POSSIBILITIES OF CARRYING OUT MODERN SANITARY EDUCATION WITHIN LESSONS OF BIOLOGY

POSIBILITĂŢI DE REALIZARE A EDUCAŢIEI SANITARE MODERNE ÎN CADRUL LECŢIILOR DE BIOLOGIE

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Abstract. *Modern sanitary education 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 governamental 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. Within the pre-university education, transmission of sanitary knowledge is carried out during both school activities, and out of school activities. Studying themes of biological sciences, during gymnasium and high school, gives numerous opportunities of approaching some subjects concerning fields of modern sanitary education. In this paper, we wish to emphasize that nutritional education, as a component of the modern sanitary education, can be realized at the same time with studying some themes of plant biology and human anatomy.*

Key words: nutritional education, fruits, vegetables, bioelements.

Rezumat. *Educaţia sanitară modernă este una dintre „noile educaţii", definite în programele UNESCO ca răspunsuri ale sistemelor educaţionale la imperativele lumii contemporane. Unul dintre obiectivele cele mai vizate de politicile şi strategiile guvernamentale din întreaga lume, menţionat de Organizaţia Mondială a Sănătăţii, este realizarea unei stări de sănătate a întregii populaţii a Globului, care să permită tuturor oamenilor să ducă o viaţă productivă din punct de vedere economic. În învăţământul preuniversitar, transmiterea cunoştinţelor de educaţie sanitară modernă se realizează atât în cadrul activităţile şcolare, cât şi extraşcolare. Studierea temelor de ştiinţe biologice, în gimnaziu şi liceu, oferă numeroase ocazii de abordare a unor subiecte privind unele domenii ale educaţiei sanitare moderne. Educaţia nutriţională, ca şi componentă a educaţiei sanitare moderne, se poate realiza odată cu studierea unor teme de biologie vegetală şi de anatomie umană, fapt ce va fi evidenţiat în acest articol.*

Cuvinte cheie: educaţie nutriţională, fructe, legume, bioelemente.

INTRODUCTION

"New education", defined in UNESCO programs, represent an assembly of specific answers in educational plan to the imperatives indicated by the problems of contemporary world. These prioritary pedagogical objectives are aiming at: education in relation to the environment or ecological education, education for change and development, education for technology and progress, education for mass media, education on the matter of population or demographical education,

education for peace and cooperation, education for democracy, and modern sanitary education (Văideanu, G., 1996, p. 65, 66).

Modern sanitary education „is aiming at the formation and cultivation of specific capacities of projection and rational organization of life, in conditions of solving some problems specific to the education for spending the spare time, modern family life education, nutrition education, sex education" (Joiţa, E., (coord.), 2003, p.19). M. Minder mention two other particular contents of this „new education": education for a judicious medication, and education for valorization of therapeutic information (Cristea, S., 2005, p. 62).

Nutrition education, as a component of modern sanitary education, 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, S., 2005, p.62). For reaching this general objective is needed to inform the people about the food nutritional value, importance of selecting and rational food dosing, its adequate preparation, as well as about the importance of identifying authentic foods (Cucoş, C., 2002, p. 57). In school, the indoor and outdoor activities offer numerous ocassions for nutrition education of young generation. Also, the pupils have the opportunity to study as a module, during I-XII classes, the chosen discipline „Education for health". For elaborating of the curriculum for „Education for health", were taken into consideration both the necessity of informing the pupils about the food importance in order to preserve the body health, and the necessity to educate the pupils for adopting a correct, balanced, and adequate food regime, which assure the normal functioning of the whole human body. Themes studied within this discipline assure the progress in formation of capacities and acquisition of notions specific to nutrition education, in accordance to the assembly of knowledges corresponding to the contents of disciplines studied during the compulsory education. Among the themes included in the curriculum for this discipline there are: diversity of foods – condition for health, food expiration date (1st class); influence of plant and animal foods, effects of unilateral nutrition (3rd class); food pyramid (6th class); factors disturbing the metabolism (sugar, protein, fat, mineral), deficiences, food additives and their influence on health (9th and 10th classes); nutrition and heart diseases (11th and 12th classes).

