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**EDUCATION FOR HEALTH FOOD BY BIOLOGICAL AND
NATURAL SCIENCES AND ROMANIAN TRADITIONS**

Mariana Iancu (a)*

* Corresponding author

(a) BIOTERRA University of Bucharest, Gârlei street, No. 81, Bucharest, Romania, iancumariana@gmail.com, +40744110704

Abstract

The scientific research on education for health food of students through Biological and Natural Sciences and Romanian traditions was achieved mainly by Microbiology as Biological Sciences and Biochemistry as Natural Sciences at the University Bioterra from Bucharest with students from the food faculties, starting with the 2012-2013 academic year until now. The reconstruction of conceptualization demonstrated that education for health food materialize professional education of students from food faculties and is based on sciences like “Biological Sciences”, “Natural Sciences”, “Educational Sciences” and “Psychology”. Didactical methodologies have been developed, such those practical-heuristic, based on laboratory experiments, i.e. determination of the pH of muscle of domestic pig and the identification the toxic food with nitrites over admissible limits, on laboratory practical works, i.e. the organoleptic examination of meat and D.N.A. (deoxyribonucleic acid) histochemically extraction for identification the counterfeit foods, on observation. Also, were developed interactive-heuristic methodologies by discussions and debates about fundamental concepts, such as health of bread, necessary for their life and future profession. Education for health food in correlation with Romanian traditions and religious beliefs reveals that they have a scientific basis, i.e. prayer before meals is cause for that the food to be bioavailable, completion of long and short posts help to detoxify the body by eating vegetable products, the ancestor of alms-boiled wheat that is both a food and a symbol and a part of a ritual. Were identified numerous examples of education for health, the undertaken objectives of the scientific research being met.

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Keywords: Education for health food; practical-heuristic didactical methodology; interactive-heuristic didactical methodology; Microbiology; Biochemistry; Romanian traditions.



1. Introduction

Whereas health of the citizens is essential for growth and prosperity in the Union, on 28 April 2010 The European Commission has adopted the Recommendation on the initiative research of joint programming “A healthy diet for a healthy life”, member States being encouraged to include many actions, including: “...identifying areas or research activities that would benefit from coordination or joint calls for proposals or pooling of resources;...exchanging information, resources, best practices, methods and guidelines, while establishing clinical studies;...exporting and disseminating knowledge, innovation and interdisciplinary approaches...;...” (European Union, 2010, p. 37).

Individual and collective activities of maintaining planetary health are possible with people at a level of general education, thus, hygienic-sanitary culture, being necessary and education for health food, that can realized on base of biological and natural sciences, in correlation with Romanian traditions.

2. Problem Statement

The European Commission invites Member States to develop and implement a common strategy for the prevention of diet-related diseases. The study in domain reveals that overweight and obesity may lead to conditions such as: cardiovascular disease; hypertension; strokes; certain cancers; type 2 diabetes; certain mental health conditions; musculo-skeletal disorders. However, these risks could be reduced if individuals were to adopt healthy behaviour, particularly in terms of diet. “If common lifestyle risk factors, among others diet-related ones, were eliminated, around 80 % of cases of heart disease, strokes and type 2 diabetes, and 40 % of cancers, could be avoided.” (European Union, 2010, p. 36).

“Over the past 20 years, governments, NGOs, the private sector, and public-private initiatives have been involved in generic healthy eating awareness campaigns all around the world. Public awareness campaigns to encourage healthy eating have been adopted widely in Europe and North America. Generic healthy eating campaigns involve the development and communication of messages that aim to make the public aware of the importance of healthy eating in general. In the EU, a survey in 2008-2009 by the European Food Information Council (EUFIC) identified 125 healthy eating campaigns being conducted during the time of the survey, and most countries had more than one. (EUFIC, 2013)” (Hawkes, 2013, p. 8).

3. Research Questions

In this research on education for health food, the students had answer to many questions from the professor, as following: “Why is brown bread healthier than white bread?”; “How it look like sick bread?”; “How can identify a healthy meat and an old, altered meat?”. This research has responded at the questions: “Which are the didactical methodologies that can be developed for education for health food?; “What the suggestive examples are for education for health food of students from food faculties?”; “What Romanian traditions are in correlation with the education for health food?”.

