Rector's Allocution

We have the special pleasure to let you know that the Review of our University, „Bulletin of Scientific Information", having ten years of consecutive issue, it achieved the recognition of the National Council for Scientific Research in Higher Education (NURC), being comprised in the category „National Reviews — C Category".

So, Bioterra University review „Bulletin 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, environment protection, agricultural economics etc).

This way, I express my gratitude to the contributors to our science magazine, to the authoritative academic and universitary personalities of whose studies are found in the selection done by the scientific board of our magazine with whom we have strong relations of partnerships in the development of jointed research projects.

I wish to our scientific science magazine many and consistent issues.

Prof. Floarea Nicolae, PhD

Rector of Bioterra University Bucharest

Editorial Board's Allocution

„Bulletin of Scientifc Information" was published at the initiative of several young researchers with the direct support of Bioterra University Board, having the first edition in 1998.

Years passed and this magazine has enriched continuously its scientific and didactic dowry becoming slowly, but surely, a veritable platform for academic information.

In 2008, this science magazine turned into a new more dinamic and attractive pattern, being published in special grafic features (full-color) and fully in English language. Also, since 2014, our science magazine benefits of a modern website: www.bsi.bioterra.ro.

Every year the editorial team has increased the number of members; nowadays it brings together numerous personalities of the scientific and academic world from different foreign countries, thus being a guarantor of a high scientific level.

Thanks to all our readers and collaborators that through their suggestions, criticisms and feedback contribute to the improving of our science magazine quality.

Prof. Petculescu Nicole Livia, PhD

Vice Rector of International Relations

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CONTENT

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ASPECTS OF *IN VITRO* PROPAGATION OF *ACER PLATANOIDES*

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Abstract

Maples are known throughout the world for centuries for their many uses: in landscape design, food industry, wood industry, medicine. Maples have many ornamental varieties, easy to propagate by seeds, but mostly by grafting and cuttings (*Posedaru*, 2005). Plants of the dissected and variegated cultivars on their own roots almost always fail to grow into good plants (*Gelderen* and *Oterdoom,* 1994). Due to low bud-forming capacity, propagation by grafting and cuttings are difficult to perform, so the *in vitro* propagation technique is widely used now at international level to obtain propagation material. The purpose of the research was to study the behaviour of several *Acer platanoides* varieties, namely "Crimson King", "Drummondii" and "Globosum", during the *in vitro* initiation phase. Maple propagation has become a frequent practice based on conventional methods nationwide along with *in vitro* cultures, and only a few studies have been found in literature to include the initial stages of micropropagation. On a scientific level, it has the potential to address the shortcomings of the traditional propagation technologies. Efficient varieties and cultivar propagation technologies have recently been developed for high ornamental value maple, which is demanded on the domestic market.

Keywords: *Acer platanoides, explants, in vitro initiation, in vitro propagation, maples*

Introduction

Maples are known throughout the world for centuries for their many uses: in landscape design, food industry, wood industry, medicine. They also have cultural implications, being used for traditions, customs or festivals. In landscaping, maples are valued for their height, habitus, and leafage doubled by the decorative effects of flowers, fruit and bark. Maples are so diverse and popular that they are preserved in many *arboreta* worldwide as part of special collections referred to as *acer forests*. They are also preferred by the Japanese who use it to obtain high-yielding bonsai.

The need for ornamental maple varieties availability on the domestic market is obvious, given that the dendrological material from the Acer genus is presently predominantly imported. The admiration they enjoy, their decorative traits, the biological and ecological particular features make maple species important landscaping elements. The species of Acer genus, trees or shrubs, stand out for their aesthetic, ecological and especially decorative - due to their habitus and foliage - value. The ecological value resides in their resistance to air pollutants and unfavorable climatic factors, such as frost or drought.

The ornamental varieties of *Acer platanoides* are used in landscaping near industrial areas or for alleys, as they create curtains with a high emission absorption capacity in crowded urban areas. Based on the assessment of the development particularities of ornamental forms of *Acer platanoides*, the ecological requirements and the importance they are given in other countries in Europe, Asia and North America, as well as on the lack of constant concern for their promotion and propagation, the possibility for multiplication on an industrial scale of the ornamental maple arises.

The ornamental varieties of *Acer platanoides* "Crimson King", "Drummondii" and "Globosum" being easily to propagate by seeds, but mostly by grafting and cuttings (*Oterdoom,* 1990).

Due to low bud-forming capacity, propagation by grafting and cuttings is difficult. As traditional methods are not effective for certain *Acer* varieties with highly decorative potential, modern methods such as *micropropagation* are needed to ease the process. Consequently, the micropropagation technique has become particularly popular and is largely used worldwide to obtain seeding material.

Maple propagation has become a frequent practice based on conventional methods nationwide along with *in vitro* cultures, and only a few studies have been found in literature to include the initial stages of micropropagation. On a scientific level, it has the potential to address the shortcomings of the traditional propagation technologies. Efficient varieties and cultivar propagation technologies have recently been developed for high ornamental value maple, which is demanded on the domestic market (*Concioiu*, 2021).

Materials and methods

Biological Material

The parent plants which young sprouts were cut from to harvest the explants in the lab were certified biologically for the cultivars presented. The health of the parent plants aged approximately 6-7 years was checked. The species *Acer platanoides* with three cultivars were considered: *Acer platanoides* "Crimson King", *Acer platanoides* "Drummondii", *Acer platanoides* "Globosum", due to the appearance of habitus, the shape and colour of leaves wich has a special ornamental value.

- ***Acer platanoides*** "**Crimson King"** (Figure 1) is an ornamental variety with ovoid thick crown, growing up to 15 m tall, with leaves that are red to dark purple during the summer and brownish-purple in the fall.

- ***Acer platanoides*** "**Drummondii"** (Figure 2) is a medium-sized tree, with a

large, dense, round-headed crown and yellowish sprouts. The leaves are green, round at first, deeply lobed with 5 lobes that are lobed in their turn, all ends long and pointed. The yellow-green erect corymbed flowers appear before the leaves and are fragrant, melliferous and ornamental. They are planted in stand-alone arrangements, street alignments or small groups in parks (*Posedaru,* 2005).

- ***Acer platanoides*** "**Globosum"** (Figure 3) - globe maple - is a tree up to 5-6 m tall with a round flattened and densely branched crown; leaves are round at first, deeply lobed with 5 lobes that are lobed in their turn, all ends long and pointed. The leaves are dark green and turn golden during the fall. The flowers are yellow-greenish, erect corymbed flowers appear before the leaves and are fragrant, melliferous and ornamental (*Posedaru,* 2005).

Harvesting and preparation of the biological material

For the *in vitro* initiation phase, the sprouts were harvested in September, in compliance with the protocol requirements of the *in vitro* culture initiation phase.

For the growth phase, sprouts were harvested during March through May, June at the latest; annual sprouts were used. Those collected for testing the *in vitro* propagation in the resting phase were harvested in December and the branches were set for forced growth.

Collection and preparation of the biological material of the three study varieties for the two phases - active growth and vegetative rest - are summarised in the charts presented in figures 4-6.

Initiating and stabilising *in vitro* cultures

The culture grow box is the place where the explants grow and develop from inoculation through the acclimation phase. To allow for a good culture growth, it should be possible to adjust the temperature and humidity to the species requirements, by using an air conditioning installation to control photoperiod (*Hoza,* 1996; *Stănică*, 1999; *Teodorescu,* 2007). The temperature and humidity are registered by a thermohygrometer and maintained at values ranging 24±2°C, and 80% humidity, respectively, by programming the acclimation device. All the material batches brought into the grow box should be labelled with the date, species, growth medium and operator name (*Hoza*, 1996). The environmental factors in the grow box are strictly controlled as they influence the culture development directly.

The explants were harvested from the vegetative axillary buds underlying the terminal (apical) bud and from the vegetative axillary buds at the nodes. The

explants tested for the initiation phase were apices with 2-3 foliar primordia, harvested in the vegetative rest and active growth phases, from the vegetative tips and axillary buds of the young sprouts. It is well established that vegetative meristematic tips are responsible for the increase in axis length, differentiation of leaves and axillary buds. As opposed to these, flowers and bracts develop from the floriferous meristematic tips (*Stănică*, 1999).

