STUDY REGARDING THE DETERMINATION OF THE SPECIFIC AGRI-FOOD CONSUMPTION NEEDS OF THE POPULATION

MARIN DIANA[1*], PETROMAN CORNELIA[1], IOSIM IASMINA[1], CIOLAC RAMONA[1], VĂDUVA LOREDANA[1], DINCU ANA MARIANA[1]
[1]University of Life Sciences "King Mihai I" from Timișoara, Faculty of Management and Rural Tourism, Romania
Corresponding author's e-mail: diana_rachiciu@yahoo.com

Abstract: *Since ancient times, studies have been developed to attest the close relationship that has been created between nutrition and the physiological state of the human body. It is well known that insufficient nutrition is one of the causes of infant morbidity and mortality, of the child's physical and mental development, of work capacity, of maintaining health throughout life. That is why the basis of human nutrition must be a balanced and quantitative consumption, in terms of number of calories, and qualitatively, in terms of structure, considering the rational weight of elements of high nutritional value.*

Key words: *food needs, consumption, rational*

INTRODUCTION

Consumption needs generally assume the existence of some limits between which they fall and which are generally called consumption norms [3,14]. The problem of consumption norms mainly focuses on the evaluation and measurement of consumption needs, starting from the fact that in the field of energy and protein needs, there is a critical threshold of maintenance expenses, which represents the maximum limit for a normal food ration. Specialists appreciate that the share in terms of energy and protein needs of different foods for a food ration differs in nine geographical areas of the world, according to the dominant share of different food groups, this share being directly linked to the level of economic development, regional conditions and the consumption tradition of the population of these territories [1,5,13].

Apart from energy consumption, the human body needs nutritional factors for the normal performance of the activity and the maintenance of life. They are composed of proteins, lipids, carbohydrates, vitamins and minerals, elements that have different roles and functions in regulating the diet, in the daily ration of each individual, as it follows from what is to be presented [2,8].

Protein needs may vary depending on various factors, such as: age, working conditions, effort, and physiological state of the body. It is considered that the optimal physiological need for protein for a normal adult would be around 1.2-1.5 grams/kilogram/body, which would mean 13-18% of the total caloric value of his daily food ration. It has been calculated, for example, that an adult individual weighing 70 kilograms needs a daily amount of 84-105 grams of digestible protein.

Lipid needs also vary depending on a number of factors between which age is significantly different, lipid needs are higher at children and tend to decrease with age. The average daily requirement of lipids is 1-2 grams per kilogram of normal body weight. The intake of lipids in the caloric structure of the daily consumption ration must represent between 20-30% in conditions of normal weight of the human body [4,6,15]. The requirements of a normal nutrition impose that, as in the structure of food consumption of lipids, products of animal origin and those of vegetable origin must be in a balanced ratio. Obviously, this ratio varies depending on the age category and sex, as well as depending on the area and the seasons. On average, the normal proportion of lipids in the ration, recommended by nutritionists, is ½ lipids of vegetable origin, ½ lipids of animal origin.

Carbohydrate needs are related to the energy intake necessary for the metabolic processes that take place in the human body. In daily consumption, carbohydrates represent 55-60% of the total caloric value of the ration, relative to normal body weight, the daily consumption of carbohydrates must, under normal conditions of consumption, be 4-8 grams/kilogram/body, meaning 300-500 grams of carbohydrates per day [7].

The needs of microelements - this category mainly includes the mineral elements that ensure the normal development of the metabolic processes and the biochemical processes of the formation of plastic substances in the body, as well as vitamins.

The daily requirement of microelements for an adult individual is valued in specialized literature at 6 grams of Chlorine, 4 grams of Sodium, 3.2 grams of Potassium, 1.2 grams of Sulfur, 1.2 grams of Phosphorus, 0.84 grams of Calcium, 0.32 grams of Magnesium, 20 milligrams of Zinc, 18 milligrams of Iron, 2.5 milligrams of Copper, 3 milligrams of Manganese, 1 milligram of Fluorine, 0.3 milligrams of Iodine [9].