4. Purpose of the Study

Purpose of Study is development of didactical methodologies for education for health food of students through biological and natural sciences in correlation with Romanian traditions.

The scientific objectives of this research are:

- reconstruction of conceptualization and of didactical methodologies for education for health food;
- identification of examples of education for health food based on biological and natural sciences, of some correlation with the Romanian traditions.

5. Paper Theoretical Foundation and Related Literature

Modern education for health “is one of the “new educations”, defined in the UNESCO programs as answers of the educational systems to the imperatives of contemporary world. “One of the most targeted objectives of the governmental policies and strategies from all the world, mentioned by the World Health Organization, is to achieve and maintain a healthy state for whole population of the world, allowing all the people to have a productive life from an economic point of view.” (Petruța & Soare, 2010, p. 101).

Public health is a key priority of the European Union, being founded in 2005 the EU Platform on Diet, Physical Activity and Health, which brings together a range of European organizations aimed at finding solutions to inadequate nutrition and physical inactivity. “Among the measures is the introduction of food labeling rules applicable throughout the EU.” (European Union, 2013, p.11).

Romania considers EU policies in addressing to education for health, including education for health food by improving knowledge about risk factors, encouraging the adoption by the population of healthy behaviors and lifestyles. “This will be done through measures of information, education and professional training, in the fields of: nutrition, alcohol, tobacco and drugs, exercise, mental health, sexual behavior and use of drugs.” (Popa, 2006, p. 4).

“Education for health or hygienic-sanitary (gr. *hygieia*=health) include knowledge and practical rules to be known and respected by man to avoid unfavorable factors contributing to disease, but also for the approximation of the factors favorable body growth and development, health and his life.” (Ciobanu, 2009, p. 38).

Education for health lies at the crossroads of science foundation as well as “Biological Sciences”, “Medical Sciences”, “Natural Sciences”, “Educational Sciences” and “Psychology” (Figure 1).

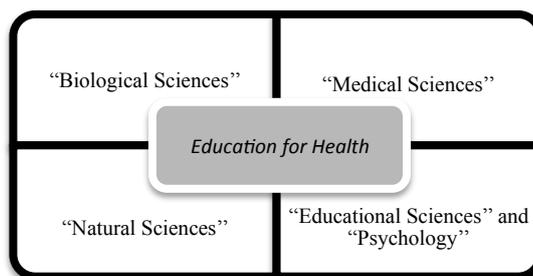


Figure 1. Sciences underpinning education for health

A component of education for health is the education of health food that materializes the professional education of students from faculties and specialization on food domain.

“Foods assure the intake of nutritive substances needed for all vital processes in the human body. A balances nutrition, with a sufficient content of micronutrients (minerals and vitamins) assure the normal growth and development of the organism, maintain the optimum state of health, allow carrying of the daily activity and participate to protection of the organism against various diseases.” (Petruța, 2010 a, p. 163).

The Sciences on which education for health food of students from faculties with food profile is based are: “Biochemistry”, “Microbiology”, “Principles of Nutrition”, “Educational Sciences”, “Psychology” and so on. Education for health food, as a component of education for health, is aiming at „the modification of nutrition behavior of individuals in the context of new existence conditions, economic and cultural, specific to postindustrial society” (Cristea, 2005, p. 62)

6. Research Methods

6.1. Summary Presentation

The methods of this research are: literature review, debate, discussion, laboratory experiments, laboratory practical work, didactical observation, questionnaire.

6.2. Laboratory Experiments and Laboratory Practical Work for Determination the Toxic Foods, Altered, Counterfeit: Hipoteses, Materials and Procedures

The results obtained in higher education is due, mainly, to the teaching methods used by professor and learning methods used by students, in the present research are being used, primarily, the laboratory experiment and laboratory practical works, the methodology applied being practical - heuristic (gr. heuriskein- to find, to discover, gr. heureka - I have found (it)).