In the species *Acer platanoides*, the buds are opposite, ovoid, attached to the stem, dark green to reddish, depending on the ornamental variety, and much larger than other *Acer* species, glabrous, with ciliated scales on the edges, in terminal or axillary positions. The larger, 4-edged, rounded terminal floriferous bud is surrounded by two smaller and pointed vegetative buds. On the outer side they have 2-3 pairs of coriaceous scales (cataphylls) that are purple-violet to brown in "Crimson King" or glassy brown-green in "Drummondii". On the inner side, the foliar primordia are green, hairy and protective of the oral primordium from which the inflorescence will develop. Figures 7-9 show the vegetative tips from which the apices were harvested to initiate the *in vitro* culture (*Concioiu* et alii, 2010) in the three cultivars. The scars of paired buds come together to form an acute angle. The vegetative axillary (lateral) buds are smaller and have a sharper peak, they are located either below the terminal floriferous bud or at the nodes level, protected by the leaf pod. A white, bitter latex is released if broken.

The explants were collected under a binocular magnifying glass in a laminar flow hood in aseptic conditions, using sterile instruments. The explants were collected very quickly (20-30 seconds/explant) in order to prevent dehydration and oxidation, and the polarity of the inoculum was considered when placing it on the surface of the growth medium.

The initiation phase usually takes four weeks but there are also cases when the explants are transferred to fresh media after a few days as they release toxic substances into the medium (especially the species containing phenolic substances). Phenolic substances are released into the medium through the lesions caused during harvesting and oxidise the growth medium. These processes may be prevented by removing or blocking the phenolic substances by:

- maintaining the explants in sterile water for a few hours after harvesting,
- transferring the explants to fresh media after a few days from inoculation,
- absorbing and blocking phenols by adding vegetable charcoal (*Stănică*, 2004).

Growth media variants were prepared with various components such as: DKW (1984) and WPM (1981) macroelements,

Results and discussion

In the *in vitro* initiation phase of maple cultures, various types of infections were found in the growth media (Figure 10), caused by bacteria, fungi or of mixed origin.

In the *in vitro* initiation phase of ornamental maple cultivars, explant growth was influenced by the components of the growth medium, genotype and type of explant. The best performing type of explant was the meristematic tissue with 2-3 foliar primordia originating from the axillary buds underlying the terminal bud. The best performing growth medium was DKW - Driver and Kuniyuki (1984) with maximum springing percentage.

Growth medium containing DKW (1984) macroelements and microelements, LS vitamins, NaFeEDTA 32 mg/l, dextrose 30 g/l, agar 7 g/l and benzylaminopurine 0.5 mg/l has proven the best. Adding BAP 0.5 mg/l to all cultivars resulted in the highest percentage of explants developed. As regards the genotype, the *Acer platanoides* "Crimson King" cultivar performed best *in vitro,* with the highest initiation phase; figure 11 shows its growth and development 20 days after inoculation.

A few days after the inoculation, DKW (1984) and WPM (1981) microelements , DKW (1984) vitamins and Mullin et al. (1974)B.

the growth medium changed its colour into maroon-brown as a result of the explants releasing phenols. These phenols cause the brownification of the medium. As the exchange between explants and the environment is dramatically reduced, the removal of the areas turned brown and their transfer onto a new medium are stringent (*Stănică*, 2004).

In order to reduce brownification, the explants were transferred to a new medium where active charcoal was added as antioxidant, 21 days from the initiation (*Concioiu*, 2021). *Acer platanoides* "Globosum" was also found to release several phenols into the medium while no phenolic emmissions were seen in *Acer platanoides "*Crimson King" (Figure 12 and Figure 13). Phenol release is not correlated with the presence of antocianic pigments that colour the leaves.

Conclusions

Knowing the morphogenetic reactivity of the *in vitro* grown explants in relation to the number of inoculated explants is particularly important as the work protocol or the production scheduling may be improved for propagation on an industrial scale. Depending on the parameters recorded in the explant initiation phase, micropropagation ca be

started considering the harvesting and inoculation of a higher or lower number of explants.

The "Crimson King" cultivar showed he lowest percentages of infected explants. For the same genotype, the ethyl alcohol used to disinfect the biological material proved efficient and the 15-minute time resulted in a maximum yield with no infected explants. An overview of the initiation phase shows that the vitroplants in the "Crimson King" were best performing among the *Acer platanoides* cultivars, followed by those in "Globosum" and "Drummondii".

The best growth media were the two variants of the DKW medium, while the WPM variants had the lowest percentage of explants grown.

Between the two types of explants, the meristematic tissue originating from the axillary buds below the terminal bud showed the best results.

As regards the appearance, the vitroplants in the "Crimson King" cultivar, which had the maximum percentage of sprung explants, were found to have grown very long with a normal appearance (Figure 14). The vitroplants in the *Acer platanoide* "Globosum" and "Drummondii" had a normal appearance as well.

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Figure 1. Stock plants of *Acer platanoides* “Crimson King” (original)

Figure 2. Stock plants of *Acer platanoides* “Drummmondii” (original)

Figure 3. Stock plants of *Acer platanoides* "Globosum" (original)

Figure 4. Harvesting and preparation of biological material of *Acer platanoides* "Crimson King" (original)

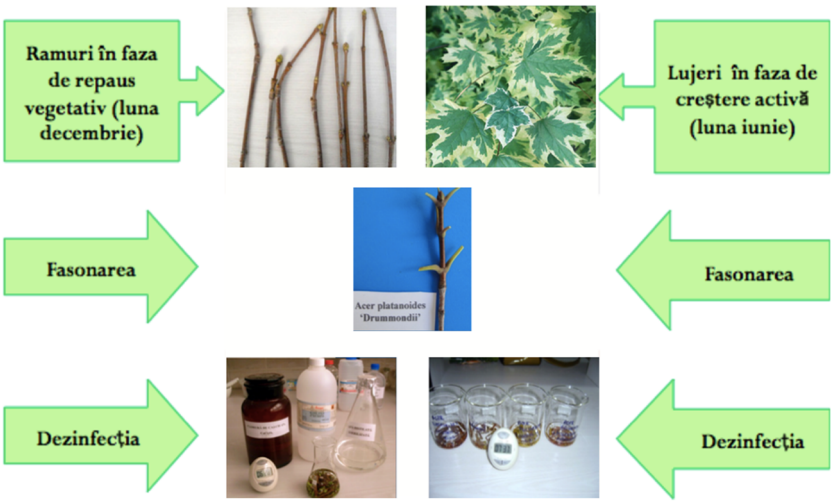

Figure 5. Harvesting and preparation of biological material of *Acer platanoides* "Drummondii" (original)

Figure 6. Harvesting and preparation of biological material of *Acer platanoides* "Globosum" (original)

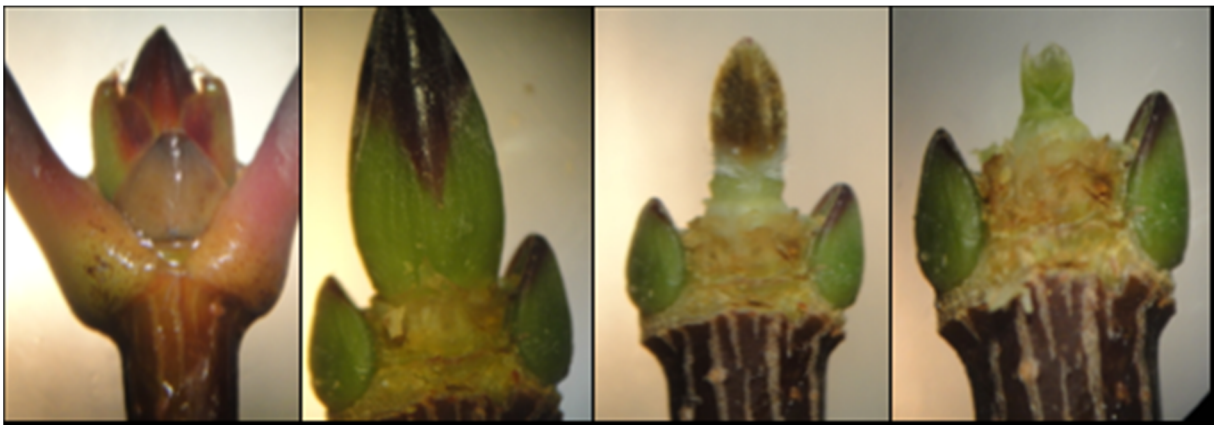

Figure 7. Floriferous terminal bud and underlying axillary buds at *Acer platanoides* "Crimson King" (original)