The need for vitamins derives from their function of regulating the biocatalytic processes that occur in the body. The daily intake for an adult is estimated at 5000 IU. vitamin A, 400 meaning vitamin D, 50-150 milligrams vitamin C, 15-26 milligrams vitamin PP, 2-3 milligrams vitamin E, 1.5-2 milligrams vitamin B12, etc.

The need for water derives from its quality to constitute itself as the main element of living tissues and as a solvent medium for food intake in the process of catabolism and intestinal absorption of nutrients. For an adult, normally developed organism, the daily water needs are estimated at 2,500-3,000 milliliters.

On the world level, as it was already shown, two fundamentally opposite nutritional aspects, with a negative character, are proliferating: undernutrition and overnutrition. From a quantitative point of view, food production and food consumption experienced different evolutions in geographical areas, being dependent on human consumption. The appropriate design of nutrition norms according to the particularly complex factors that determine behavior and food needs is of particular importance in this direction. Thus, imbalances generated by excess or deficit are avoided through an adequate adaptation to the requirements of the targeted entity.

MATERIALS AND METHODS

For the preparation of this scientific work, studies were undertaken regarding the consumption needs, in the case of agro-food products, analyzing the opinions of several authors in the field of product consumption.

RESEARCH RESULTS

The points of view expressed regarding the basics of a rational diet are nuanced, in general, which is natural because the issue of human health is particularly complex, with areas still unexplained by science in general and medicine in particular. For example, precisely for this reason, the Report of the British Department of Health is drafted in a cautious style, bypassing the idea of recommendations, in favor of the expression "reference values", emphasizing for this that they are not necessarily valid for a specific person.

From the perspective of research, this Report presents two interesting aspects. First of all, the consumption of reference nutrients are set within higher limits, on the grounds that their excess use does not have negative effects, as it contributes to reducing the risk of deficiency. Second, the report indicates that the average energy requirement is 2,550 calories/day for adult men and 1,940 calories/day for adult women, emphasizing that excess can be harmful and has the potential to favor overweight. At the same time, 55 grams of protein/day are mentioned for adult men and 45 grams of protein/day for adult women.

According to specialized literature, the consumption needs of the population can be expressed through energy consumption (calories), through the consumption of nutritional factors (proteins, carbohydrates, lipids) and through the consumption of microelements (minerals, vitamins, etc.).

Human energy consumption is given by the quantity and quality of food products necessary for human activity and is usually expressed by the number of calories of vegetal and animal origin. In this way, the notion of consumption must be examined and interpreted in a double sense:

- food consumption in the narrow sense, which is related to the actual act of nutrition, that is, the actual food consumption that satisfies the physiological requirements;
- food consumption in a broad, economic sense and which is constituted in relation to the purchase of agro-food products intended for food, that is, food availability.

It is recommended that the energy requirement to be distributed as follows (figure 1):

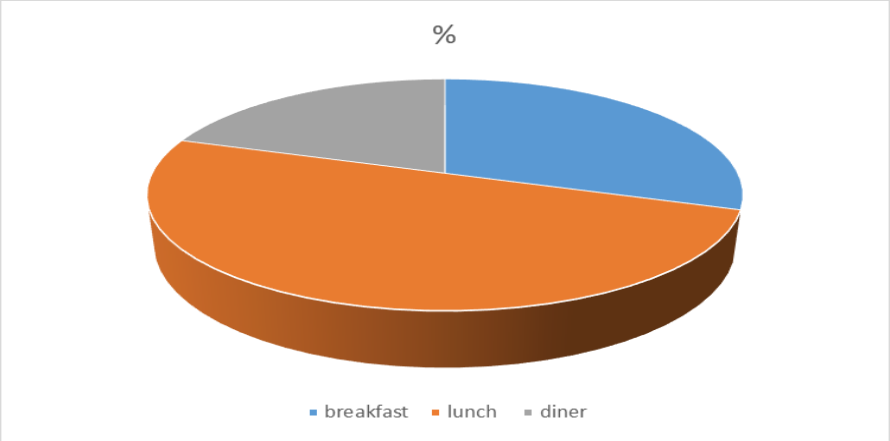

Figure 1. Energy requirement distributed per day

Of course, human energy needs depend on a number of factors such as: age, body weight, physical and/or intellectual activity, geographical environment, etc.