Taking into consideration the decrease of the number of schools in which this chosen discipline is studied in recent years, the aim of our study was to identify the ways and possibilities of carrying out nutrition education within the Biology lessons. The main objectives of this study was the identification of that biology themes studied in gymnasium and high school, within which notions of nutrition education could be transmitted.

MATERIAL AND METHOD

In recent time, a special attention is given to the education of pupils towards a healthy eating and balanced nutrition, which must contain all groups of nutrients. As it is generally known, fruits and vegetables represent an important source of biolements and chemical elements, indispensable for normal functioning of human body. Bioelements are classified in macroelements and microelements. Macroelements are

the minerals which the human body requires in relatively large quantities. This category include calcium (Ca), magnesium (Mg), phosphorus (P), potassium (K), sodium (Na), chloride (Cl) and sulphur (S). Microelements or oligoelements are the minerals which are needed by the body in very small quantities, such as: iron (Fe), zinc (Zn), iodine (I), fluoride (F), copper (Cu), manganese (Mn), selenium (Se), cobalt (Co), chrome (Cr), molibdene (Mo), silicon (Si), lithium (Li), nickel (Ni), arsenium (As), bromine (Br) tin (Sn) and vanadium (V).

Due to their composition, fruits and vegetables are recommended both in the nutrition of healthy people, for maintaining their health, and people having various disorders, for attenuating or even curing them.

In order to emphasize the possibility that the teacher of biology have to transmit and consolidate notions of nutrition education, we analyzed the content of Biology mannuals used in gymnasium and high school at present, and identified themes of plant biology and human anatomy, within which the importance of fruits and vegetables in human nutrition, as well as the importance of some minerals (macroelements and oligoelements) and eventually vitamins for the human body, could be emphasized.

RESULTS AND DISCUSSIONS

Transmission of knowledge about the importance of fruit and vegetables in nutrition can be carried out within the lessons of Biology, during the 5th class, but without realizing interdisciplinary connections with the chemistry notions. When studying the theme "The fruit and seed" and chapter "Angiosperms" can be emphasized the importance of fruits and vegetables for health preservation and/or curing of some diseases. These knowledge can be presented by: a) the teacher, at the end of lesson, under the form of "curiosities"; b) pupils, if they have been asked to elaborate together or in groups, in the classroom, by independent study, a material based on information from various sources (brochures, journals, books) offered by the teacher, or materials selected by themselves from the Internet; c) pupils, if they have been asked to elaborate, individually or in groups, various materials (summary, essay, report), as homeworks. In the case when the presentation of notions is done by pupils, is necessary to assure their fixation by elaboration of a cluster or table, together by the teacher and pupils, on the black (or white) board, mentioning the fruit/vegetable, and therapeutic indications. With this ocassion can be emphasized also the advantages of a diversified nutrition, including "alive foods" constituted from vegetables and fruits, as compared to the unilateral nutrition or oriented only on certain "favorite" foods, due to the taste they have. In the 9th class, this subject of nutrition education can be resumed when studying the dicotyledonous and monocotyledonous plants within the theme "Angiosperms". This time, taking into consideration that the pupils acquired the concepts "chemical element" and "mineral", and also of the chemical formulas, during the 7th class, they can be asked to additionally mention the macro- and oligoelements, eventually the vitamins, from the fruit (table 1) and vegetable (table 2) composition.