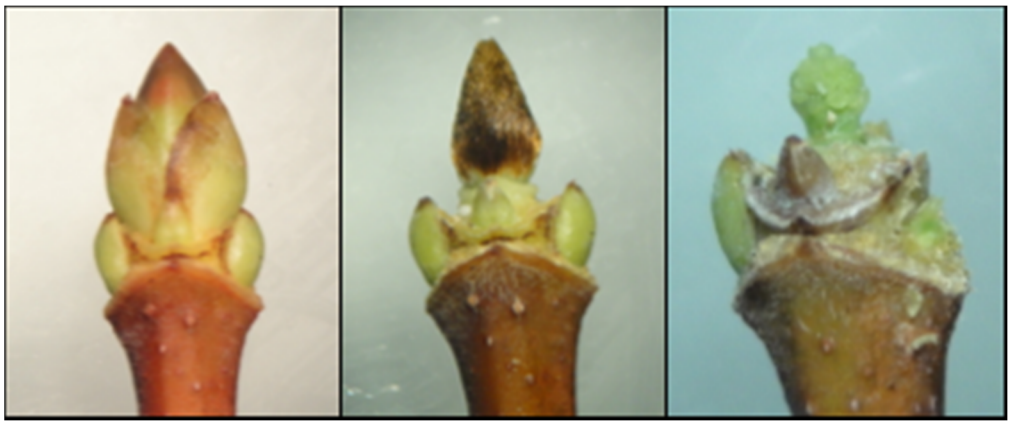

Figure 8. Floriferous terminal bud and underlying axillary buds at *Acer platanoides* "Drummondii" (original)

Figure 9. Floriferous terminal bud and underlying axillary buds at *Acer platanoides* "Globosum" (original)

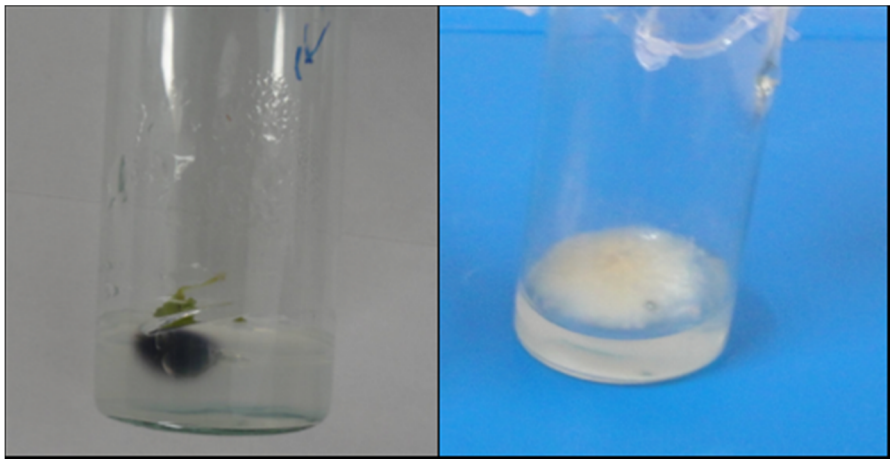

Figure 10. Infected explants (original)

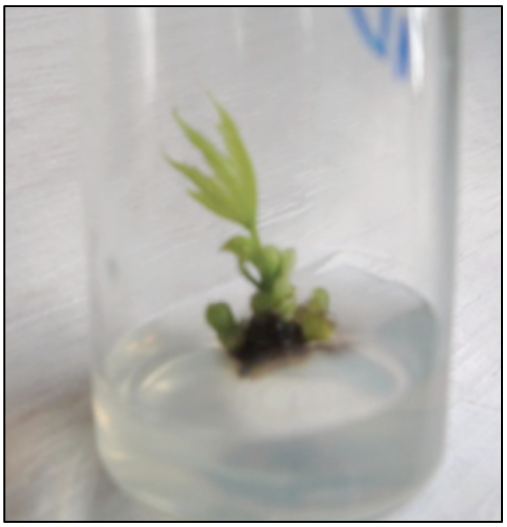

Figure 11. "Crimson King" explants at 20 days after inoculation (original)

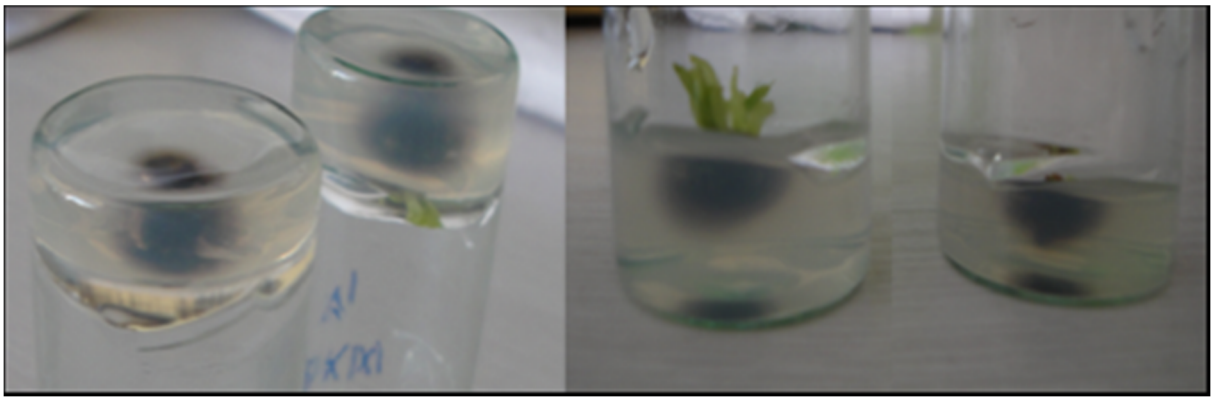

Figure 12. Phenolic emissions at *Acer platanoides* "Globosum" (original)

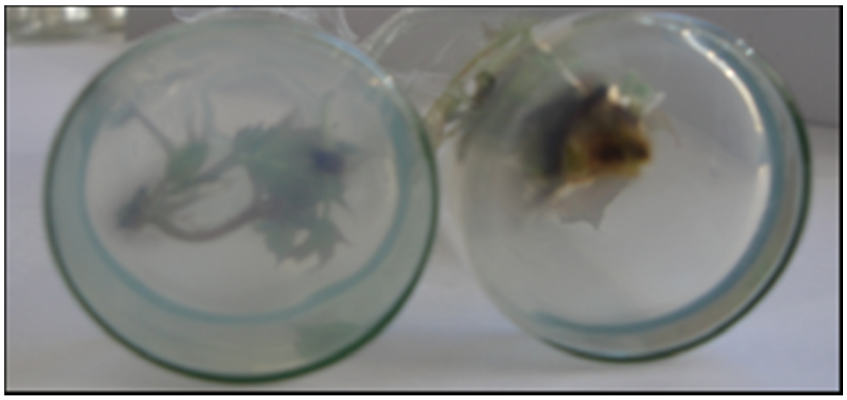

Figure 13. Phenolic emissions at *Acer platanoides* "Crimson King" (original)

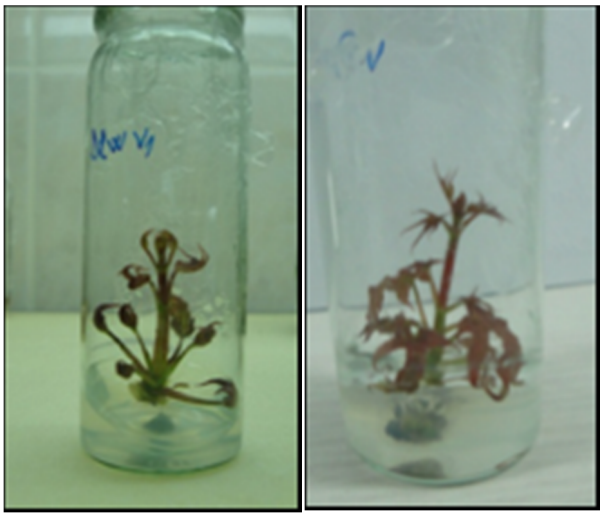

Figure 14. In vitro microshoots of *Acer platanoides*
"Crimson King" (left) and "Globosum" (right) (original)