In terms of quantifiable relationships, consumption can be presented in the form of a multifactorial equation of the form [12]:

$$Ne = f(g, a, m) \quad (1)$$

in which:

Ne represents the energy needs of a person in 24 hours, expressed in kilocalories/day;

g - represents the body weight of the individual expressed in kilograms;

a - represents the activity carried out by the respective person;

m - represents the geographical environment.

The basis of reference and calculation of energy needs is the basal metabolism (Mb), which represents the energy needs of the human body at rest. Depending on the activity performed, the amount of daily energy can be presented as follows:

$$Qe/zi = Mb * Naf \quad (2)$$

where:

Qe/day – represents the amount of daily energy required;

Mb – represents the amount of energy needed to cover the energy consumption related to basal metabolism;

Naf - represents the dimensioned coefficient depending on the physical and mental activity carried out by the individual.

Of course, daily energy consumption needs differ quantitatively (kilocalories/day), depending on age (children, teenagers, adults, elderly), gender (male, female) and the biological state of the individual (health, maternity). All of these are differentiated into groups and typologies depending on the variables that characterize their physiological state and their economic and demographic behavior.

Food availabilities expressed quantitatively in kilocalories and grams of protein/day/person must be supplemented with structural and qualitative evaluations of the food consumed. Within the modern nutritional requirements, the qualitative dimension of the daily intake must also be taken into account, which can be expressed by:

a) the ratio between calories, respectively proteins of animal and vegetable origin, their availability and structure (in industrialized countries the consumption of calories of animal origin predominates, of 60-70%, and of the available daily world average of proteins per inhabitant, about 67% belong to vegetable proteins and 33% to animal proteins);

b) intake of essential amino acids;

c) the ratio between essential polyunsaturated fatty acids and saturated fatty acids (the proportion of vegetable fats in the total amount of fats consumed, recommended between 1/2 and 1/3);

d) the qualitative aspect of the ingested carbohydrates, taking into account the amount of starch, sucrose, dietary fibers;

e) the presence of vitamins and mineral substances in the food consumed, their variability, for example, the daily availabilities of retinol and beta-carotene respectively and the ratio between the availability from vegetable and animal products;

f) the influence exerted by anti-nutritional substances that decrease the coefficient of use of proteins, vitamins or mineral salts.

According to the majority of opinions in the field, we believe that the largest part of the food intake should be provided by cereals and derivatives, followed by fats, vegetables, milk, meat, etc. In this case, if the optimal ratio between the different food groups is respected, the body's caloric needs will be provided by proteins 12-13%, lipids 28-32% and carbohydrates 56-60% (figure 2).

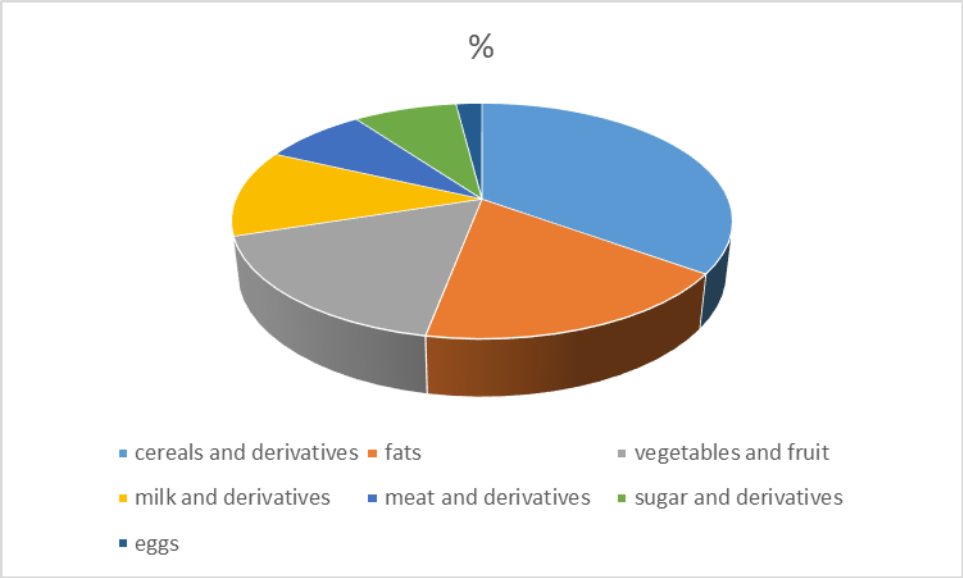

Figure 2. The percentage intake of different food groups in the physiological diet
Source: processing after different authors