Table 1

Composition in bioelements and vitamins of some fruits and their importance for human health

Fruits/ Plant	Macro-elements/ 100g	Oligo-elements/ 100g	Vitamins	Therapeutic indications
Blueberries *Vaccinium myrtillus*	Ca (6 mg), Mg (6 mg), P (12 mg), K (77 mg), Na (1 mg)	Fe (0,3 mg), Zn (0,2 mg)	A, C, E., K, PP, B6, B9	circulatory disorders, atherosclerosis, enteritis, biliary insufficiency, improvement of nocturnal eyesight
Apricots *Prunus armeniaca*	Ca (13 mg), Mg (10 mg), P (23 mg), K (259 mg), Na (1 mg) S, Cl	Fe (0,4 mg), Zn (0,2 mg), Cu, Br, F, Ni	A, C, E., K, PP, B1, B2, B6, B9	physical asthenia, depressions, anemia, insomnia, diuretic, constipation
Black currants *Ribes nigrum*	Ca (61,60 mg), Mg (26,90 mg), P (66,10 mg), K (361 mg), Na (2,20 mg), Cl	Fe (1,7 mg), Zn (0,3 mg), Cu, Co	A, C, E, K, B1, B2, PP, B6	anemia, atherosclerosis rheumatism, gastritis, heart and respiratory insufficiency, nephritis
Lemons *Citrus limonum*	Ca (26 mg), Mg (8 mg), P (16 mg), K (138 mg), Na (2 mg)	Fe (0,6 mg), Zn (0,1 mg), Si, Mn, Cu	A, C, E, PP, B1, B2, B3, B6, B9	pulmonary infections, intestinal infections, rheumatism, anemia, arteriosclerosis, asthenia, hypertension
Olives *Olea europaea*	Ca (94 mg), Mg (4 mg), P (3 mg), K (9 mg), Na (898 mg)	Fe (3,3 mg), Zn (0,2 mg), Mn, Cu, Si	A, C, E, K	anemia, insuficienţă hepatic insufficiency, biliary litiasis, diabetes, rachitism, allergies
Apples *Malus communis*	Ca (6 mg), Mg (5 mg), P (11 mg), K (107 mg), Na (1 mg), Cl, S	Fe (0,1 mg), As, Mn, Co, Si, Br	A, C, E, K, PP, B1, B2, B9	reumathism, feverish state, gout, diabetes, anemia, asthenia, insomnia
Walnuts *Juglans regia*	Ca (44 mg), Mg (130 mg), P (690 mg), K (510 mg), Na (2 mg)	Fe (2,4 mg), Zn (2,4 mg), Cu (0,2 mg), Se, Mn	E, B1, B2, PP, A, C,	diabetes, tuberculosis, intestinal parasites, dermatosis, renal litiasis
Figs *Ficus carica*	Ca (35 mg), Mg (17 mg), P (14 mg), K (232 mg), Na (1 mg)	Fe (0,4 mg), Zn (0,2 mg), Mn, Br	A, C, D, K, B1, B2, PP, B6, B9	asthenia, gastritis, colitis, feverish state, bronchitis, laryngitis, constipation
Grapes *Vitis vinifera*	Ca (10 mg), Mg (0,70 mg), P (20 mg), K (191 mg), Na (2 mg)	Fe (0,4 mg), Zn (0,1 mg), I, Co, Ni, Br, F	A, C, E, K, B1, B2, PP, B6, B9	anemia, asthenia, gout, reumathism, litiasis, nephritis, dermatosis, oedema, intoxications

(after Grigorescu, E., 1996; Chirilă, P., 1997; http://dieta.romedic.ro/alimente/Fructe_011/filtru)

Table 2

Composition in bioelements and vitamins of some vegetables and their importance for human health

