroduction**

Organic farming is an agricultural system designed to provide consumers with fresh, tasty and authentic at the same time respects and natural life cycle of agroecosystems. Organic farming contributes to protection of natural resources, biodiversity and ensuring animal welfare and rural development.

Organic farming, protected within the EU and Romania to the definition given by this farming system is similar to the terms, "organic agriculture" or "biological agriculture" used in other Member States. This system of agriculture is a process "modern" to grow plants, raise livestock and produce food, which differs fundamentally from conventional agriculture.

Organic farming is a major contributor to sustainable development, increased economic activities with a significant added value and increase interest in rural areas. The objectives and principles of organic production rules are contained in the EU and national legislation in this area. These rules, along with defining the method of production in the plant and animal breeding, and cover the following aspects of organic farming system: labeling, processing, inspection, marketing and import.

For procurement and marketing of organic products bearing the EU logo label and specific organic production, producers must go through a strict process that must be followed exactly. So, before you can obtain agricultural products can be marketed as'



organic product made from “holding must first undergo a conversion period of at least two years.

In Romania, testing and certification of organic products is currently provided by private certification bodies and inspection. They are approved by the Ministry of Agriculture and Rural Development, on the basis of independence, impartiality and competence established by the Order no. 688 / 2007 approving the regulations on inspection and certification system, approving the inspection and certification bodies Supervision and inspection bodies. Approval by MAFRD control bodies shall be preceded, necessarily, their accreditation in accordance with European Norm EN ISO 45011:1998, issued by a body designated for this purpose.

Organic farming is a dynamic sector in Romania in recent years which has seen an upward trend in both the plant and livestock sector. Product marketing organization is an important branch of organic farming. Marketing of organic products is only registered traders to Ministry of Agriculture, through various channels to market: farm-gate sales, wholesale sales in stores, sales in shops, on-line sales through stock market for organic products (www.agricultura-ecologica.ro), seasonal sales by market.

Materials and methods

A. Organic fertilizers in agriculture

1. Compost

In organic farming, the concept of fertilizer at fertilization is preferred because the primary purpose of nutrient intake is not as direct nutrition of plants, as is common practice in conventional agriculture, both enriching the land. Through the process of wetting the soil microbial population and activity in organic

farming to ensure the full range of nutrients necessary for plant nutrition and reduce risks of deep-water pollution.

Due to increased solubility of synthetic chemical fertilizers, to ensure a fast growing plant, the main effect, but with a number of side effects, unwanted. One of the most serious effects of excessively use of chemical fertilizers phenomenon occurs because nutrients wash solutions from / to the ground by rain or irrigation water and their infiltration into groundwater, contributing to increased rates of eutrophication water. Another phenomenon occurred due to excessive use of chemical fertilizers for plants overeating, is the proliferation of animal and plant pests, such as aphids, red spider, mildew and Botrytis Tucker, whose development is enhanced crops fertilized with excessive nitrogen. For these reasons organic farming or organic fertilizers is preferred that elemnte mineral nutrients, poorly soluble are mobilized by soil microorganisms.

2. Humus

Humus is an organic material in black or brown, which is formed as a result of decomposition in soil and animal debris (roots, straw, manure, green manure, etc..) Due to activity of microorganisms (bacteria and fungi) and macro (earth worms, insects, mites etc.. component of soil fauna: the approximately 100,000 m², of the frames, which represent 10% of total biomass and include at least 1 million per hectare, equivalent to working out two steers would always work in a hectare of land). In soils rich in humus and microorganisms work is intense and favorable macro-organisms, which positively affects fertility.

Humus in cultivated land must be constantly renewed by the addition of organic matter, if not impoverish the soil gradually. Some cultures released large amounts of residues after harvesting: they are “humigene”, they



are mainly fodder crops. Others consume far more humus than surrender: they are "humivore" appropriate sugar beet and potato. A soil rich in humus has a good structural stability, which significantly limits the retention and wind erosion. Humus is particularly necessary in fragile soils (due to their granulometry), land slope and still making the type of crop (celery, black winter field, vines and orchards).

3. Organic fertilizers

Organic fertilizers increase the humus content of soil and water retention capacity, improves structural stability, decreases the amount of energy required to work the soil, stimulate soil biological activity and provide the major nutrients and fertilizers needed vegetation.

-soil organic material administered

Soil organic matter are given:

- Slow-moving amendments: manure, compost, producing stable humus, improving soil structure and generally neeliberând than half of the nitrogen content in the first year;
- Amendments to the rapidly evolving: liquid fertilizers, solid and liquid animal manure from livestock farms, green manure;
- The limited complementarity, rapid mineralization of organic fertilizers: bird droppings, fish or meat meal, blood meal etc..