The new recommendations are based on a particularly complex calculation methodology and include the following elements:

• calculation of energy requirements for all ages based on the needs of measurements and estimates of total daily energy expenditure and energy needs;

• modification of energy requirements and recommendations, in order to correct the overestimations for newborns and children, respectively the underestimations in the case of teenagers;

• proposals for distinct requirements for populations with different lifestyles that include different levels of usual physical activity, starting at the age of six;

• reassessment of the energy requirements for adults based on the energy expenditure expressed as a multiple of the basal metabolic rate;

• classification of physical activity levels according to the type of usual activity that corresponds to maintaining good health and appropriate weight on long term.

The Institute of Hygiene and Public Health in Bucharest has adopted guidelines for the specifics of life and activity in Romania, namely the temperate climate, with an annual average of 10˚C and slightly higher energy consumption for the same population groups, given the reduced facilities of normal daily life. The daily average caloric needs of an individual are fixed as follows (figure 3):

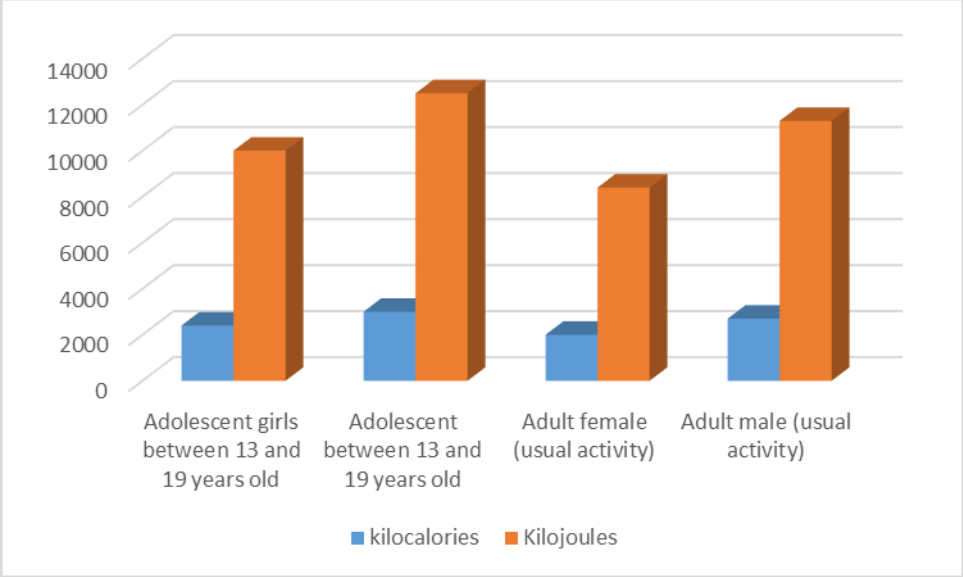

Figure 3. Daily average caloric needs by age and gender

For Romania, to determine the nutritional requirements of the population, the following criteria must be taken into account:

- the specific needs of children, young people and the elderly;
- the nature and intensity of the population's physical effort;
- the tendency to reduce physical effort, simultaneously with the increase in demands;
- neuropsychic criteria, under the conditions of modern life;
- the need to prevent diseases caused by nutritional imbalances.

These nutritional norms will target:

• the balance of the human energy balance, so that the energy intake is equal to the daily energy expenditure;

• covering the body's needs for substances with a biocatalyst role, especially vitamins and mineral elements.