“Experiment teaching is a fundamental method in biological education. Through the experiment, a known practical activities report progress and results, introduce new variables set according to a hypothesis developed in order to verify them through - a remark caused intentionally by - a new action search to find the evidence - for and - against .” (Ciobanu, 2008, p. 109).

The students searched solutions to resolve the negative situation of consummation of toxic food by investigation by experiment, finding solution on education for health food. Investigative study was conducted on various types of meat products, the experiments consisting in the determination of nitrites in meat products used, the hypothesis being: “If we apply the method of Peter-Griess reagent spectrophotometric we determine the presence of nitrites in meat, sometimes over the limit of standards in the field.” The principle of the method is: “Nitrites form in acidic medium with alpha naphthyl amine and sulfanilic acid a red colored complex whose intensity is proportional to the concentration.” (Jurcovan, 2013, p. 26).

An other example of a laboratory experiment that contributed to education for health food of students from faculties and food specializations involved in the scientific study undertaken is to determine pH muscle of domestic pig (*Sus scrofa domestica*), the hypothesis set forth by the students

being: “If we determine the pH of the muscle samples, we find a variety of pH corresponding to several grades of meat, mainly fresh meat and meat spoiled.”

The laboratory work practical by organoleptic examination, with the help of senses-sight, smell (biochemical sense), tactile, gustatory (biochemical sense) can lead to food sanitation and therefore, the danger and risk of disease.

Thus, taking into account the organoleptic factors assessment of the appearance, color, consistency, smell and bone marrow and based on the observation of fragments of fresh, relatively fresh meat, meat altered, expired, placed in Petri dishes (Figure 2) based on their smelling, on previously information presented by the teacher with reference to fresh meat, for consumption, students made a comparative analysis of food products and rediscovered characteristic elements of altered products, unhealthy.

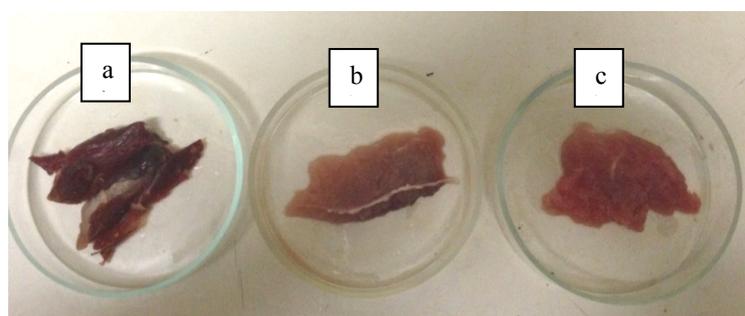


Figure 2. Organoleptic examination of meat: altered meat, expired (a), relatively fresh meat (b), fresh meat (c), placed in Petri dishes

The students has determined in the Biochemistry laboratory within Bioterra University from Bucharest, using chicken liver, banana and onion bulb as food, trough practical laboratory work of D.N.A. histochemical extraction, if the foods is natural or not, the presence of D.N.A. indicating that the foods are natural, and the absence of D.N.A. indicating that the foods not are natural, being counterfeit.

7. Results

7.1. Education for Health Food by Biochemistry

In didactical process at Biochemistry as natural sciences, students were attracted to the practical-heuristic methodologies based mainly on laboratory experiments for determine of the toxicity of foods, i.e. the meat products with nitrites over the limit, laboratory experiments based on the procedure for determining the pH of mammalian meat, on laboratory practical work of determination a mammal meat, altered and fresh, eatable, laboratory practical work of D.N.A. histochemical extraction for determination of the presence / absence of D.N.A. and so if the food is natural or not, on didactical observation.

Results of laboratory experiment of biochemistry of determining by students the nitrites in meat products expressed in mg. nitrites/100 g. meat demonstrated that the meat products used recorded values between 1.54 mg. nitrites/100 g. Italian salami and 9.96 mg. nitrites/100 g. peasant baloney, the normal value being 7 mg. nitrites/100 g. meat products, shown in the following figure (Figure 3), some products meat being toxic food for health. The students learn that for their health is necessary to avoid eating the

toxic foods with nitrites over admissible limits, that determine the forming of methemoglobin which can cause death by suffocation.

