Transformational processes the development of economic systems in conditions of globalization: scientific bases, mechanisms, prospects

Collective monograph edited by
M. Bezpartochnyi

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Ekonomisko sistēmu attīstības transformācijas procesi globalizācijas apstākļos: zinātniskie pamati, mehānismi, perspektīvas

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The authors of the book have come to the conclusion that it is necessary to effectively use the management approaches to regulate modern international economic relations, methodological tools for analyzing international competitiveness and innovation. Basic research focuses on assessing the structure of R&D costs, analysis of innovative development the industrial enterprises, diagnostics of direct and portfolio investments, stress-testing of the banking system, marketing support of companies' competitiveness, diagnostics of structural transformations in agriculture. The research results have been implemented in the different models of reengineering business process, reforming the pension reform, developing the human resources capacity of the region and managing human resources, managing quality in the hotel-restaurant business and tourism, forming a logistics strategy, innovative technologies in education. The results of the study can be used in decision-making at the level of international business, ministries and departments that regulate international relations, ensuring security and overcoming risks. The results can also be used by students and young scientists in modern concepts of the formation of international economic relations in the context of ensuring the competitive advantages of actors and improving innovation policy.

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Contents

INTRODUCTION

The modern paradigm of global economic development necessitates the transformation and modernization of the national socioeconomic system, taking into account not only the national peculiarities of socio-economic relations and market mechanisms, but also the world, global market, since the influence of global processes on the national economy leads to its subordination to the laws of the global market.

Therefore, the process of integrating transitive countries into the global economy depends on the extent to which the entities of the national economic system are able to develop, respond, or can oppose the actors of the global economy without destroying the features of social relations that have historically developed and have a national specificity.

In order to carry out a systemic transformation and to formulate a country's socio-economic development strategy, which involves structural modernization, it is necessary to analyze the internal potential of the national economic system, its goals and socio-economic objectives of development, as well as the requirements of the global market, its structure and development mechanisms, especially in the conditions of the global systemic crisis.

The purpose of writing this collective monograph is to substantiate theoretical-methodological foundations and to develop organizational-economic mechanisms for the development economic systems in a globalizing environment, taking into account transformational changes in the international economic environment.

The object of the authors' research was the transformational process of changes in the world, peculiarities and trends of development economic systems, generalization of world experience in the field of ensuring stability and increasing the competitiveness of economic actors in various spheres of the national economy in order to ensure the effectiveness of their further functioning and development in a globalizing environment.

The subject of study were various processes of economic systems development; substantiation of the necessity of introducing innovations by economic entities; development of organizational-economic mechanisms for ensuring the competitiveness of economic systems; substantiation of directions of maintenance economic safety in the conditions of globalization; formation of theoretical-methodological basis for the adoption of practical solutions in the conditions of socio-economic asymmetry of the world economy in the process of European modernization of reforms, university council and the implementation of norms international law.

economic and financial mechanisms of state regulation of the development of tourism and resorts.

This will increase the amount of capital investment in the tourism and resorts of Ukraine and become one of the main sources of revenues to the state budget.

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Kuzmin Oleg
PhD in Engineering, Associate Professor, Department of Technology of Restaurant and Ayurvedic Products
National University of Food Technologies
Pozdniakov Serhii
PhD in Economics, Member of the Board Public Organization "Platform for Public Dialogues"
Kiiko Victoriia
PhD in Engineering, Associate Professor, Department of Examination of Food Products
National University of Food Technologies
Akimova Luidmila
PhD in Economics, Associate Professor, Department of Finance and Nature Resourse
National University of Water and Environmental Engineering
(Kyiv, Cherkasy, Rivne, Ukraine)

DEVELOPMENT OF QUALITY MANAGEMENT SYSTEMS IN THE HOTEL-RESTAURANT BUSINESS

Introduction. One of the important problems of the hotel-restaurant economy of Ukraine for today is development and implementation of a

quality management system (QMS) (Azgaldov et al, 2011, 2015; Topol'nik, Ratushnyj, 2008) [1-3]. Availability of QMS remains an important tool in competitive struggle on the market of the hotel-restaurant services (HRS) (Topol'nik, Ratushnyj, 2008) [3].

The complexity of the assessment of HRS is largely caused by difficulties of formalization, generalization and analysis of evaluation criteria, and definition of methods of their measurement. Therefore qualimetric methods are most often used for setting quality service parameters (Topol'nik, Ratushnyj, 2008; Kuzmin et al, 2017, 2018; Niemirich et al, 2018; Dietrich et al, 2017) [3-7].