The nutrition norms are usable in the design and structuring of the offer and in the production of agri-food goods, in the quantity and assortment required by all consumer segments. Thus, in the assortment diversification action, other factors are taken into account,

such as: requirements for nutritional balance or enrichment, consumption habits and habits. Nutrition norms also help in the orientation and specialization of commercial companies, in structuring the commercial assortment and in promoting the consumption of agri-food products. Population groups are delimited according to these criteria, both in national and international nutrition norms.

Nutrition experts were particularly concerned with covering food deficiencies, until the 60s, proposing that the food consumed should have enough calories. The protein myth was outlined, and subsequently reaffirmed, which suggested sufficient protein consumption (many times excess consumption), and resorting to meat and derived products was considered the best way to obtain them.

Today, researchers and nutrition experts have proven that it is more important to be concerned about the quality of food than the quantity, showing that the needs for protein are still lower than previously thought and that the problems regarding nutrition in developed countries were due precisely to the excessive consumption of foods of animal origin, fat and sugar, as well as the lack of vegetable products (fruits, vegetables, cereals) [11].

Physiological nutrition, the fundamental nutritional principles are ensured both by foods of vegetable origin, which must have a high weight, and by those of animal origin which, according to most authors, have a very important role at least in certain periods of life [10].

The body's requirements for nutrients vary inter- and intra-individual, depending on age. Due to these differences, in order to achieve a nutritional balance between what the body metabolizes or loses and what it receives through food, it would be necessary to know the needs of each individual consumer, which is practically impossible. That is why nutritional needs are established for groups of consumers with common physiological characteristics, children, adolescents, women and men, highlighting their modification under the influence of environmental factors, in order to be able to adjust them according to their metabolic effect.

Whether it is the physical lack of agri-food resources or the low purchasing power as a result of insufficient incomes, the study of the nutritional balance issue is closely related to the food problem at different levels and the sources that determine it. Sooner or later, ignoring or not recognizing the requirements of food balance almost always leads to negative health consequences. A healthy diet requires a balanced supply of nutritional factors, both quantitatively and qualitatively.

The standard of living of a nation is also closely related to the quantitative and qualitative food intake that its members consume, well-being being circumscribed to the process of providing the necessary elements for a decent life. Moreover, agro-food products in particular do not represent an end in themselves, contributing to the ever-growing demands of the population. Specialists unanimously agree on the idea that people's lives, their state of health, are closely related to what they consume daily, quantitatively, but especially qualitatively.

Between man and food are established close relationships during existence and even before birth through the maternal body. The fundamental relationship is determined by the fact that food supplies the body with nutrients it needs to provide the energy indispensable to vital processes, to synthesize its own substances, repair wear and tear and to form active substances that favor the normal development of metabolic processes.

It is necessary that the food consumed provides the body with the necessary substances, and primarily the essential ones, in optimal quantities, to ensure a normal state of nutrition. The foods that humans consume contain various nutrients, each of which fulfills a specific function in the body. If one food is consumed in excess, and another is not consumed enough, some functions of the body will be affected, this being reflected in the general state

of health. In establishing a balanced diet, although a general, basic model can be fixed, it must always be suited to the needs of each individual.

Thus, it is considered that one of the major difficulties of modern nutrition is the one of establishing the norms of rational nutrition. Comparing the recommendations made by different authors, by different national and international bodies regarding the intake of nutrients, significant differences will sometimes be found. Attempts to find a food model that is suitable for all individuals of a community will probably never be crowned with success.

The quality and value of exclusive intake cannot be measured by the total calories it provides, but rather by the foods that make it up. For example, a few simple comparisons underline this aspect:

• refined carbohydrates (flour or white rice) contain practically the same calories as whole grains, but their nutritional quality is lower;

• white sugar contains practically the same number of calories as brown sugar or honey, but it is very poor in vitamins and minerals, which makes it unsuitable for usual abundant consumption;

• lean meat and soy provide a similar amount of calories and yet their intake for a healthy diet is totally different.

Fewer and fewer specialists these days sustain that, for the diet to be nutritionally correct, it must contain a high amount of protein, and especially that it must be mostly of animal origin. However, the amounts recommended to be ingested daily have evolved downward in the last twenty years. Today, it is known that excess protein is closely related to rheumatic diseases and osteoporosis, with excess uric acid, including the reduction of life expectancy.