Vegetable/ Plant	Macroelements/ 100g	Oligoelements/ 100g	Vitamins	Therapeutic indications
Green Pepper *Capsicum annum*	Ca (10 mg), Mg (10 mg), P (20 mg), K (175 mg), Na (3 mg)	Fe (0,30 mg), Zn (0,10 mg), Cr, Si	A, C, E, K, B1, B2, PP, B6, B9	vitaminizing, intestinal colic, muscular cramps, meteorism
Green onion *Allium cepa*	Ca (61 mg), Mg (20 mg), P (33 mg), K (260 mg), Na (4 mg) , Cl	Fe (1,90 mg), Zn (0,50 mg), I, Ni, Si	A, C, E, K, B1, B2, PP, B6, B9	respiratory problems (cold, bronchitis, asthma), flu, oedema asthenia, diabetes, rheumatism, aterosclerosis
Carrot *Daucus carota*	Ca (35 mg), Mg (12 mg), P (35 mg), K (320 mg), Na (69 mg), S	Fe (0,30 mg), Zn (0,20 mg), I, Co, As, Ni, Cu, Br	A, C, E, K, B1, B2, PP, B6, B9	anemia, enterocolitis, gastroduodenal ulcer, pulmonary disorders, rheumatism
Parsley *Petroselinum sativum*	Ca (138 mg), Mg (50 mg), P (58 mg), K (554 mg), Na (56 mg), S	Fe (6,20 mg), Zn (1,10 mg), Cu, Br, I	A, C, E, K, B1, B2, PP, B6, B9	anemia, asthenia, ischemic cardiopathy, oedema, rheumatism
Spinach *Spinacia oleracea*	Ca (99 mg), Mg (79 mg), P (49 mg), K (558 mg), Na (79 mg), S	Fe (2,70 mg), Zn (0,50 mg), Cu, I, As, Ni, Mn	A, C, E, K, B1, B2, PP, B6, B9	anemia, rachitism, convalescence, scurvy, astenia, burns
Cabbage *Brassica oleracea*	Ca (40 mg), Mg (12 mg), P (26 mg), K (170 mg), Na (18 mg), S	Fe (0,50 mg), Zn (0,20 mg), I, Co, As, Ni	A, C, E, K, B1, PP, B6, B9, D2	gastritis, gastric and duodenal ulcer, bronchitis, asthma, diabetes, eczema chilblains, wounds

(after Grigorescu, E., 1996; Chirilă, P., 1997; http://dieta.romedic.ro/alimente/Legume_010.html)

Also, taking into consideration that the pupils have acquired knowledge of human anatomy and physiology during the 7th class, at the time of filling out the cluster/table, can be questioned about the role of some macro- and oligoelements in the make-up and good functioning of the organism. For instance: Which elements confer rigidity to the bones? (Ca and P); Which element is especially important for the formation of hemoglobin from the red blood cells? (Fe); Which element is essential for the synthesis of the tyroid hormones? (I); Which element is found in saliva, gastric juice and bile? (Cl).

The tables realized in the 9th class can be saved and used subsequently in the 10th and 11th classes, in the moment when different human disorders will be discussed. Based on the analysis of data from tables, the pupils will be able to indicate, for instance, which fruits or vegetables can be consumed for curing some

disorders of the digestive system (gastritis, gastro-duodenal ulcer, enterocolitis, biliary litiasis etc.), respiratory (bronchitis, laryngitis, bronchitic asthma), circulatory (aterosclerosis, arterial hypertension, varicose vein), excretory (urinary litiasis), or some endocrine disorders (diabetes).

In the 11th class, within the theme "Vitamins", the pupils can select from the tables the source of various vitamins presented in the textbook. As a completion of the knowledge transmitted within the chapter "Metabolism", after the presentation of vitamins, could be realized a table or cluster regarding the source and importance of minerals for the human body. For activating the pupils, the work can be organized in groups, each group realizing a cluser for a certain bioelement, mentioning the chemical symbol, foods containing it, and its role in the organism. At the end of lesson, the clusters realized can be assembled into a final cluster, starting from the concept of bioelement.

CONCLUSIONS

1. Nutrition education, as a component of modern sanitary education, can be realized both during teaching of the chosen discipline "Education for health", and within Biology.

2. Together with studying some themes of plant biology, in gymnasium and high school, can be emphasized the importance of fruits and vegetables for the health of human body, as natural source of minerals, and vitamins.

3. In the college, within some themes of human anatomy can be emphasized the importance of macro- and oligoelements for curing some disorders and for maintaining the health of human body.

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