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PARADIGM SHIFT: FROM TEACHING ABOUT DIVERSITY TO LEARNING IN DIVERSITY

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Abstract
Diversity is in human nature. It is our way to face the challenges from a continuously changing world, originated from work and study mobility, international migration and globalization. Biodiversity and societal diversity created a suitable environment for education, leading to the concept of multicultural education, so much required in today's student's development. This metamorphose faced by the European societies refined the education providers and policy-makers, coming to a paradigm shift, from "*Teaching about diversity*" to "*Creating diversity, teaching for diversity, learning in diversity!"* Lack of knowledge base on the preparation of teacher educators, of coherence concerning teachers training to approach classroom diversity in secondary education, lack of systemic policy approaches towards inclusion and diversity and diverse student teachers established the framework. Can we answer these questions: Do educators understand the learners' need for integration in a multicultural environment, within a school context? Are teachers prepared for diversity in the classroom? What does it mean to teach for diversity and in diversity? Are there functional methodologies for teacher trainers? How do we address these challenges? By providing an insight comprehensive view of classroom diversity management in secondary education, for both private and public formal educational institutions, which would be of much help for European EU state members.

Keywords: *multicultural education, paradigm shift, societal diversity, secondary education, methodology*

Introduction

Diversity is our way to face the challenges from a continuously changing world, originated from work and study mobility, international migration and globalization. It can be seen at the individual level, moving to the population one and then to global level, thus from a microsystem to a macro system, with a different impact-range. Europe faces a diversity of all kinds: diversity in geography, culture, language, national identity, political views, values, and demographics, in social and economical areas. Biodiversity and societal diversity created a suitable environment for education, leading to the concept of multicultural education, so much required in today's student's development.

The coexistence of different cultures in the same space was the emerging point of some related concepts: multicultural(ity), intercultural(ity), multiculturalism and interculturalism, that, at first glance, they might appear synonyms. Despite that, there are

differences of opinion and distinctions among them.

Kymlicka (1989) developed the theory of multiculturalism based on the liberal theory of autonomy and equality. According to his theory, multiculturalism refers to a way in which multiple cultures coexist in a society that accommodates conflict, negotiation and distribution of social, political and economic power, assimilation, preservation and adaption (*Pattnaik and Upendra*, 2016).

Multiculturalism is a descriptive term, referring to a state of affairs, to the coexistence of several groups in the same society. The concept tries to highlight the difference or even the net separation between cultures and groups perceived as different, and is mainly used in post-colonial societies (The UK, The Netherlands), where it is a matter of parallel coexistence of ethnic groups, without any real relation to each other (*Giordano*, 2003). Accepting the diversity of cultures leads to the acceptance of the idea of coexistence of many cultures, to the adoption, as a policy of diversity management, of multiculturalism. The concept of multiculturalism has been used with reference to Western countries around the XVIIth and XIXth centuries when they have established a unique national de facto identity. The term *multiculturalism* was first used by the Canadian Commission for Bilingualism and Biculturalism in 1965, and after 1970 it represented the federal policy in the field (*Ciolan*, 2010). It represented a political response from the need to preserve the cultural diversity of the federation, in which there are two official languages, English and French, but there are also recognized indigenous languages. It has become an official policy in various Western states since the early 1970s, for reasons that varied from country to country.

Multiculturalism is a concept and an ideology of diversity, being determined by a series of factors involving the assertion of group identities, like political, economic, social, cultural and religious ones, due to how cultural entities struggle for recognition within the state. Regulatory multiculturalism is a response of current political theory to multiculturality, a reaction driven by one of the phenomena resulting from the presence of multiculturality in most of the current states: the explosion of demands to accommodate the differences of cultural minorities (*Huzum*, 2009).

Multiculturalism should mitigate this tension by promoting issues of intercultural communication, interpersonal relationships, changing perspectives, contextual analysis, understanding of different views and how cultural conditions affect values, attitudes, beliefs,

preferences, expectations and behaviour. Similar to cultural, political, religious pluralism, which is dominant in the Anglo-Saxon states, multiculturalism focuses on recognizing the existence of several ethnic groups as national policy (*Taylor,* 1992). Beyond the political aspect of recognizing the coexistence of several ethnic groups within the framework of the same state entity, multiculturalism has a shallow and side approach regarding the interaction between groups, while interculturalism has a deeper understanding of these mutual influences.

Regarding cultural diversity, types and the concept of a multicultural society are used to designate a society in which one or more types of cultural diversity are present. On the judicial-political, multiculturalism identifies with ”the promotion of minority cultures (ethnic, religious), especially at an institutional level, like schools, local communities, nations” (*Parekh,* 1998).

Interculturalism emphasizes the openness of coexisting cultures to one another, in an attempt to identify the common trunk that can be branched out. It is a model based on tolerance, communication, respect for diversity, but also drawing the limits beyond which the right to difference disappears because it would undermine community management.

The concept of ”intercultural” focuses on the interaction between the distinct societies groups, referring more to a dynamic process of exchange, dialogue, bargaining between groups, and identifying a common language and space shared communication.

The intercultural character refers to the mutual relationship between the constituent elements of the exchanges (*Ivasiuc* and collab., 2010). In describing the notion of *interculturality*, there are two approaches: the descriptive character and the normative one. The descriptive character refers to the space between two or more cultures, which is, par excellence, a dynamic space, subject to a permanent process of negotiation between two groups perceived as belonging to different cultures (*Abdallah-Pretceille*, 1999). The normative part of the concept starts from the idea that a better understanding between individuals in groups seemingly different is possible and desirable (*Perregaux*, 1999).

Therefore, the concepts of multiculturalism and interculturalism have the same major difference as well as there are between multicultural and intercultural terms. In the light of these clarifications, it is more accurate to use the term *”intercultural”*, as it defines a dynamic process, a relationship of different groups one face of the others. The prefix *”inter-”*

reflects a series of dynamic and reciprocal processes: exchanges, interaction, reciprocity, barriers removal and solidarity between groups (*Rey*, 1999).

Education plays a major role in multicultural and intercultural European societies. Multicultural education aims to improve interpersonal relations between students coming from different countries, which will help them to acquire knowledge, attitudes and skills needed to participate in cross-cultural interactions, personal, social and civic actions. Some of the authors who dealt with multicultural education in their studies were *Banks J.A.* (2001) and *Irvine J.J.* (2003). When defining the concept of multicultural education, in Banks's vision, there are more dimensions: content integration, the knowledge of construction process, an equity in pedagogy, an empowering school culture and social structure. "Multicultural education is the field of study designed to increase educational equity for all students that incorporates, for this purpose, content, concepts, principles, theories, and paradigms from history, the social and behavioural sciences, and particularly from ethnic studies and women studies" (*Banks* and *Banks*, 2001).

To designate the appropriate cultural diversity management activities, it is used the concept of *intercultural education*. The problem of intercultural education has been explored from several perspectives, like descriptive and methodological ones, by: *Nieto S.* (1992), *Cucoș C.* (2000), *Banks JA, Banks* (2001), *Ciolan L.* (2010).

The intercultural approach materializes first through education, as an antidote to racism, xenophobia, exclusion and marginalization. It is based on the idea that a better communication and awareness of tolerance between people is possible. It claims to play an important role in the collective creation of a cultural space that accepts, inserts and redefines the cultural significance of members of different communities. Therefore, intercultural education is a necessity, a specialized form of education, which puts students and their cultures into a differentiated approach but is conducted under the principle of equity.

Educational policies are the strategic directions for the development of the educational system and include legislative norms applied in practice through methodologies, controlled and monitored, and ultimately evaluated through impact studies.

Materials and methods

In the last years, work and study mobility, international migration and globalization led to the reshaping of European directives, rules and legislative measures. Societal diversity creates a

suitable environment for education, be it a formal, non-formal or informal one. The metamorphose faced by the European societies refined the education providers, such as public institutions or private organizations, shaped the landscape that generates opportunities and challenges in the system. It became a constant need for the educational system, which must face the challenges imposed by the diversity of European societies and the continuously changing world. Social exclusion, the increasing number of migrant children and refugees generated specific situations and demands that educators of all levels have to cope with. Therefore, the teachers, professors, pedagogues and tutors must be prepared to face them and to be one step ahead of meeting the students learning needs. Different concepts are used in different countries and it is not always clear whether the same phenomena and research variables are being referred to. Lack of knowledge base on the preparation of teacher educators, of coherence in relation to teachers training to approach classroom diversity in secondary education (i.e. paradigm of inclusive education predominantly), lack of systemic policy approaches towards inclusion and diversity and diverse student teachers, established the framework of these observations.