Regarding the origin of proteins, it used to be considered that those of animal origin were indispensable and that no diet could be sufficiently nutritious if it did not contain animal proteins in abundance. Currently, it has been demonstrated that, thanks to the phenomenon of supplementation by combining vegetable proteins, it is possible to obtain a protein of good quality, just like the animal one. Thus, the quality of food does not depend, as was believed before, on the amount of proteins or their source, but on the fact that a variety of healthy foods must be consumed in a balanced ratio [9].

A hyperprotein and hypercaloric diet that is administered to children in developed countries and through which rapid growth is achieved, but it can have serious repercussions during adolescence and adulthood: obesity, increased risk of diabetes, arteriosclerosis, etc. Of course, insufficient growth can be due to poor nutrition, but excessive growth is not always correlated with proper nutrition. A priority for nutrition experts and health authorities is hygiene, the absence of pollutants and contaminants of any kind. However, the current knowledge about food and nutrition does not allow the individual to appreciate whether a food is free of pathogenic germs or toxins and is indicated for consumption. The hygienic value of food is indispensable, but not sufficient to determine its quality.

The consumption basket represents a notion that designates the structure and components of the consumption of an average-sized family over a determined period of time, usually a month. The structure of the consumption basket includes both food and non-food products, as well as services. The expression of the consumption levels included in the basket can have in mind a minimum level or a normal level and can be made in physical or value units. The consumption basket in value terms represents the amount of expenses required by an average-sized family for the purchase of current consumer goods and services over a determined period of time. This can constitute an important statistical benchmark in calculating the cost of living index or the evolution index of prices and tariffs for products and services intended for public consumption.

Malnutrition can start as soon as we go below the corresponding food consumption level of 2,500 calories, if the animal protein intake is less than 20 grams per person per day. Below 2000 calories and 10 grams of animal protein per person per day is considered the phenomenon of undernutrition, and a level of average food consumption per person per day below 1500 calories and 5 grams of animal protein indicates the existence of the hunger situation.

The consumption of products from one's own resources, also called self-consumption, includes mostly human and fodder consumption of food products, to which non-food products are also added. Households' own resources consist of: agricultural production, stocks of previous periods, products processed in the household, products received as gifts or for work, etc. The evaluation in monetary units is carried out at the average purchase prices.

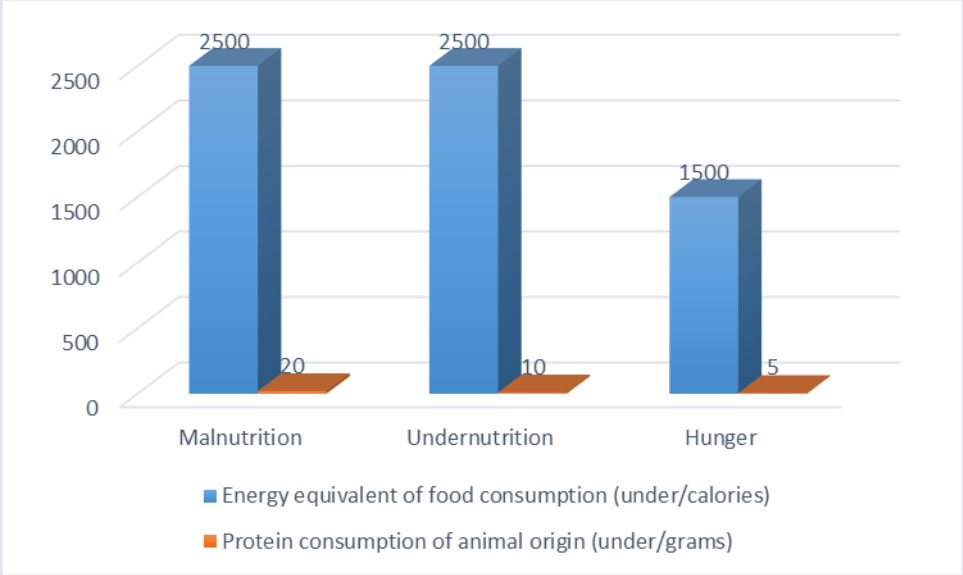

Figure 4. The phenomenon of underconsumption – average daily individual level

A high share of self-consumption in total consumption expenditure indicates a low degree of development and organization of the agro-food markets, usually associated with a low standard of living of the population.