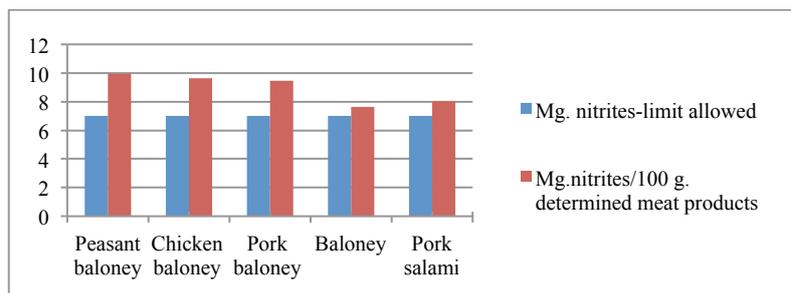


Figure 3. Comparative values of mg. nitrites limit allowed and determined over the allowable amount of meat products

Previous biochemical studies on the pH, the information given by student on the pH of the fresh meat of bovine or ovine not more than 6.2, and at a maximum of 6.6 muscle pH of domestic pig, the procedure for determining the pH of meat mammalian led to the rediscovery of the students, through their own effort of mammalian meat eatable to detect adulterated meat, unhealthy, if the pH is determined increasingly smaller and so the meat is becoming more acidic, the advancing deterioration. The hypothesis was confirmed, as identified by students several grades of meat.

“Manufacturers and distributors of meat and meat products are controlled by specialized personnel in health control. Analysis and health inspection of meat watch on one hand, to emphasize the main chemical components that characterize the nutritional value of the product and on the other hand, to highlight any alterations that make this food a harmful factor for the health of the consumer.” (Tomescu, Drăgan, & Meiroșu, 2000, p. 108).

In biochemistry practical work and laboratory experiment, at topics “Organoleptic examination of food” and “Determination of pH”, the students in addition to their training, expertise and health control, acquires an education for health food, getting power to distinguish for example a mammal meat, altered and one fresh, eatable; to distinguish between a fresh fish, eatable, healthy and one altered, damaged, old. Also, in Biochemistry, by practical work and laboratory experiment, the students discovers counterfeit food by various additions, such as the presence of starch or gelatin in the cream or the presence of starch in sausage.

“It is an approach derived from a different philosophy of knowledge, another explanation of the science, this time regarded as a functional process as a living, active, continual development of knowledge as an ongoing, never completed, the discovery of new truths, a genuine intellectual creation.” (Cerghit, 2002, p. 79).

The processing of information was continued with the preparation of a comparative table (Table 1) with the characteristics of mammalian meat which was organoleptic examined and filled with new data rediscovered by students within the heuristic conversation initiated by the professor, approached didactical methodology is one practical-heuristic (Greek heuriskein-to find, to discover; Greek heureka-I have found (it)) based on the teaching methods, i.e. laboratory practical work, didactical observation, heuristics conversation.

Table 1. Organoleptic examination of fresh meat, relatively fresh meat and meat altered, expired

No. Crt.	The factors for assessing organoleptic character	Fresh meat	Relatively fresh meat	Altered meat
1.	Appearance	On the surface has a film; tendons are glossy, elastic and firm; articular surfaces are smooth and glossy; the fat color is normal, characteristic of species.	On the surface has a dry film or partially covered with a thin layer, sticky; sometimes you can see mold spots; tendons are relatively soft, have a matte aspect and sometimes has a gray color; the articular surfaces are covered with mucus; fat has a matte aspect and a low consistency.	Meat surface is sticky, smooth; fat is matte gray-dirty; rancid odor and taste; soft tendon, gray, wet, covered by a layer of mucus; articular surfaces are covered by abundant mucus.
2.	Color	On the surface is pink to red; the color section is characteristic of species and of respective muscular region.	On the surface and in section the color is matte and compared to fresh meat.	On the surface, the color is dark-gray or greenish. In section, sometimes faded.
3.	The consistency	It is firm and elastic. In section, is compact; it does not form the pressure holes when pressing a finger.	It is soft; both surface and in section; in pressure holes formed when you press a finger into the fresh meat, the pressure holes quickly disappear and the meat goes back to its original shape.	The pressure holes which are formed by pressing the finger are persistent, both on the surface and in section.
4.	Smell	Pleasant, characteristic of each species.	Slightly acidic odor or mold; the smell of mildew is missing from deeper layers.	The smell of rotting meat at the surface and deeper layers.
5.	The bone marrow	Glossy in section; fill in all central medullary canal; normal color and consistency.	Easily detached from the bone edge; softer and darker; matte section, sometimes gray.	Do not fill the medullary canal; reduce consistency; gray color, dirty.