Looking at some European Educational Policies and programmes for Diversity and Integration it can be seen that somehow there is not a coherent framework for educational diversity. These are some referrals:

- ”*The EU needs new methods and tools to produce teachers for diversity, and to lay the foundations for more inclusive societies through education”* (Council of the European Union and European Commission, 2015),

- *”Integration of children with disabilities in some countries; while other countries understand it in its broader sense”* (European Agency for Development in Special Needs Education, 2010),

- ”*Research analysing how teacher educators are prepared is scarce”* (European Commission, 2013).

EU Programmes for Diversity and Integration, like *LLP (Comenius, Erasmus)*, *Erasmus+ (ex LLP)*, *eTwinning*, *Horizon 2020*, should continue efficiently to support EU collaborative activities, initiated by providers and educational institutions.

Results and discussions

This metamorphose faced by the European societies refined the education providers and policy-makers, coming to a paradigm shift, from ”Teaching about diversity“ to ”Creating diversity, teaching for diversity, learning in diversity!”

Can we answer these questions: Do educators understand the learners' need for integration in a multicultural environment, within a school context? Are teachers prepared for diversity in the classroom? What does it mean to teach for diversity and in diversity? Are there functional methodologies for teacher trainers? How do we address these challenges?

It became a constant in the educational system to face challenges imposed by the diversity of European societies and the continuously changing world.

By examining the EU diversity management on education, for formal, non-formal or informal education, viewed by different actors in the field, to give recommendations about the harmonization of educational policies and measures.

The main objectives would be:

- to give a clear understanding of the terms related to the lexical field of culture and diversity, to perceive the borders and interactions, the fine lines that overlap and create confusions;
- to display and reflect on the practical approach of diversity and multiculturality, referring to all actors and stakeholders involved in the educational process, to observe how European diversity teaching tools are used and to what extent, in order to take advantage of the opportunities brought by an intercultural society.

Possible solutions would be:

- to raise awareness on the importance of well-prepared teacher trainers for diversity in Europe;
- the EU stakeholders and educational policy-makers should be encouraged to see how they could take advantage of diversity in schools;
- to increase the number of well-prepared teacher's trainers, specialized in integration, diversity and intercultural education;
- to enhance teacher trainers exchange programmes within EU state members, for a longer period, and, preferably, in a multicultural environment.

Conclusions

The EU should refer to societal diversity as an asset that applies to school-related diversity.

Providing an insight comprehensive view of classroom diversity management in secondary education, for both private and public formal educational institutions, would be of much help for European EU state members.

Raising awareness on the importance of well-prepared teacher trainers for diversity in Europe and harmonizing teacher intercultural competences within a European framework integrated into the curricula will point to

societal diversity as an asset that applies to school-related diversity.

EU state members should prepare teachers for diversity and in diversity, not regarding diversity, by promoting multicultural education as a normal teaching-learning environment.

Encouraging both student teachers and teacher educators to participate in intercultural exchanges will decrease the negative impact of diversity and will conduct to better integration of multicultural students.

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TESTING OF REFERENCE MATERIAL BY ELISA METHOD

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Abstract
Mold-producing secondary decomposition products belonging to the genus Aspergillius, the genus Penicillium and the genus Fusarium are called **mycotoxins**. As an analytical biochemical analysis, ELISA involves the detection of a specific substance whose presence is analyzed quantitatively or qualitatively in a liquid sample by a method that continues to use liquid reagents. The biochemical reaction will generate a signal that can be easily quantified and interpreted as a measure of the amount of analyte in the sample that remains liquid. It is the opposite of the "dry lab" which can use dry strips - and even if the sample is liquid, the final detection step in "dry" analysis involves reading a dry strip by methods such as reflectometry and does not need a reaction holding chamber. to prevent spillage or mixing between samples. Samples were analyzed for the presence of Fusario-toxins, Total Aflatoxins and DON using commercially available quantitative ELISA test kits. Mycotoxin extraction and analysis were performed according to the manufacturer's instructions as follows.

Keywords: *mycotoxins , ELISA test , wheat, corn.*

Introduction

Mold-producing secondary decomposition products belonging to the genus *Aspergilius, the* genus *Penicillium* and the genus *Fusarium* are called ***mycotoxins*** .

Due to the unfavorable conditions of humidity and temperature, the toxicogenic fungi found in the hay contaminated and consumed by the animal, reaching the consumer by ingesting food of animal origin where mycotoxins were developed. Mycotoxins are substances producing certain species of fungi such as the genus *Aspergillus,* the genus *Fusarium,* the genus *Penicillium and the* like *Trichothecium.* They are highlighted in their spores, or in the substrate on which the fungi grow.

Maize varieties were collected randomly from feed producers in the counties of Dâmbovița (Băleni), Vaslui (Pogana), SV Oltenia Region, Constanța.

Materials and method

All samples were stored at 4 ° C in sealed plastic bags until mycological analysis and mycotoxin. Fifty seeds were randomly selected, sterilized to the surface in 0.37% NaOCl and immersed in 0.1% Tween 20 for 10 minutes before drying on sterile filter paper. In the case of flour, 10 g were used and 100 ml of water were mixed .

1 ml of each dilution was then used for plating. From the initial batch of isolates (Table 1.), a liquid suspension of

maize or flour was plated on 20 Petri dishes of potato dextrose agar (PDA) and left at 24 ° C for up to 7 days. The colonies were analyzed according to their phenotype on the PDA.

After 6-12 days, Fusarium-like colonies were transferred to PDA and incubated at 22 ± 2 ° C for 6 days. Single colonies were then produced by washing the spores with water distilled and deionized sterile PDA plates by serial dilutions. The spores produced were stored at -80 ° C until later use.

Table 1. The seed lot ID in corn feed samples (by the original research: R. Munteanu)

Lot	Asparagus Negros	Other *Aspergillus* spp.	*Fusarium* spp.	*Penicillium* spp.	Other fungi
S01	-	-	-	-	3
S02	-	5	-	3	-
S03	2	6	-	-	2
S04	-	-	-	-	-
S05	5	2. 3	-	-	5
S06	3	2	6	1	-

Samples were analyzed for the presence of Fusariotoxins, Total Aflatoxins and DON using commercially available quantitative ELISA test kits.

Mycotoxin extraction and analysis were performed according to the manufacturer's instructions as follows. A total of 20 g of samples were mixed with 40 ml of 90% methanol for fusariotoxins, 100 ml of 70% methanol for total Aflatoxins and 100 ml of deionized water for DON.

The extract was filtered through filter paper and used directly for the analysis of total Aflatoxins ELISA, while for the detection of fusariotoxins and DON the filtrate was diluted with deionized water (20 and 1:10, respectively).

Results and discussion

The ELISA procedure was performed according to the manufacturer's instructions. The optical density (OD) was measured at 450 nm by an ELISA reader. A calibration curve was constructed using the OD values of five standard concentrations 0 , 1 -6 mg / kg-1 fumonisis 1-20 mg / kg-1 for aflatoxins and 0.5-10 mg / kg-1 DON. Detection limits were 0.1 mg / kg-1 for fumonisis, 1 μg / kg-1 for aflatoxins and 0.15 mg kg-1 for DON. Mycotoxin concentrations in the samples were measured by interpolation from the corresponding calibration curves shown in Table 2. Occurrence of fusariotoxins, aflatoxins and deoxynivalenol in 36 feed samples.

Table 2. Mycotoxin Concentrations
(by the original research: R. Munteanu)

Mycotoxins	Samples (%)	Concentration	
		Mean ± SD (mg / kg)	Values (mg / kg)
Fusario-toxins	30.6	0.40 ± 0.70	0.1–2.5
Aflatoxine	88.9	$3.0 \cdot 10^{-3} \pm 1.36 \cdot 10^{-3}$	$0.8 \cdot 10^{-3}$–$5.9 \cdot 10^{-3}$
Deoxynivalenol	72.2	2.60 ± 1.37	0.8–6.4

Conclusions

Corn grains can be contaminated with various mycotoxins, but systematic investigations of toxicity are lacking. Because corn is used in animal feed but also for human consumption, we explored the level of mycotoxin contamination present in corn samples used for animal feed by combining mycotoxin measures and mycological determination of colonizing fungi.