Schematic organic matter evolves in three phases:

- Transient decomposition products by micro and macro;
- Partial transformation of humus;
- Conversion into stable humus.

4. Green manure

Green manure crops are hidden or associated culture used in large, fruit, vegetable and vine crops. Their introduction does not lead to major crop loss because they are placed on empty seats (free) or in combination with other herbs.

They are being harvested as forage or crushed and incorporated into the topsoil. Built-In too deep, green manure undergoes anaerobic partial decomposition, especially in clay soils.

The main plant species used as green manure a) legumes: beans, lupine, sainfoin, forage peas, meslin, clover. Home is their ability to fix nitrogen from the air and play efficient plants.

b) grasses: barley (for light soils or limestone), oats (wet and cold regions), Rye. Grasses are usually planted in association with legumes to increase the mass of vegetation due to a favorable effect on soil structure and C / N ratio high enough.

c) cruciferous cabbage feed, forage rape, white mustard, fodder beet. Cruciferous has several advantages: their roots in the soil due to swing afânează their rapid development, while better mobilize mineral reserves from the soil, especially potassium. Moreover, they grow on poor land and some of them (white mustard, fodder beet) are able to combat nematodes (class of worms with thinner body, cylindrical).

d) Other species: spinach and sunflower (very resistant to drought, rapid growth in warm climates); various bee plants (currently mobilized in soil potassium and fight against nematodes).

In order for plant biomass can be decomposed into contact with air, soil incorporation is made shallow (5-10 cm) in heavy soils, 10 to 20 cm in light soils. To achieve this, a green manure shattered agricultural machine equipped with rotating bodies or cosește a special mower, equipped with several cutting bar, stacked one above another.

Crushing is expected when it is necessary to decompose rapidly, especially in gardening, given the rapid rotation of crops. Green manure is mixed with the soil with a disc harrow or teeth.



It should never be built through deep plowing as fresh organic matter ferments, which inhibits root growth and develop riding.

Aerobic decomposition of green manure must be gradual and complete as possible before sowing of the main culture, to not risk compromising its development. Green manure decompose faster when tender and rich in protein but when soil is aerated by cultural techniques.

Period of incorporation of green manure crops is determined by the following conditions of climate and soil conditions. Incorporation of green manure should be avoided immediately after rain, when soil is still moist. On the other hand, the optimal stage of plant mass destruction before its incorporation in soil must be done before înspicare for grasses, or before the first stage of flowering, for dicotyledonous. After this time there is a risk of seed formation and thus samuraslei, followed by green manure lignificarea, which produces a blocking oxide.

B. Fertilizers used in organic agriculture

a) Mineral Fertilizers

These fertilizers or amendments are complementary to and not substituted by recycled nutrients. Amendments corijează soil characteristics (calcium, pH, etc.). And make future fertilizer organic fertilizer soil bringing essential elements and present in insufficient quantities: phosphorus, potassium, calcium, magnesium and trace elements. Shortcomings are highlighted by analyzing soil samples. The only authorized mineral fertilizers are natural substances that have not only suffered physical treatment (crushing, sieving). They should have a low solubility in general, so that it can not be directly assimilated by plants, microorganisms must soluble.

Also, some fertilizers (such as patentkali) exception, to meet the needs of potassium and magnesium.

b) Fertilizers predominantly calcareous

Sand-chip calcareous algae

Amendment is a natural limestone of marine origin, which can increase soil pH too acidic and rich in calcium them. Contains 30-40% calcium carbonate and magnesium and also many trace elements (copper, iron, silicon, magnesium, etc.). These algae are finely ground before use, their effectiveness is linked to the softness of Grist, as with all mineral amendments. Seaweed powder is scattered on the ground directly over the farm animal bedding or compost incorporated into his preparation time (3-4 kg per tonne of seaweed organic fertilizer). You can also use, spray directly on paper, to stimulate vegetation and fight against certain pests of crops. It is preferable to administer moderate and divided every two years for example, than to make a massive one every five years.

Dolomite

This sedimentary rock rich in calcium and magnesium, is used in acidic or neutral soils. It can replace the sand rates of algae, especially in regions distant from the sea.

c) Sources of phosphorus

- Natural Phosphates

In the case of phosphorus deficiency in acid soils phosphorus intake is done naturally, especially from North Africa (Morocco), phosphate or chalk. In calcareous soils are given natural phosphates (such as phosphate Senegal, for example). Each time, when possible, the contribution of fertilizer is through composting.

Thomas slag

By-product of metallurgical slag Thomas (or basic slag) can be used in neutral or acidic soils.



d) Sources of potassium

Magnesium sulfate

Decanting water from the sea, provide soil magnesium sulfate magnesium.

It is used especially in alkaline soils.

Iron sulfate

The added bulk manure or compost to prevent blockage caused by direct administration.