A qualitative index of a product is a quantitative characteristic of one or several properties of a product, which characterize its quality, and is considered in terms of certain conditions of its creation, exploitation or consuming (Azgaldov et al, 2011, 2015; Topol'nik, Ratushnyj, 2008) [1-3].

According to the amount of characterized properties the indexes are divided into simple and complex (Topol'nik, Ratushnyj, 2008) [3]. Simple qualitative index identifies one of its properties (Sébédio, 2017; Kuzmin et al, 2014-2017) [4, 8-11]. Complex index identifies several properties of a product (Azgaldov et al, 2011; Topol'nik, Ratushnyj, 2008) [1, 3].

A product quantitative estimation is a set of operations, which includes: qualitative indexes' nomenclature selection of a product, value determination of these indexes and their comparison with basic indexes (Niemirich et al, 2018; Kuzmin et al, 2018; Dietrich et al, 2017) [5-7].

Complex method of a product quantitative estimation is based on expressing of the estimation rate by one number, which is a result of grouping of selected simple indexes to one complex index (Azgaldov et al, 2011, 2015; Topol'nik, Ratushnyj, 2008) [1-3].

Complex method of a product quantitative estimation is prevailing (Wang et al, 2016; Rodgers, 2017; Perng, Oken, 2017) [12-14]. But, a complex estimation of food products is not exclusive of differential estimation, because in some cases high value of complex qualitative index can disguise the low level of product's quality according to some simple indexes.

Each qualitative index, being a quantitative characteristic (extent) of one of object's quality model (fact) should reflect (to greater or lesser extent) the ability (property) of the object (fact), meet public demands (interests, values) in certain conditions. Therefore, in order to form a qualitative index we should take into account following qualitative

components: public demand, certain conditions, object and extent of its meeting. Qualitative index should provide an answer to the question: to what extent is this object (fact) able to meet public demand (interest, value) (Topol'nik, Ratushnyj, 2008) [3].

Materials and methods. The daily ration of human nutrition (breakfast, lunch, dinner) and the norms of the physiological needs of the average person – to determine the complex quantitative assessment of the quality of diets. An additive mathematical model as most widespread in a qualimetry is used for joining the quality rating into the generalized (complex) index. Methods – qualimetric (Azgaldov et al, 2011, 2015; Topol'nik, Ratushnyj, 2008) [1-3].

Method of a diet complex quantitative estimation (Topol'nik, Ratushnyj, 2008; Kuzmin O. et al. 2017) [3-4]:

1. Index values for set diets are determined from the formula:

$$P_{ij} = \frac{M_{ij}}{\sum M_{ij}}, \tag{5.1}$$

M_{ij} – content of nutrient materials in group j in nutrition products included in the diet.

2. Analogously, due to recommended norm, basic indexes are determined:

$$P_{ij}^{basic} = \frac{M_{ij}^{basic}}{\sum M_{ij}^{basic}}, \tag{5.2}$$

M_{ij}^{basic} – regulatory i nutrient material in group j of daily ration material.

3. Simple indexes' estimation of proteins, fats, carbohydrates is calculated by the formula:

$$K_{ij} = \left(\frac{P_{ij}}{P_{ij}^{basic}} \right)^{z}, \tag{5.3}$$

P_{ij} – index of a nutrient material in daily ration;

P_{ij}^{basic} – basic (balanced) value of index of a nutrient material in daily ration (according to norms of physiological needs);

z – index, that considers the influence of changing index value on qualitative rate of an object, that is equal to plus 1 in proteins and carbohydrates content estimating and minus 1 in fats content estimating.

4. Weight coefficient value of nutrient materials m_{ij} is calculated by the formula:

$$m_{ij} = \frac{\frac{\sum M_{ij}^{basic}}{M_{ij}^{basic}}}{\sum\left(\frac{\sum M_{ij}^{basic}}{M_{ij}^{basic}}\right)}. \qquad (5.4)$$

Complex qualitative index of meal due to nutrient materials equation for two-level structure is determined from the adaptive model:

$$K_o = \sum_{i=1}^{t} M_j \cdot \sum_{j=1}^{n_i} m_{ij} \cdot K_{ij}, \qquad (5.5)$$

M_j – weight coefficient value of nutrients.