Fusarium species have been reported to infect corn and contaminate with fusario-toxins

Surprisingly, not even a producer DON CPC has not been identified, despite the attempts of isolation. The results can be explained by the presence of unknown fungal strains that can produce DON that cannot be isolated by traditional methods or more likely by the presence of cross-reacting chemicals in the ELISA.

The most common toxin in maize was Aflatoxin, produced by Aspergillus spp. Indeed, a large set of isolates obtained from maize were classified as belonging to the latter genus.

The overall levels of mycotoxin contamination observed were not extremely high and all concentrations were below the EU target level. However, the coexistence of different toxins can be a cause for concern that requires further attention.

Contamination could to be held in storage facilities, it has not been possible to obtain intact isolated from the beans. However, it was not possible for the purpose of this study to determine whether Fusarium contamination occurred in the field or during storage. This may be true, given that often different cereals are stored in the same location.

The importance of proper storage of grains to reduce the risk of cross-contamination and the spread of toxins is essential for the preservation of healthy food.

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CHILDREN OBESITY AND THE RISKS OF INADEQUATE NUTRITION

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Abstract
Obesity is a global problem that currently affects hundreds of millions of people on all continents. If adult obesity has been extensively studied and analyzed, the same cannot be said about childhood obesity, which has been given interest only recently. Childhood obesity is a common reality that society needs to pay due attention to. Beyond the variations of different statistics regarding the incidence and prevalence of this pathology, all agree on the increase in the frequency of childhood obesity, which is considered today the best known nutritional disorder in children and adolescents in developed countries where food additives are used in all food on the market.

Keywords: *children, obesity, food additives*.

Introduction

In recent decades, the number of food additives added to foods and other foods has greatly increased. The American Academy of Pediatrics presents the severity and risks associated with childhood obesity in an article entitled "Food Additives and Children's Health", published in 2018, and raises an alarm about unhealthy junk food, which leads to inadequate growth and development. of children (1).

Materials and methods

The most used food additives mentioned by the American Academy of Pediatrics with a major impact on children's health are:

The sugar

Most children eat a lot of sweet foods. Sugar is added to many foods, from ketchup and bread to processed meat. A conclusive example, often neglected, is yogurt, especially fruit-flavored varieties that contain about 18 grams of sugar.

Saturated fats

Saturated fats, such as red and processed meat, fried foods, milk, cheese, butter, but also pastries and cakes, are a risk factor for cardiovascular disease in both adults and children.

Lead in food

One of the most important risks of lead in food is that it causes behavioral disorders such as hyperactivity, aggression and inattention, as well as low IQ. (2)

Fructose corn syrup

This sweetener is added to many foods and beverages, has a different ratio of fructose to glucose, so it is even sweeter than sugar. It is also much cheaper, so it is added to many foods and is the main caloric sweetener in juices. (3) While the FDA (Food and Drug Administration) and the American Medical Association (AMA) argue that there is no definitive evidence that fructose corn syrup is worse for health than regular sugar, honey, or other traditional sweeteners, many other researchers consider that there is a link between the increase in obesity rates and the increase in the consumption of high-glucose maize syrup in the 1970s.

Artificial sweeteners

Despite being used by the healthcare industry to produce low-calorie, sugar-free foods, artificial sweeteners are harmful to health.

Research has shown that it causes gastrointestinal stress with problems such as bloating, diarrhea and intestinal dysbiosis or the lack of beneficial bacteria in the gastrointestinal tract, which make up 70% of our immune system. (6)

Artificial colors

A large number of foods contain these additives, which have in their chemical composition: mineral compounds, petrochemicals, oil, tar which are a source of toxins. Many artificial colors in food contain highly toxic chemicals, which are responsible for various diseases, disorders, behavioral problems, and DNA mutations. Although artificial staining is approved by the FDA for the purpose of increasing food flavor, they are responsible in children for: attention deficit hyperactivity disorder (ADHD), brain tumors, and other cancers. (7)

Sodium

Sodium is hidden in a wide range of foods. The American Heart Association recommends that it is ideal to consume 1500 mg (and no more than 2300 mg) of sodium per day, but, for example, on average, children in the US consume more than 3100 mg of sodium per day, and children with older age they consume higher amounts of sodium as their calorie intake increases.

Excess sodium - when it comes to equally popular lunch options for children, such as pizza, bread, rolls, cold dishes, processed meat and salty snacks - is associated with high blood pressure in children. This risk is even higher for overweight or obese children.

Nitrates

Sodium nitrates and sodium nitrite are preservatives found in processed meat, such as ham, meat and hot dogs. While they help protect meat from dangerous bacterial growth, such as botulism, in large quantities - and especially when heated, they form nitrosamines, which are unhealthy. (8)

They inhibit the transport of oxygen, which means that it impedes the ability of red blood cells to carry oxygen to other organs in the body. This can cause respiratory problems and other organ damage, and can lead to gastrointestinal and brain cancers due to its carcinogenic effects.

Sodium monoglutamate

It is a popular additive that adds a delicious flavor to packaged soups, sauces and artificial foods such as biscuits. This flavor enhancer can often cause digestive problems and even headaches and fatigue. (9)

Trans fats

Trans fats are a concern for all age groups, because of the way they raise cholesterol levels and the risk of heart disease - even in children. Doctors recommend reading the ingredient lists and avoiding any product that says "partially hydrogenated," "fully hydrogenated," or any "hydrogenated." (10)

In the general context of the global trend of increasing the frequency of obesity, childhood obesity has gained increasing interest in recent years, representing the research topic of extensive epidemiological studies conducted in several states. According to the results of the Nutrition Assessment Study (NHAES) initiated in 1963 in the United States, it is found that by 1995 the number of cases of obesity had doubled, increasing by 54% in children aged 6-11 years and by 40% in children. age group 12-17 years.

According to data at the end of the millennium, 32% of children aged 5-14 were overweight, and 14% of couples aged 5-14 were overweight, and 14% of children aged 6-11 and aged 5-14 years were overweight and 11% of those aged 12-17 were obese. England's National Health Surveillance Program has found that the frequency of child overweight has increased from 7.3% to 15% in recent decades, with an increase of 43% in Canada, 10% in China and South Korea with 7.8%. Romania reported in 2019 an increase in childhood obesity of 8%.

Eating disorders are certainly one of the main causes of this explosion of overweight and obesity in children and adolescents, along with the reduction of daily physical activity. The bad role played by the high-calorie, hyperlipidic diet rich in trans lipids and simple carbohydrates on the health of the entire population is well known. Excessive caloric intake and

changes in the quality of nutrients consumed daily by children and adolescents will cause changes over time in the composition of the body, changes that will be reflected in their health, cognitive ability and intellectual performance. (11)

Conclusions

The World Obesity Federation estimates that, in the absence of drastic prevention and treatment measures, by 2030, in our country, almost 500,000 children aged 5 to 19 will suffer from obesity, according to a statement from the Smart Nutrition clinic. In the last four decades, the global rate of childhood obesity has increased tenfold, with the number of children diagnosed with obesity reaching about 124 million, according to a WHO study, quoted by the mentioned source.

For Romania, the absence of official statistics makes childhood obesity a silent killer. The only official study contains data from 2015 and shows that in all age groups studied - 7, 8 and 9 years - the share of children with weight problems (overweight or obese) is over 25%, according to INS data (National Institute of Statistics), more precisely 1 out of 4 children from the studied groups have weight problems.

Children obesity has become one of the most important public health problems in developed and developing countries. Comorbidities such as type II diabetes and steatohepatitis (fatty liver disease), which were considered adult diseases, are currently commonly diagnosed in obese children.

Obese children and adolescents are at increased risk of developing serious diseases throughout the body, from cardiovascular, endocrine, gastrointestinal, neurological, pulmonary, to orthopedic, dermatological, psychosocial disorders, and functional limitations. Assessment and monitoring of these comorbidities is part of the treatment plan.