The need for mineral fertilizers is evaluated as:

- By observing the ground: for example, needs mineral fertilizers are lower in sandy soils than in soils, wetlands;
- By observing the culture, to pinpoint any deficiencies, diseases or pests;
- The chemical analysis laboratory.

If an item high deficiencies, the correction is done in several stages, in order not to unbalance the ground. For each element embedded in the soil are expected maximal dose. It also takes into account soil capacity to retain nutrients, it depends on the clay and humus content.

Results and discussions

Organic agriculture - a viable alternative to traditional agriculture

Food should refer to organic production methods only if they come from an organic farm system is applied management practices. These practices aim to improve the nutrient content and productivity of the ecosystem supported, providing weed control, pests and diseases by dependent life forms, recycling plant and animal residues, crop selection and rotation, water management, plowed and cultivated.

Soil fertility is maintained and enhanced through a system that optimizes the biological activity and physical nature and mineral soil to ensure a balanced

nutritional content of plants and animals, but also to conserve its resources. Output is supported by nutrient recycling plant as part of the strategy of fertilization. Pest and disease involves encouraging a balanced relationship host/predator population growth of beneficial insects, biological control and cultural and mechanical removal of pests and affected portions of the plant. Base administration wisely organic livestock is to develop a harmonious relationship between land, plants and animals and respect for the physiological and behavioral needs of animals. When it is reached through a combination of quality fodder produced organically, a pace supported storage, livestock management systems appropriate to the behavioral and management practices that reduce stress, supporting the health and welfare, preventing illness and avoiding the use of their allopathic medicines (including antibiotics).

Organic agriculture an alternative to traditional agriculture, due to its malfunction and causes that have led to lower resistance in plants, animal health and soil quality and thus human health. Organic farming is based in principle on raising soil organic matter content by using natural organic fertilizers.

If the term organic farming, organic that has become familiar in recent years, the practical significance of this method of production is still unclear for most of the farmers. As regards the system of concepts, it was estimated that about 16 different names used for organic agriculture, the most popular are: organic farming, regenerative agriculture, sustainable agriculture, sustainable agriculture. In some cases different names indicates the conceptual or philosophical differences. Biological term is preferred in continental Europe, while the British and Americans use the term organic, and in Romania the term organic.



Harmfulness pesticide use in intensive agricultural practice

In late 2001, the Indian farmer Enakunthala Ravi death sparked a wave of feedback on the maintenance practices of cotton crop in India. The case of the young man who died poisoned by pesticides that had inhaled while treating cotton crop against pests, is not unique. During the harvest of 2001, another 500 farmers have died as a result of accidental ingestion of pesticides.

Such cases arouse public indignation at the moment, but does not cause a major change in global agricultural strategy. The reason is obviously the business side of the agricultural industry. For agri-business giants, if you bring a harvest massive profits, then as the statistics above show only minor losses. In fact, these statistics say that the real price of massive crop is primarily paid by final consumers, but farmers in poor countries oppressed by hunger and thirst apparently saved by the rich countries import. According to a study from the digital archive of the U.S. National Institutes of Health, within six years, no fewer than 8,000 patients hospitalized in a medical institution in Warangal, due to pesticide poisoning. Over 20% of them died. A menu consisting only of foods that do not exceed legally allowable pesticide residues can accumulate a final amount of unexpected harmful pesticides. A team of researchers from the School of Public Health at Harvard found that even if people exposed to low levels of pesticides, the risk of developing Parkinson's disease could increase by up to 70%.

Advocates argue that conventional farming a drop in productivity would affect food security of billions of people. However, statistics indicate that current is an excessive, if confronted with the phenomenon of food waste. According to a study commissioned by the British government, the English threw

in the trash every year about four million tonnes of good food to eat. U.S., however, throw more than 25 million tons of food, ie just over one quarter of annual production. In addition, a huge quantity of food is lost simply due to processing, transport and inadequate storage of food.

Comparison of the foregoing at the current level of Romanian agriculture, Romanian farmers performance relative to other farmers in the EU's performance, we can say with certainty that it is necessary to rethink agricultural policy in our country. One of the principles that should be promoted and that would lend itself best of many small farms and very small (subsistence) would support and stimulation to obtain organic products, because at least for now it's hard to keep up with farmers in countries developed, and the disadvantages are obvious.

'Organic farming - protected within the EU and Romania to the definition given by the agricultural system is similar to the terms, "organic agriculture" or "biological agriculture" used in other Member States. This system of agriculture is a process "modern" to grow plants, raise livestock and produce food, which differs fundamentally from conventional agriculture.