Results and discussions. According to norms of physiological needs of a common person at the age from 18 to 59 we have developed complex qualitative index of meal: total amount of nutrient materials – 617 g (proteins – 88 g; fats – 107 g; carbohydrates – 422 g); total amount of mineral matters – 11150 mg (*Na* – 5000 mg; *K* – 3750 mg; *Ca* – 800 mg; *Mg* – 400 mg; *P* – 1200 mg); total amount of vitamins – 90,3 mg (B_1 – 1,6 mg; B_2 – 1,8 mg; B_6 – 1,9 mg; *C* – 85,0 mg).

1. Complex quality rating of breakfast. Due to norms of macronutrients, mineral matters and vitamins content, included in breakfast dishes, the calculation of nutrient materials found in menu (Table 5.3).

According to the recommended norms of physiological needs basic values have been determined from the formula (5.2). Basic qualitative

indexes of macronutrients, mineral matters and vitamins are the following: for proteins – P_p^{basic}=0,15; fats – P_f^{basic}=0,17; carbohydrates– P_c^{basic}=0,68; sodium – P_{Na}^{basic}=0,45; potassium – P_K^{basic}=0,34; calcium– P_{Ca}^{basic}=0,07; magnesium – P_{Mg}^{basic}=0,03; phosphorus– P_P^{basic}=0,11; thiamine – P_{B1}^{basic}=0,02; ribofflavinum – P_{B2}^{basic}=0,02; perydoxine – P_{B6}^{basic}=0,02; cevitamic acid – P_c^{basic}=0,94.

Weight coefficient value of nutrient materials m_{ij} has been calculated due to the recommended norms of physiological needs by the formula (5.4). Weight coefficients are the following: proteins – m_p=0,50; fats – m_f =0,40; carbohydrates – m_c=0,10; sodium– m_{Na}=0,03; potassium – m_K=0,05; calcium– m_{Ca}=0,25; magnesium– m_{Mg}=0,50; phosphorus– m_P=0,17; thiamine – m_{B1}=0,36; ribofflavinum – m_{B2}=0,32; perydoxine – m_{B6}=0,31; cevitamic acid – m_c=0,01.

Table 5.3

Calculation of macronutrients, mineral matters and vitamins content included in breakfast dishes

Nutrient materials	Name of the dish						
	Diary butter	Aubergine caviar with green onions	Beef stewed	Pasta cooked	Bread of wheat flour of grade 1	Cocoa with milk	Total
Weight, g	10	150	125	150	150	200	785,0
Macronutrients, g:							
proteins	0,06	1,20	17,90	15,60	11,40	3,80	49,96
fats	8,25	4,22	6,60	1,35	1,35	3,90	25,67
carbohydrates	0,09	12,90	7,00	112,80	74,55	24,80	232,14
Mineral matters, mg:							
Na	7,40	915,00	775,00	15,00	732,00	50,00	2494,40
K	2,30	457,50	266,00	186,00	190,50	242,00	1344,30
Ca	2,20	47,10	22,00	27,00	39,00	122,00	259,30
Mg	0,30	29,40	25,00	24,00	52,50	18,00	149,20
P	1,90	84,00	178,00	130,50	124,50	120,00	638,90
Vitamins, mg:							
B_1	0,00	0,11	0,07	0,26	0,24	0,00	0,67
B_2	0,01	0,11	0,17	0,12	0,12	0,00	0,53
B_6	0,00	0,32	0,67	0,09	0,09	0,00	1,17
C	0,00	30,00	1,10	0,00	0,00	0,00	31,10

Absolute values of qualitative indexes of macronutrients, mineral matters and vitamins calculated by the formula (5.1) are the following: for proteins – P_p=0,160; fats – P_f=0,080; carbohydrates – P_c=0,750; sodium – P_{Na}=0,510; potassium – P_K=0,270; calcium – P_{Ca}=0,050; magnesium – P_{Mg}=0,030; phosphorus – P_P=0,130; thiamine – P_{B1}=0,020; ribofflavinum – P_{B2}=0,015; perydoxine – P_{B6}=0,034; cevitamic acid – P_c=0,920. Obtained results are brought in the Table 5.4.