CONCLUSIONS

The major importance of the nutrition norms of the population derives from the fact that they are used in the foundation of food and nutrition policies, serving to evaluate the volume and structure of the necessary basic food, respectively of the agro-food resources necessary to be transformed into directly ingestible food, but also of the volume and structure of the necessary nutrients. Nutrition norms should be considered indicative; they should not be ignored, but examined with caution, depending on the specific conditions in the respective environment.

In the current economic model of Romanian households, the consumption of agri-food products from own production and those received from the extended family (parents, siblings, etc.) is one of the ways to cover food consumption needs. For agri-food products, compared to other products or services, the phenomenon of self-consumption is much more extensive, and in the case of certain categories of the population (with stable residence in the rural area or in small towns), they have a very large weight in covering consumption needs. The

differentiation between residence environments in terms of self-consumption is also manifested as a result of the greater degree of processing of some agri-food products.

That is why agro-food products with a low degree of processing have a greater share in self-consumption (eggs, milk, fruit, etc.), while in the case of agro-food products with a higher degree of processing, the share of self-consumption in total consumption is reduced significantly (bakery products, oils, etc.). The drastic decrease sometimes in sales of certain categories of agri-food products can be largely explained by the very high share of self-consumption and, to a lesser extent, by the increase in imports.

REFERENCES

[1]. CĂTOIU I., TEODORESCU N., 2004, Comportamentul consumatorului, Editura Uranus, București

[2]. CHIRAN A., GÂNDU ELENA, 2005, Piaţa produselor agricole şi agroalimentare în UE, Editura U.S.A.M.V. Iaşi

[3]. DIACONESCU, M., 2005, Marketing agroalimentar, Editura Uranus, Bucureşti

[4]. MACALL D.M., WILLIAMS C., GLEIM S., SMYTH S.J., 2021, Canadian consumer opinions regarding food purchase decisions, Journal of Agriculture and Food Research, Volume 3, ISSN 2666-1543

[5]. FOLTEAN F., LĂDAR L., (COORD.), 2004, Marketing, Editura Mirton, Timişoara

[6]. HURDUZEU G., IONEL I., LUCA L., 2009, Review of Agricultural and Food Trade România, București

[7]. MANOLE V., STOIAN MIRELA, 2003, Agromarketing, Ediţia a II-a, Editura A.S.E., Bucureşti

[8]. MARIN DIANA, 2015, Research Regarding the Purchase Decision Process of Consumer of Food Products, Scientific Papers: Animal Science and Biotechnologies, 48(1), 328-332

[9]. MIRON MIHAELA A., 1996, Comportamentul consumatorului - Evoluţie, determinări, realităţi şi perspective, Editura All, Bucureşti

[10]. MUNTEANU C., (coord.), 2008, Marketing: principii, practici, orizonturi, Editura Sedcom Libris, Iaşi

[11]. NEGRUŢ C., 2002, Politici agroalimentare comparate, Editura Solnes

[12]. OLINESCU R., 2000, Totul despre alimentaţia sănătoasă, Editura Niculescu, Bucureşti

[13]. PETROMAN CORNELIA, PETROMAN I., MARIN DIANA, GABRIS DELIA RAMONA, CIOLAC RAMONA, VĂDUVA LOREDANA, 2013, Consumption of Food in Quantitative Terms on Average of Origin, Lucrări Ştiinţifice Zootehnie şi Biotehnologii (Scientific Papers: Animal Science and Biotechnologies), ISSN 1221- 5287, Editura Agroprint Timişoara, vol.46(1), pag. 382-384

[14]. SAUNIER CLAUDE, 2004, Les nouveaux apports de la science et de la technologie á la cualité et á la sûreté des aliments

[15]. SOLOMON M., 2004, Consumer Behavior: Buying Having and Being, Prentice Hall