Specific farming practices include:

- crop rotation as a prerequisite for effective use of farm resources;
- Very strict limits on the use of synthetic chemical pesticides and chemical fertilizers, antibiotics for livestock, food additives and other substances used for complementary agricultural products;
- Prohibition of the use of genetically modified organisms;
- Recovery of existing on-site resources, such as use of manure as fertilizer and animal feed produced on the farm;
- Choice of species of plants and animals resistant to diseases and pests, adapted to local conditions;



- Livestock at large and opened shelters and feeding them with organic feed;
- The use of animal husbandry practices appropriate to each breed separately.

Conclusions

Organic farming is also part of a larger chain, including food processing, distribution and sales sectors and ultimately the consumer who is the final link in the chain of distribution of organic farming, and therefore must be given most attention to be given to high-quality food and drink, fresh and tasty, which claims to satisfy fully justified.

Many Romanian operators in organic farming (farmers, processors and traders) have noted ecologică agriculture sector development and the steps have been taken in organizing this market and therefore began to be interested in producing organic products.

Producers Association of Traditional and Ecological Maramures traditional fairs held regularly, each time reaching a success. Șlibovița jam or, in men cheese, cheese with dill, honey, nuts, honey comb, berries, horincă, slime or Slane, ham, homemade sausage, black pudding, corn bread, homemade bread, mulled wine, homemade cakes, halva, herbs, wool rugs, pottery, popular with clothes and masks, wickerwork and wooden objects, Maramureș music (which is an organic product reported another type of music used according to statistics of the 99 presidential % of Romanian) or selected dishes: cabbage post - boace, punches.

Such events are recorded in all regions, although shy, they will be one of the types of businesses that could serve to stabilize the population in rural areas, especially on hills and mountains, taking advantage of

structural funds available to farmers in EU European. Of course, these foods must be produced properly comply with the ethical nature and animal welfare, and ensuring that this complex system of regulations mentioned is implemented, operators will follow the production will receive a certificate of organic product will be able to label product word "organic".

References

1. Chida practice organic farming - organic farming techniques "Ion Toncea, Ed AcademicPres, Cluj Napoca, 2002
2. James AA, E. Pascal, customer relationship management, lecture notes, revised and enlarged edition, Prouniversitaria Publishing, Bucharest, 2008
3. I. Macon, Intellectual Property, Publishing All Beck, 2005
4. M. Olaru, Quality Management, ed. Economic, 1999
5. Paraian E., E. Pascal, expertise of goods, Pro Ed Universitaria, Bucharest, 2007
6. Regulation (EU) nr.1383 / 2003, Article 2
7. S.C. NATURE OF LAND LLC company catering sector preponderant approaches aiming to contribute to extending and developing this concept in our country's population-Ing Radu Panait
8. <http://www.ifoam.org/whoisifoam/index.html>
9. <http://europa.eu.int/comm/agriculture/qual>
10. http://www.organic-europe.net/europe_eu/default.asp
11. www.ec.europa.eu/agriculture/organic/home.ro
12. <http://www.biofach.de/main/Page.html>
13. <http://www.soel.de/english/index.html>
14. www.agricultura-ecologica.ro
15. www.bioagro.ro/



GLOBAL WARMING AND TOURISM

Stan Petrescu

Bioterra University of Bucharest

Abstract: *Tourism is a very important activity: economical, social and holistic; it must contribute to increase the satisfaction of those practicing it, organizing it, supporting it and it helps lead to the development of regions, investment interest, to be based on value, team-work and networking and be customer oriented, offering and demanding projects. It must not be rigid and unimaginative, but must be varied because the diversification trend leads to evolution and improves relations between people.*

Key words: *concept of tourism; green tourism; ecological processes; climate change; global warming; environment; biodiversity.*

Introduction

• Man as an island and its welfare

There are over six billion human beings around us. In the center of human concerns, lies the human himself, as an individuality compared to others. Great sufferings are not collective, they are individual. When everybody is hungry – each individual is hungry; when everybody walks – each individual is walking, each one must swim when we all fall into the sea.

Harmony, coexistence with nature examines each one's issues, considering the individual as the most important human cell. For as long as one lives, it is the most important being in its life. The man, in his unmistakable individuality.

That is the beginning of life and so is the end: individual.

It is known that one can not live alone: necessarily living with each other and together harmonizing with nature.

The man lives on an island, on an individual island and this is the very truth. Every human being is a separate Island. In this global ocean

there are over six billion individual human Islands. But man isn't the only island in the ocean: man is an Island in an archipelago of six billion islands. The man is an Island alone, but it is not an island of solitude.

The man will never be alone, because the environment does not allow him. The human Island is surrounded by numerous other items – many items, infinite items, all kinds of items. In the midst of all these, lies the man and all the other individuals.

Universal harmony rules are the same for all kinds of coexisting and this is a proof of ability to build and maintain the coexisting between man and the surrounding nature.