Table 5.4

Calculation of absolute values and simple qualitative indexes

Absolute values					**Simple qualitative indexes**				
	breakfast	dinner	supper	daily ration		breakfast	dinner	supper	daily ration
Macronutrients									
P_p	0,160	0,160	0,18	0,16	K_p	1,138	1,145	1,31	1,06
P_f	0,080	0,100	0,14	0,14	K_f	2,079	1,710	1,19	1,21
P_c	0,750	0,740	0,66	0,70	K_c	1,075	1,075	0,97	1,03
Mineral matters									
P_{Na}	0,510	0,390	0,38	0,47	K_{Na}	1,130	0,880	0,84	1,04
P_K	0,270	0,310	0,15	0,25	K_K	0,810	0,940	0,45	0,74
P_{Ca}	0,050	0,050	0,09	0,07	K_{Ca}	0,730	0,680	1,29	1,00
P_{Mg}	0,030	0,052	0,04	0,04	K_{Mg}	0,850	1,460	1,07	1,00
P_P	0,130	0,188	0,34	0,17	K_P	1,210	1,740	3,15	1,53
Vitamins									
P_{B1}	0,020	0,046	0,07	0,04	K_{B1}	1,130	2,610	4,18	2,00
P_{B2}	0,015	0,030	0,15	0,06	K_{B2}	0,780	1,480	7,91	3,00
P_{B6}	0,034	0,370	0,07	0,11	K_{B6}	1,650	1,770	3,39	0,18
P_c	0,920	0,880	0,69	0,79	K_c	0,980	0,940	0,74	0,85
Complex quality rating of daily rations									
K_0						1,27	1,69	3,38	2,11

Simple indexes' quality rating of proteins, fats, carbohydrates has been calculated by the formula (5.3) using data from Table 5.4. Simple indexes' estimation is the following (Figure 5.7): from proteins – K_p=1,138; fats – K_f=2,079; carbohydrates– K_c=1,075; sodium– K_{Na}=1,130; potassium– K_K=0,810; calcium– K_{Ca}=0,730; magnesium– K_{Mg}=0,850; phosphorus– K_P=1,210; thiamine – K_{B1}=1,130; ribofflavinum – K_{B2}=0,780; perydoxine – K_{B6}=1,650; cevitamic acid – K_c=0,980.

Complex qualitative index of meal due to nutrient materials equation for two-level structure has been determined from formula (5.5), in which weight coefficient values (M) are for macronutrients – 0,35; vitamins – 0,55; mineral matters – 0,1. Due to the calculation results breakfast has complex quality rate K_o=1,27.

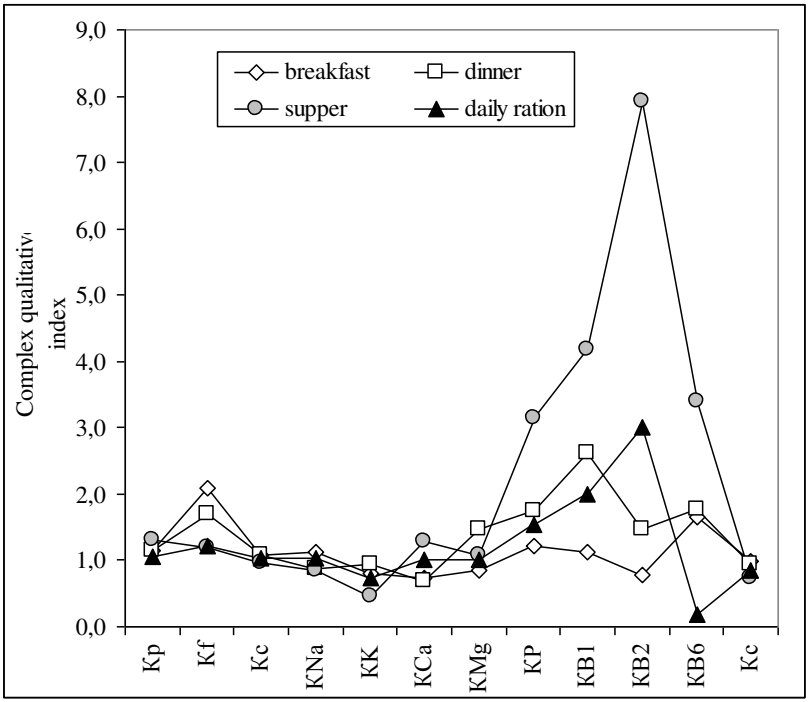

Figure 5.7 Single indexes of the quality of the diet

2. Complex quality rating of dinner. Due to norms of macronutrients, mineral matters and vitamins content, included in dinner dishes, the calculation of nutrient materials found in canteen menu is provided (Table 5.5).

Absolute values of qualitative indexes of macronutrients, mineral matters and vitamins calculated by the formula (5.1) are the following: for proteins – P_p=0,160; fats – P_f=0,100; carbohydrates – P_c=0,740; sodium P_{Na}=0,390; potassium – P_K=0,310; calcium– P_{Ca}=0,050; magnesium – P_{Mg}=0,052; phosphorus – P_P=0,188; thiamine – P_{B1}=0,046; ribofflavinum – P_{B2}=0,030; perydoxine – P_{B6}=0,370; cevitamic acid – P_c=0,880 (Table 5.4).