There are also, identified numerous examples of education for health food.

It thus contributes both for their training in profession and for education for health food of students, didactical methodology is practical-heuristic, learning methods based on laboratory experiment, observation, heuristic conversation. “Provided by applying a biological education models, varied and combined strategies and teaching methods for the particular age of the students...” (Iancu, 2015, p. 613)

8. Discussions

In this research were developed the didactical methodologies for education for health food of students through natural and biological sciences such interactive-heuristic methodologies by discussions (lat. *discussio* = suggesting that the image of a building shake for see if it is quite solid ; *discuss* = examine the value of information) and debates centered on fundamental biochemistry and microbiology concepts such as those in correlation with concept of “bread”. “Within the literature on psychology and didactics of natural science, a great importance is given to the concepts and process of their formation. Concept is a notion, a general idea which is elaborated by analysis and synthesis, abstractization and generalization.” (Petruța, 2015, p. 688)

The professor “must be moderators, arousing inquiries, questions, discussions and debates. Students are encouraged to express divergent views when supporting their own opinion or opposing another student’s opinion. The teacher is a constructive educational manager; engages all students in the

learning process and facilitates the use of heuristic rather than simply present the new content.” (Iancu, 2014, p. 72).

Students rediscovering by study and discussion that yeast used in bread industry belongs to the species *Saccharomyces cerevisiae*, carrying out the alcohol fermentation, a series of enzymatic biochemical reactions through that carbohydrates are degraded up to ethyl alcohol (C₂H₅OH) and CO₂.

Students responded at questions of professor previously presented and argue through discussions and debates that it is healthier to eat brown bread than white bread because the nutritional content is higher and also the lower starch content and increased gluten contributes to better growth, development and operation of body to avoid fattening, obesity. On base of observations, by the literature review, students discussed at Microbiology as Biological disciplines about pathogens that develop on bread, most often are grown on bread mold pathogen *Aspergillus glaucus* as in class Deuteromycetes molds (fungi imperfect).

“Method discussions/debates has several advantages: is a form of socio-empirio-centrally learning, through enhances interactions, communication within the group, activism pupils / students increases spontaneity, develop the ability to overcome polemics, reasoned presentation of ideas, to respect freedom of speech, contribute to the formation of communication skills within the group, etc. which are sign up on line with achieving a modern and formative biological education.” (Iancu, 2012, p. 60).

In didactical research laboratory from Specialized Department with Psychopedagogical Profile of BIOTERRA University of Bucharest were presented and discussed with students the results of one questionnaire in correlation with marketing and the consummation of the natural or counterfeit honey bees. “The role of ... apicultural products (honey, pollen, royal jelly, propolis) for the cure of various disorders it has been known since ancient times.” (Petruța, 2010 b, p. 374). Over 150 students completed the questionnaire in correlation with eating of honey bees. The data collected following administration of the questionnaire revealed, inter alia, that: most students eat honey, which is purchased by parent’s supermarkets, when they buy, read the label, particularly durability, as well as their parents; students do not recognize counterfeit honey bees examination; students know the kinds of honey, but also part of the honey quality standards, such as those related to organoleptic; etc.

“Improving public knowledge on the relationship between diet and health, energy intake and output, on diets that lower risk of chronic diseases, and on healthy choices of food items, is a prerequisite for the success of any nutrition policy, whether at national or Community level. Consistent, coherent, simple and clear messages need to be developed, and disseminated through multiple channels and in forms appropriate to local culture, age and gender. Consumer education will also contribute to creating media literacy, and enable consumers to better understand nutrition labelling.” (European Commission, 2005, p. 8)

8.1. Discussions in Correlation with Education for Health Food and Romanian Traditions

Another approach to health food is the correlation with Romanian traditions. On base of literature review, by discussions on Romanian traditions and religious beliefs in correlation with the nutrition, the food and the education for health food reveals that they have a scientific basis, i.e. prayer before meals is

the psychological cause for that the food to be bioavailable, fasts help to detoxify the body by eating vegetable products, the ancestor of alms-boiled wheat is both a food and a symbol and a part of a ritual.