We live today in a world where everything is possible. Everything being possible in this world of asset management, we are, at the same time, under the impression that we live in a chaotic world.

But our world, of course, is not chaotic. The same causes produce the same effects. And that doesn't mean chaos: it is the principle of logical causality. The world is sinuous, of course, but not chaotic. And being sinuous, has nothing to do with being chaotic. A sinuous road is not chaotic.



Chaotic is the fate of a driver that doesn't know how to drive; chaotic is trajectory of the car whose driver is asleep at the wheel. Accidents are caused only by drivers who don't know how to drive, didn't learn how to drive, but they think they know how to drive.

Man must learn to drive and stop blaming the road, because there is no other road, because there is no other reality. The world is exactly how it is suppose to be. The word and environment should be taken as they are.

The man, from the beginning of his life and all the way to the end of it, is running after wealth. The welfare is "confortable" when you enjoy life with dignity and satisfaction. Given that welfare is a state of satisfaction, to achieve it, it is important, first of all, to leave the state of dissatisfaction. This is the purpose of human action: to live in harmony with the environment, to leave the state of dissatisfaction, to achieve a state of satisfaction.

Well-being is a state of satisfaction without excesses, made of material welfare and mental welfare, in fact, two solid columns supporting complete well-being. Wealth, and mental status are both necessary, so none of them should be despised. Mental well-being comes from a mental satisfaction. Material wealth is the result of a real sufficiency. Material wealth is important and prevalent in any attempt to acquire the full welfare. Therefore, man as an Island will always seek to acquire complete welfare.

Sustainable development of tourism, of agrotourism and the main purpose of environmental protection lead to economic growth and welfare, all being closely linked to the human Island and its environment.

The fascinating journey of knowledge of human nature, in harmonious conjunction with the surrounding nature, must start from "man as an island and its welfare".

The big industry of world tourism and entertainment has its center of direct concern "Man as an island and its welfare".

One can understand the general philosophical theme „The Green Sustainable Tourism”, only by considering the men coexisting by living in harmony with the environment.

The great ancient Chinese scholar Lao Tzâ said, in his work „To snow in the middle of summer ”: „A journey of a thousand miles begins with a single step”. It is the same in tourism. It is happening to me now, when I am thanking the good Lord that I have the fortune to take the first step in the great journey of knowledge of the wonderful Middle East.

Materials and methods

• The concept of tourism development

English verb „to tour” (Traveling, wandering), opened the window to the great adventure of travel entertainment. A great specialist, dedicated to research travel phenomenon, Swiss professor Walter Hunziker, defines tourism as „all the relationships and phenomena resulting from the movement and stay of people outside their place of residence, as long as the stay and movement are not motivated by a permanent establishment or any gainful activity”. Although criticized by some, for its lack of generality, the limited character as excluding a series of events that have travel content, such as participation in national and international congresses and meetings, business travels, events requiring many travel services as well, remains a reference definition.

Tourism has been one of the most successful industries in post-war growth. In 1950 there were only 25 million international tourist arrivals worldwide.



These days, over 650 million tourists travel around the world each year. Almost 10 times more tourists than in 1950 traveling on vacation in their own country. While tourism has become a powerful tool of wealth transfer and job creation, we now know that uncontrolled tourism development has four major inconveniences for tourist destinations and are really issues for protected areas.

Tourism is a Triptych activity: economical, social and holistic; it must contribute to increase the satisfaction of those practicing it, organizing it, supporting it and it helps lead to the development of regions, investment interest, to be based on value, team-work and networking and be customer oriented, offering and demanding projects. It must not be rigid and unimaginative, but must to be variated because the diversification trend leads to evolution and improves relations between people. In the knowledge society, the following resources are by far the most important: **information, digital communication and high technology**.

By utilising these three resources, tourism should lead to wealth and happiness, to the real satisfaction of the human island. Tourism should be part of the concept of healthy living - green or environmental tourism.

In his famous „Brundtland” report, from 1987, of the World Commission on Environment and Development (WCED), four critical principles for the concept of sustainability have been highlighted: the idea of holistic planning, cross-sector planning and strategies, the importance of keeping key ecological processes, the need to keep the valuable human heritage and biodiversity, recognizing that regional developments should occur so as not to reach long-term depletion.

Through the imposition and enforcement of these principles, tourism can have a strong physical impact on the visited places, can

have serious cultural impact and can have major influence on transport to and from tourist destinations, more subtle speaking, can destroy the future promised by the transformation of tourist destinations in an area dependent on money from tourism activities, can contribute to good results in conventional tourism development, which looks upon culture and natural environment as resources for exploitation and at exhaustion.