The main factors for increasing the rate of children obesity are unhealthy diets, high in salt, sugar and fat, in combination with reduced physical activity. These worrying trends reflect both the lack of nutritional education of parents and children, the high degree of urbanization and digitalization, as well as the aggressive marketing of certain unhealthy foods and beverages.

Another factor that contributes to this problem is the popular belief that a fat child is a healthy child, which encourages some families to over-feed their children.

As with any medical condition, preventing obesity is much easier than treating it.

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DETERMINATION OF MYCOTOXIN CONTAMINATION BY ELISA METHOD

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Abstract
Mold-producing secondary decomposition products belonging to the genus Aspergilius, the genus Penicillium and the genus Fusarium are called mycotoxins. As an analytical biochemical analysis, ELISA involves the detection of a specific substance whose presence is analyzed quantitatively or qualitatively in a liquid sample by a method that continues to use liquid reagents. The biochemical reaction will generate a signal that can be easily quantified and interpreted as a measure of the amount of analyte in the sample that remains liquid. It is the opposite of the "dry lab" which can use dry strips - and even if the sample is liquid, the final detection step in "dry" analysis involves reading a dry strip by methods such as reflectometry and does not need a reaction holding chamber. to prevent spillage or mixing between samples. The analysis of 58 samples of wheat, corn and derived products was performed, regarding the incidence in food of 2 mycotoxins: Aflatoxin B1 and Zearalenone. 58 samples of wheat, corn and derived products were analyzed for the dietary intake of 2 mycotoxins: aflatoxin B1 and zearalenone. The foods studied were: corn and wheat grains for aflatoxin, wheat flour, bakery products and cereals to determine zearalenone. The determinations were performed by ELISA method at the Institute of Food Bioresources in Bucharest.

Keywords: *mycotoxins, ELISA test, wheat, corn.*

Introduction

Mold-producing secondary decomposition products belonging to the genus Aspergilius, the genus Penicillium and the genus Fusarium are called mycotoxins. Due to the unfavorable conditions of humidity and temperature, the toxicogenic fungi found in the hay contaminated and consumed by the animal, reaching the consumer by ingesting food of animal origin where mycotoxins were developed. Mycotoxins are substances that produce certain species of molds such as Aspergillus, Fusarium, Penicillium and Trichothecium.

They are highlighted in their spores, or in the substrate on which the fungi grow. The analysis of 58 samples of wheat, corn and derived products was performed, regarding the incidence in food of 2 mycotoxins: Aflatoxin B1 and Zearalenone.

The food products studied were: corn and wheat grains for the determination of Aflatoxin, and wheat

flour, bakery products and breakfast cereals for the determination of Zearalenone. The determinations were made by ELISA method.

Material and method

The enzyme-linked immunosorbent assay (ELISA) is a commonly used analytical biochemistry test. The assay uses a solid-phase enzyme-linked immunosorbent assay (EIA) to detect the presence of a protein in a liquid sample using antibodies directed against the protein to be measured. In the simplest form of ELISA, the antigens in the sample are attached to the surface, then a matching antibody is applied over the surface so that it can bind to the antigen.

The antibody binds to an enzyme and, in the final step, a substance containing its substrate is added. The subsequent reaction produces a detectable signal, most often a change in color. Note that ELISAs may perform other forms of ligand binding assays instead of strictly " immuno" assays, although the name bears the original "immuno" due to the common use and history of the development of this method.

The technique essentially requires any ligand reagent that can be immobilized on the solid phase together with a detection reagent that will specifically bind and use an enzyme to generate a signal that can be properly quantified. Between washes, only the ligand and its binding counterparts remain specifically bound or "immunosuppressed" by antigen-antibody interactions with the solid phase, while non-specific or unbound components are washed.

Unlike other laboratory test spectrophotometric formats where the same reaction well (e.g., a tub) can be reused after washing, ELISA plates have immunosorbed reaction products on the solid phase, which is part of the plate, and therefore not are easily reusable. The enzyme used in the Elisa test is Peroxidase.

The principle of the method

As an analytical biochemical analysis, ELISA involves the detection of a specific substance whose presence is analyzed quantitatively or qualitatively in a liquid sample by a method that continues to use liquid reagents.

The biochemical reaction will generate a signal that can be easily quantified and interpreted as a measure of the amount of analyte in the sample that remains liquid. It is the opposite of the "dry lab" which can use dry strips - and even if the sample is liquid, the final detection step in "dry" analysis involves reading a dry strip by methods such as reflectometry and does not need a reaction

holding chamber. to prevent spillage or mixing between samples.

Quantitative reading is usually based on detecting the intensity of light transmitted by spectrophotometry, which involves quantifying the transmission of a specific wavelength of light through liquid (as well as the transparent bottom of the well in the format of the multi-well plate).

The sensitivity of the detection depends on the amplification of the signal during the analytical reactions. Because enzymatic reactions are very well known amplification processes, the signal is generated by enzymes that are bound to the detection reagents in fixed proportions to allow accurate quantification - hence the name "bound enzyme".

The assay is also called a ligand because it will bind specifically to a detection reagent, so the ELISA falls into the largest category of ligand binding assays. The ligand-specific binding reagent is "immobilized", usually coated and dried on the transparent bottom and sometimes on the side wall of a well, which is usually constructed as a multi-well plate, known as a "plate". ELISA ".

Usually, like other forms of immune-tests, the specificity of the antigen-antibody reaction is used because it is easy to raise an antibody specifically against a bulk antigen as a reagent, alternatively, if the analyte itself is an antibody, the antigen its target can be used as a binding reagent.

Results and discussions

The results of the determinations were highlighted in table 1.1 and table 1.2. 58 samples of wheat, corn and derived products were analyzed for the dietary intake of 2 mycotoxins: aflatoxin B1 and zearalenone.

The foods studied were: corn and wheat grains for aflatoxin, wheat flour, bakery products and cereals to determine zearalenone. The determinations were performed by ELISA method at the Institute of Food Bio-resources in Bucharest.

Table 1.1. The results of the aflatoxin assays (µg/kg)
(by the original research: R. Munteanu)

Nr. crt .	FEED	No. of samples examined	Positive tests	%	Extreme values detected	Maximum allowed limit
1	Corn grain	12	5	42	0.5-2.0	5.0
2	Grau grain	12	3	25	0.5-2.0	2.0
	Total	24	8	33	-	-

Table 1.2. The results of the Zearalenone determinations (µg/kg) (by the original research: R. Munteanu)

Nr. crt .	FEED	No. of samples examined	Positive tests	%	Extreme values detected	Maximum allowed limit
1	Flour of wheat	12	3	25	5-25	75
2	Goods of bread small	12	2	16	3-10	50
3	Cereal for Breakfast	10	1	8	5-20	50
Total		34	6	17	-	-

Conclusions

Aflatoxin B1 was detected in 33% of the samples analyzed with the maximum of 2.0 mg / kg beans perishable Wheat and Maize and minimum of 0.5 mg / kg. Zearalenone has been detected in 17% of the samples with values contained in the range of 3-25 mg / kg.

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EVALUATION OF DRINKING WATER QUALITY IN CLUJ COUNTY FROM ROMANIA

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Abstract
Determining and monitoring the quality of drinking water is of primary importance for countries as well as communities. The ensuring of good quality drinking water is a basic factor in guaranteeing public health, the protection of the environment and sustainable development. The aim of the present study is the monitoring of drinking water quality of Cluj County. Several studies have been carried out to analyze the quality of drinking water coming from their water distribution system. In order to evaluate the quality of the surface waters and groundwater used as raw water by the operators, were collected and analyzed various samples. The results interpretation was made according to admitted limits provided by 458/2002 Law republished in 2017 [1] and according with the requirements of the Drinking Water Directive (Council Directive 98/83/EC/1998) intended for human consumption [2]. In the areas with agricultural activity, the nitrates presence was observed in relatively stable concentrations in time. The condition of the water supply networks is a factor which contributes to the water quality.

Keywords: *quality, public health, drinking water, nitrates*

Introduction

For many countries of the world, including our country, as well, water demand in the whole country economy, far exceeds the available stock of their resources.