“Religiously speaking, food complements the spiritual life and the more spiritual life becomes high, the food becomes insignificant.” (Atudosiei, 2006, p. 4). This is another valence of the food, that of integrating cultural and religious.

The students showed that a part of Romania's population taken into account in diet and religious faith, the Orthodox Christian tradition, crossing long and short period of times of full or partial abstention from food, which contribute to improve human health as eating vegetable products lead to detoxification and health of the body, remove toxins entered the body with animal foods. Because the body is deprived of certain nutrients, such as animal protein, long periods as it may appear deficient nutrition foods and specific diseases. Were established to enter into a long fasts a day of “eating meat” and “eating cheese” and were introduced during the long fasts “eat fish”. But the fasts helping to morally, ethically education, contributing to the intensification of mental traits, character, and will, through education and self-education through self-control.

“It depends very much on us as the food to be accepted by of body and prayers, blessings before meals serve just for good preparation and assimilation of food. Blessing aims to “taming” of food. The secret to the food to open it consists in heating and heat Love means (...) Do not ever eat what you do not like!” (Aivanhov, 2008, p. 25).

In the Romanian tradition, the ancestor of alms-boiled wheat-stems from the very roots of garnishment novel, which is known as a great nation of farmers. Wheat (*Triticum aestivum*) symbolizes the connection between life and death.

Romanian tradition and religious belief, cage that is prepared especially for eternal memory of loved ones gone in nothingness, is both a food and a symbol and a part of a ritual, as the three basic components of alms were their significance: wheat (Barley) which then yields a mean crowd sprouts grown right Christian faith and their salvation, sugar or honey represents virtues of Saints and walnut kernels (seeds) released from the fruit that holds him handcuffed, is victory over death through the resurrection of our Lord Jesus Christ.

In contemporary society, many of these traditions and religious beliefs unfortunately have been abandoned.

It is a matter of deep bioethics of specialists in the field, family, public institutions, including schools, in making education for health food in correlation with Romanian traditions and religious beliefs that are part of our identity as a nation. It is also a patriotic duty to lower the degree of morbidity and mortality rate and therefore improving population health in Romania by education.

“People with better education have more access to informational resources, which promotes health and better health literacy, leading to being better equipped to understand, integrate and act upon this information. In the same way, income provides the means to purchase health care, and to have access to better nutrition, housing or educational opportunities.” (Oprea, 2010, p. 84).

9. Conclusions

The analyze of data obtained by pedagogical observation, debates, discussions, the study of scientific bibliography has demonstrated that education for health food materializes professional education of students from food faculties and based on sciences like “Biological Sciences”, i.e. “Microbiology”, “Natural Sciences” i.e. “Biochemistry” and on knowledge of professor in “Educational Sciences” and “Psychology”, that the education for health food correlates with Romanian traditions and religious beliefs.

Didactical methodologies have been developed on practical-heuristic methods, i.e. laboratory experiments, laboratory practical work, observations, but and interactive-heuristic methods, i.e. discussions, debates, being identified numerous examples of education for health food, the scientific objectives being met.

Modern teaching in learning process of biological and natural disciplines concentrates on the student, making them interactive subjects, co-participant and co-authors in their own training, students being attracted to the heuristic approach and interactive by discussions, debates, focusing on fundamental concepts, for example, the concept of “bread”, the results obtained by students together professor reflecting the training of their for profession correlated with education for health food and with intellectual education by education for science.

Health education, especially education for health food, professional education, intellectual education by science, but other sides of education are needed and complementary, their variability being in reaction at more complex situations in which the people are put in contemporary society and in which they can solve by creating sustainable solutions based on science, very important for life being the Biological and Natural Sciences.

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