To achieve a sustainable tourism, we need an open approach, in partnership with all implicated factors. Success depends on the goodwill and flexibility of the partners. It takes a long-term approach, working hard to achieve in a rapidly changing modern world. Tourism requires the acquisition of special skills and is an area with a fierce competitive market economy. Flair, skill to accept necessary risks, market knowledge and international networks knowledge are essential. Partners may be from the public sector, the private sector and nonprofit interest groups.

• **Green tourism**

Green tourism is not based on green tourists. A green tourist is not a tourist dressed in green, in any case. A green tourist is a tourist who thinks green and is trying to protect the environment so that future generations of tourists can enjoy this planet.

Green tourism can be written bound, in a word, because it is a concept such as agrotourism, ecotourism and translates as: new tourism, bio-eco-tourism, resource of natural tourism and civic values in corporate travel, clean service in tourism, a sustainable development of tourism, tourist service in harmony with the environment, all the friendly relations between tourism and environment, architecture of all states tourism in agreement with climate change,



compatibility between the joy of living in nature, with care for the environment.

We offer that, in terms of sustainability "green tourism", to mediate for harmonization of the different interests, sometimes divergent, of all "players" involved in the development of tourism and travel-loving countries in the world.

Green Tourism should be understood as tourism relations - environmental protection of the biodiversity in tourism. It also means direct contact with the environment and reach of optimum harmony with nature, also representing a natural form of tourism, support of a specific form of nature, in all respects, if you will, means a strong friendship between entertainment and the environment around us.

Green tourism refers to mid-environmental resources protection, through conscious tourist attraction, being also a form of economic benefits through nature, for nature, certainly representing an admirable generator and multiplicator of the value-added given the benefit of nature, such as welfare for nature, which creates welfare to human and the whole community.

And not least, green tourism means compatibility of pleasure experienced through joy in nature, concern for mid-environmental resources, a huge positive engagement to maintain biodiversity within balance limits, the science of processing leisure in time to relax, spent as much as possible in nature.

The ensemble of particular forms of tourism, whose developments is in perfect harmony with the natural and socio-cultural environment of the receiving areas, defines, unquestionably, the Ecotourism or Green Tourism. Ecotourism is based on the multitude of forms of tourism that are promoted to improve the impact of tourism from a social, cultural and environmental point of view.

It is necessary to cultivate and develop the potential of any person (provider or recipient of a travel service), its creativity and willingness to voluntarily adopt a protective attitude towards the natural environment.

From the corner of the Green environmentalists came the proposition to transfer the pressure of public increasingly concerned about the state of the environment on public authorities to take material measures (măsură concretă) to protect the environment in tourism, and beyond. We understand the economic importance and the progress the development of tourism involves, in any area of the world and we want to actively involve (implică în mod activ) ourselves in the deployment of all principles governing a clean and healthy planet.

Green tourism is due to unveil his vision, that of a world where it grows in respect and harmony with nature, bringing the benefits of this exchange, each actor's contribution to tourism, the protection and enhancement of natural values, as basis of a sustainable living environment.

Green tourism is to reveal his mission, consisting of those dynamic actions that contribute to sustainable development of all countries of the world, as a part of an overall plan (plan global/general) in which we live, so that future generations can enjoy at least the same benefits of nature, as we do.

Results and discussions

The most widespread concern generated by global warming are people and institutions engaged in agriculture, in the areas that affect living and quality of life depending on them, mostly on the weather. Small and large travel agencies will also be affected or owners of tourist resorts, who will have to



face, with great sacrifices, new challenges caused by climate change.

The entire tourism product will be affected - every destination has a climate related component. If the climate will change, and it is a certainty, we must adapt rapidly, on the go.

Some nations will discover that they had a tourism industry and now it no longer exists. All the tourism industry will be affected for each destination is influenced by climate condition.

In the globalized world, tourism will not be faced generally with a major crisis, though profits will depend on proper adjustment. But along the Equator, maintaining the tourism industry afloat is a matter of survival. In most of Africa, for example, tourism is an important source of foreign income.

The world will have to take drastic measures to reduce emissions of greenhouse gases over the next two years in order to avoid the terrible effects of climate change, experts warn of climate analysis at the Hadley Center in Britain.

In their view, only a 3% reduction in global emissions by 2010 would avoid a global warming of 2 degrees Celsius that would have disastrous effects on the whole world.

However, there is a price to pay. With an industry based on cars and buses, air conditioning and plane flights, tourism is a major source of gases that cause warming. It is responsible for 5 percent of carbon dioxide emissions worldwide, as concluded in the conference in Davos¹. Poor countries do not usually hold funds necessary for changes to be made so the medium is no longer endangered. It's nice to talk about reducing the number of air travel, but many states depend on it.

Think about New Zealand and Australia. More importantly, what happens in poor countries - the Maldives, Seychelles and Africa - countries that need this type of transport, because it is the only way tourists can arrive².