There are waters that even in their natural state have unsuitable characteristics for any use. The industrial development and the demographic explosion have negative impacts on surface water quality. As a result of various socio-economic activities, surface water quality changes quantitatively and qualitatively more and more. The chemical substances that enter into the water produce imbalances in that aquatic environment. [3]

Water resources in Cluj County can be considered as sufficient but still unevenly distributed in space and time. According to the degree of hydrotechnical arrangement, they are made up of natural

waters, which are naturally assured, and additionally by accumulations, which are generally quite rich and qualitatively adequate. In Cluj County there are three surface sources: Tarnița (the main source), Gilău (the backup source) and Someșul Cald (the backup source - when turbidity is overcome or accidental pollution occurs in Gilău) lakes that service Cluj area system. [4]

The main purposes of the present study were: to provide information about water quality of surface sources from Cluj County, to assess the human impact on surface water quality through monitoring the global physico-chemical and chemical parameters.

Materials and methods

In this study, were determined only physical and chemical parameters of waters from the three surface sources, more exactly: turbidity, water hardness, free residual chlorine, ammonium, iron, electrical conductivity, oxidation, nitrates, nitrites and pH, taste and smell.

All sampling and analysis to determine water quality indicators are made after rigorous standardized methods, which ensure consistency and comparability.

Sample preparation was conducted in accordance with water standards.

All aqueous solutions were prepared with ultra-pure water. The reagents used were of high analytical purity (purity ≥ 99%). The reagents used were purchased from Sigma-Aldrich Chemie GmbH, Merck.

Standard work solutions were prepared on the day of determination by taking the appropriate volumes from the stock solution after equilibration at room temperature using ultrapure water for dilution. Sampling was done in hermetically sealed sterile containers.

The Central Laboratory of Bioterra University of Bucharest has qualified staff in the fields of chemistry of water and is technically endowed with high performance equipment that guarantees the accuracy of the results obtained for all drinking water quality indicators.

Results and discussions

The levels of the measured physico-chemical parameters for the drinking water samples are presented in Tables 1 - 3.

In Romania, drinking water is defined and regulated by the law 458/2002 [1] regarding the quality of the drinking water, completed and subsequently amended.

For the case study we analyzed 12 quality parameters from three sources of surface water in Cluj County, in the tables below are presented only a few of the obtained results, more exactly for the water

from Tarnița, Gilău and Someșul Cald Lakes.

The water from Tarnița shows a small amount of fine particles in suspension and the value is lower than those obtained for Gilău and Someșul Cald Lakes. The water has an acidic pH.

The water conductivity for Tarnița Lake is quite low, this means that the total amount of salts dissolved in water is small.

The value of oxydability is quite low that means that the amount of oxidizable substances is low.

The value for nitrites and nitrates is within the limits provided by the law and the value is lower than those obtained for Gilău and Someșul Cald Lakes.

Tarnița has a total hardness within the limits provided by the law and the value is small compared to the values obtained for the other two studied lakes.

Table 1 – The obtained results for sample of water from Tarnița

Crt. No.	Organoleptic /physico-chemical indicators	Reference for analysis	Maximum permissible values	Values obtained	Unit
1	Turbidity	SR EN ISO 7027:2001	Maximum 5	0,52	NTU
2	pH	SR EN ISO 10523:2012	≥6,5 ; ≤9,5	6,80	pH units
3	Conductivity	SR EN 27888:1997	2500	353	µS/cm at 20° C
4	Free residual chlorine	SR EN ISO 7393-2:2002	0,50	0,05	mg/l
5	Ammonium	SR ISO 7150-1:2001	0,50	0,018	mg/l
6	Nitrites	SR EN 26777:2002	0,50	<0,008	mg/l
7	Nitrates	SR ISO 7890-3:2000	50	8,25	mg/l
8	Iron	SR ISO 6332:1996/C91:2006	200	28	µg/l
9	Oxydability	SR EN ISO 8467:2001	5,0	1,32	mgO_2/l
10	Total hardness	SR ISO 6059:2008	Minimum 5	2,16	german degrees
11	Taste	SR EN 1622:2007	Acceptable to the consumers and no abnormal change	Acceptable	-
12	Smell	SR EN 1622:2007	Acceptable to the consumers and no abnormal change	Acceptable	-

The water in Gilău Lake has the amount of fine particles in suspension higher than the Tarnița Lake but less than the Someșul Cald Lake.

It can be seen that when the pH value is small and ammonium value is small.

In Gilău Lake the nitrates value is less than 10 mg/l, so it can also be consumed by children.

Table 2 – The obtained results for sample of water from Gilău

Crt. No.	Organoleptic /physico-chemical indicators	Reference for analysis	Maximum permissible values	Values obtained	Unit
1	Turbidity	SR EN ISO 7027:2001	Maximum 5	1,14	NTU
2	pH	SR EN ISO 10523:2012	≥6,5 ; ≤9,5	6,89	pH units
3	Conductivity	SR EN 27888:1997	2500	377	µS/cm at 20° C
4	Free residual chlorine	SR EN ISO 7393-2:2002	0,50	0,19	mg/l
5	Ammonium	SR ISO 7150-1:2001	0,50	0,089	mg/l
6	Nitrites	SR EN 26777:2002	0,50	0,0095	mg/l
7	Nitrates	SR ISO 7890-3:2000	50	9,32	mg/l
8	Iron	SR ISO 6332:1996/C91:2006	200	47	µg/l
9	Oxydability	SR EN ISO 8467:2001	5,0	2,67	mgO_2/l
10	Total hardness	SR ISO 6059:2008	Minimum 5	3,28	german degrees
11	Taste	SR EN 1622:2007	Acceptable to the consumers and no abnormal change	Acceptable	-
12	Smell	SR EN 1622:2007	Acceptable to the consumers and no abnormal change	Acceptable	-

The ammonium is present in levels above 0.1 mg/l N and this may indicated sewage or industrial contamination.

The water in Someșul Cald Lake has a higher nitrates value than 10 mg/l, so it is not recommended by pediatricians for children.

Table 3 – The obtained results for sample of water from Someșul Cald

Crt. No.	Organoleptic /physico-chemical indicators	Reference for analysis	Maximum permissible values	Values obtained	Unit
1	Turbidity	SR EN ISO 7027:2001	Maximum 5	1,57	NTU
2	pH	SR EN ISO 10523:2012	≥6,5 ; ≤9,5	6,92	pH units
3	Conductivity	SR EN 27888:1997	2500	479	µS/cm at 20° C
4	Free residual chlorine	SR EN ISO 7393-2:2002	0,50	0,22	mg/l
5	Ammonium	SR ISO 7150-1:2001	0,50	0,19	mg/l
6	Nitrites	SR EN 26777:2002	0,50	0,012	mg/l
7	Nitrates	SR ISO 7890-3:2000	50	10,38	mg/l
8	Iron	SR ISO 6332:1996/C91:2006	200	67	µg/l
9	Oxydability	SR EN ISO 8467:2001	5,0	3,98	mgO_2/l
10	Total hardness	SR ISO 6059:2008	Minimum 5	3,04	german degrees
11	Taste	SR EN 1622:2007	Acceptable to the consumers and no abnormal change	Acceptable	-
12	Smell	SR EN 1622:2007	Acceptable to the consumers and no abnormal change	Acceptable	-

The comparative analysis of the test results indicates that all the parameters analyzed are within the legal limits for all the samples taken into account for the case study, but it can be seen that water from Tarnița is purer.

Conclusions

From the three surface water sources to the consumer's tap, the water is carefully monitored, constituting a safe source of fresh drinking water.

The obtained results have allowed us to support the fact that the inhabitants of Cluj County benefit from drinking water services that meet the European Union standards.

Drinking water quality assurance in Cluj County is controlled through a combination of measures: selection of best available source water, catchment protection, control of treatment processes and management of the distribution and handling of the water. Generally, raw water quality is influenced by natural and human factors. Risk assessment helps in hazards identification, prevention of contamination events and proper treatment steps proceeding. Prevention of microbial and chemical contamination of water source is the first barrier against drinking water contamination of public health concern. Water resource management and potentially polluting human activity in the catchment will influence water quality downstream and in aquifers. This will impact on treatment steps required to ensure safe water, and preventive action may be preferred to upgrading treatment. [5]

Better raw water quality involves less intensive processing and lower costs for water treatment, in terms of sustainable development. A less processed product and fewer chemicals added generate a higher quality drinking water, healthier for human consumption, in terms of public benefits.

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