Awareness that tourism and climate change are closely related, Fiji has joined this year the Ministers of Environment and Tourism. According to the Ministry of Environment and Tourism in Fiji, tourism is the only chance to overcome poverty in Fiji. Without it, the country's economy would collapse.

On the short term, global warming offers a range of opportunities, especially in temperate zones. Warming trends have extended golf season in Antalya, Turkey, over a month, according to Ugur BUDAK, coordinator for the company golf Akkanat Holdings. Golf season started normally in March. Yet, tourists from Britain and Germany arrive now in Antalya in February. High temperatures, drought, lack of humidity, high and dry winds contribute to the spread of fire. Any spark changes immediately into a fire that spreads rapidly and beyond control. Often, fires occur naturally, sometimes caused, but not infrequently these disasters have occurred because of negligence, particularly in tourist areas of natural or protected areas, where man lives in close contact with nature, making the camping or outdoor recreation.

Melting glaciers (topirea ghețarilor) are a major problem for the entire planet. One of the largest glaciers in Antarctica is melting four times faster than a decade ago. 15 years ago, was estimated that glaciers will melt in about 600 years. Now, the information suggest that it could disappear in just 100 years.

¹ "Climate Change and Tourism", organized by the UN in Davos in October 2007.

² Geoffrey Lipman, Assistant Secretary General of World Tourism Organization of the UN, Davos 2007. Source: www.iht.com.



The highest ski slope (pantă) in the world has melted. Chacaltaya glacier in Bolivia, 18,000 years old, where highest ski slope in the world was placed, completely melted due to climate change.

The worst effects of the melting glacier is that two million Bolivians living in the area near the capital La Paz, were left without water (au rămas fără apă).

Global warming could cost the EU 65 billion per year, if not be stopped.

The total cost of global warming but could be much higher as the study focuses only on the four sectors of the economy and does not consider the noneconomic impact in other areas such as biodiversity, ecosystems and natural disasters.

Tourism is the only sector that would maintain (și-ar menține) a neutral growth in aggregate EU level, despite differences between regions.

Glaciers in Alaska and Washington are melting every day. Three large glaciers, in Alaska and Washington state have lost considerably in size by melting, which is a clear sign of global warming, shows a study by the Geological Service of the United States (USGS)³.

The three glaciers have the same type of behavior - weight loss, and where they are located, the climate can not support healthy glaciers anymore, as geologists say.

Drought, as a consequence of global warming, affects the production of organic products. Total production of organic products this year will fall by 15% compared with the previous year to 226,270 tons.

The Sahara is growing “green” as a result of global warming. Is a paradox. Global warming gradually transform the Sahara, but other desert regions as well, mainly arid areas in green areas, because of the frequent raining.

According to National Geographic News, these rains may revitalize dry regions, a phenomenon that can be exploited by farmers. Also, the frequency of higher rainfall can restore the Sahara in time to the savannah it used to be 12,000 years ago.

According to experts, although initially to circulate thought the Earth’s warming will cause an expansion of deserts, now the situation seems to be the exact contrary. Experts believe that a secondary scenario may run to replace the first where water and life will occupy arid, which causes narrowing of the desert regions.

Farouk el-Baz, director of the Center for Remote Sensing at Boston University, supports this theory and believes that the Sahara is undergoing (trece) a climate change from dry conditions to wet conditions. „Earth warming will result in greater evaporation of ocean water, leading to more rain” said el-Baz.

Climate change will lead to migration, with incalculable consequences, the 75 million people in the Pacific. An Oxfam⁴ organization report shows that small Pacific islands already feel the effects of global warming, including water shortages and food, increased cases of malaria and frequent floods.

³ The United States Geological Survey (USGS) is a scientific agency of the United States government. The scientists of the USGS study the landscape of the United States, its natural resources, and the natural hazards that threaten it. The organization has four major science disciplines, concerning biology, geography, geology, and hydrology. The USGS is a fact-finding research organization with no regulatory responsibility. Source: en.wikipedia.org/wiki/United_States_Geological_Survey

⁴ Oxfam International is a confederation of 14 organisations working with over 3,000 partners in around 100 countries to find lasting solutions to poverty and injustice. Oxfam was originally founded in Oxford in 1942 as the Oxford Committee for Famine Relief by a group of Quakers (which included Marcus Tite), social activists, and Oxford academics. Source: en.wikipedia.org/wiki/Oxfam.



Already, increasingly more people were forced to leave their homes and the number of those moving is growing. In addition, the report warns that many people will not be able to return in their own country and will become international refugees, issue that will turn in a major source of insecurity.

Climate warming has led to a decrease of 50% in the weight of fish in European waters, according to a French institute Cemagref⁵ study, published in USA.

Institute researchers specialized in sustainable water management and planning, who studied fish populations in European rivers, the North Sea and Baltic Sea have shown that different fish species have lost an average of 50% in weight for the past 20 -30 years and the total weight of fish present in European waters decreased by 60%.

Global warming may lead, through its effect, to the outbreak of war, poverty expansion, enlargement migration, increasing activities of terrorist and organized crime and all these to mobbing in world tourism.

In addition to the effects of global warming on tourism, other factors can be added as well, such as oil slicks in the sea, nuclear radiation, forest fires, water and soil pollution.

Conclusions

Tourism is one of the largest industries in the world that has ties with the gross domestic product and the degree of global occupation. The environment is the most important

element in tourism, so there is a broad-large interest in protecting natural and cultural resources. Although there have been ongoing concerns, these resources are eroding slowly and steady and the development of industry will rather deteriorate the fragile ecological system that sustains the industry. Thus, if the industry was sustained, it was necessary for measures to be undertaken to minimize the effects. At the Rio Earth Summit (UNCED) in 1992, there was a general consensus, (Agenda 21⁶) by which the tourism industry and passenger transportation was supported and had to take care of the ecological system, the environment and local communities. In conclusion, Agenda 21 to support work development was adopted by 182 countries. This program has identified some key issues that must be resolved.

Overall experience of travel companies allowed the identification and improvement of some basic issues discussed at Rio. Top areas for improvement in terms of financial performance, resulting in reduced water and energy consumption are reduction of water loss by water loss management and waste management by expanding the recycling process and thus leading to reduced costs.

However, the overall experience has led companies to design a clear picture containing a series of mandatory standards needed to be respected by all players in tourism. Green, players such as hotel chains and cruise ships, car rental, transport, restaurants, airports, fast foods, travel agencies for rest and treatment centers, equipment rental, tours operator,

⁵ Cemagref (public agricultural and environmental research institute) leads final research projects in three areas : continental waters, agricultural and food . Source: www.cemagref.fr/English/.

⁶ Agenda 21 is a programme run by the United Nations (UN) related to sustainable development. It is a comprehensive blueprint of action to be taken globally, nationally and locally by organizations of the UN, governments, and major groups in every area in which humans impact on the environment. The full text of Agenda 21 was revealed at the United Nations Conference on Environment and Development (Earth Summit), held in Rio de Janeiro on June 14, 1992, where 178 governments voted to adopt the programme. The final text was the result of drafting, consultation and negotiation, beginning in 1989 and culminating at the two-week conference. The number 21 refers to an agenda for the 21st century. It may also refer to the number on the UN's agenda at this particular summit. Source: http://en.wikipedia.org/wiki/Agenda_21.



casinos, garages and petrol stations, shops, autogrill sites, rental boats, golf clubs, ski centers, info-centers, other sports facilities, ports and tourist routes.

All these actors have to comply with certain mandatory standards such as: concern for minimizing environmental and ecological impacts, reduce risk and future liabilities, attracting responsible customers, increasing the contribution to the local economy, reducing water consumption and energy, improving community relations, provide confidence to shareholders, potential investors and other third parties, encouraging and perpetuating the local traditions and customs, motivating the staff, improving living standards, preserve local cultural heritage, support, expansion and planning applications of the program to minimize the environmental and human effects, by the employees applying their knowledge, minimizing environmental impacts on the community.

It is imperative that all people on the planet to advocate respect for nature and transmission of faith in the potential of each person when engaged as a provider or beneficiary of a tourist service and also cultivate their wills to take in a free and conscious, a protective attitude towards the natural environment.

5. Stănciulescu Gabriela Travel Agency Management, Bucharest, Editura ASE, 2002.

www.ecotourisme2002.org

www.world-tourism.org

www.nationalgeographic.com,

www.bbc.co.uk

References

1. Alexander, D, Neguț S, Istrate I: Geography of Tourism, Bucharest: Academy;
2. Ionică Maria (coord), (2004) - Tertiary Sector Development Strategy, publisher Uranus, Bucharest;
3. Stănciulescu Gabriela: Sustainable tourism management in urban centers, Editura All Beck, Bucharest, (2004);
4. Sustainable Tourism Strategy of Romania project;

INTERNATIONAL PARTNERS

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Khadiga Mohamed Gaafar – Higher Institute for Specific Studies
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Balestri Gino – D.A.G.A. Sezione Scienze Zootecniche, Università di Pisa
Ceccanti B. – Istituto per lo Studio degli Ecosistemi (ISE), Pisa
Doni S. – Istituto per lo Studio degli Ecosistemi (ISE), Pisa
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Manager, Argelato (BO)

CANADA

Héroux Gilbert – Vanier College, Montreal



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catalin.galan@gmail.com

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Office:

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