Table 5.5

Calculation of macronutrients, mineral matters and vitamins content included in dinner dishes

Nutrient materials	Name of the dish							Total
	Beetroot boiled with green onions	Vegetable soup and beans	Fried fish fried	Buckwheat porridge	Rye bread	Sugar cookies	Tea with sugar	
Weight, g	150	500	100	150	100	50	200	1250,00
Macronutrients, g:								
proteins	2,88	12,80	15,07	14,81	7,60	7,5	0,2	60,85
fats	3,37	10,90	6,67	3,90	1,10	11,8	0,0	37,74
carbo-hydrates	16,99	43,20	6,67	76,35	40,70	74,0	16,0	273,91
Mineral matters, mg:								
Na	164,40	129,20	1089,33	988,50	538,00	36,0	0,0	2990,43
K	549,60	1073,0	213,33	256,50	206,00	90,0	6,0	2394,43
Ca	70,80	93,00	70,27	81,00	38,00	20,0	1,0	374,07
Mg	81,60	75,00	84,27	94,50	49,00	13,0	1,0	398,37
P	81,60	279,00	484,27	351,00	156,00	69,0	0,0	1420,87
Vitamins, mg:								
B_1	0,04	0,48	0,56	0,36	0,18	0,08	0,0	1,70
B_2	0,07	0,17	0,45	0,20	0,11	0,08	0,0	1,08
B_6	0,05	0,30	0,61	0,29	0,06	0,06	0,0	1,37
C	19,08	12,40	0,93	0,00	0,00	0,00	0,0	32,41

Quality rating of simple indexes for a group of nutrient materials has been determined from the formula (5.3), as a result the values are the following: for proteins – K_p=1,145; fats – K_f=1,710; carbohydrates – K_c=1,075; sodium – K_{Na}=0,880; potassium – K_K=0,940; calcium – K_{Ca}=0,680; magnesium – K_{Mg}=1,460; phosphorus – K_P=1,740; thiamine – K_{B1}=2,610; ribofflavinum – K_{B2}=1,480; perydoxine – K_{B6}=1,770; cevitamic acid – K_c=0,940 (Table 5.4).

Complex qualitative index of meal due to nutrient materials equation for two-level structure has been determined from formula (5.5). Due to the calculation results breakfast has complex quality rate – K_o=1,690.

3. Complex quality rating of supper. Due to norms of macronutrients, mineral matters and vitamins content, included in supper, the calculation of nutrient materials found in canteen menu is provided (Table 5.6).

Table 5.6

Calculation of macronutrients, mineral matters and vitamins content included in supper

Nutrient materials	Name of the dish			
	Cheese pudding (baked with carrots)	Bullet rifled	Tea with sugar	Total
Weight, g	250	100	200	550
Macronutrients, g:				
proteins	25,28	7,40	0,20	3,88
fats	22,65	2,90	0,00	25,55
carbohydrates	49,65	51,40	16,00	117,05
Mineral matters, mg:				
Na	1140,00	402,00	0,00	1542,00
K	487,50	125,00	6,00	618,50
Ca	352,00	25,00	1,00	378,00
Mg	152,50	3,00	1,00	156,50
P	511,00	872,00	0,00	1383,00
Vitamins, mg:				
B_1	0,28	0,15	0,00	0,43
B_2	0,83	0,08	0,00	0,91
B_6	0,35	0,06	0,00	0,41
C	4,00	0,00	0,00	4,00

Absolute values of qualitative indexes of nutrient materials calculated by the formula (5.1) are the following: for proteins – P_p=0,18; fats – P_f=0,14; carbohydrates– P_c=0,66; sodium – P_{Na}=0,38; potassium – P_K=0,15; calcium – P_{Ca}=0,09; magnesium – P_{Mg}=0,04; phosphorus – P_P=0,34; thiamine – P_{B1}=0,07; riboflavinum – P_{B2}=0,15; perydoxine – P_{B6}=0,07; cevitamic acid – P_c=0,69 (Table 5.4).

Quality rating of simple indexes of nutrient materials has been determined from the formula (5.3), as a result the values are the following: for proteins – K_p=1,31; fats – K_f=1,19; carbohydrates – K_c=0,97; sodium – K_{Na}=0,84; potassium – K_K=0,45; calcium –

K_{Ca}=1,29; magnesium– K_{Mg}=1,07; phosphorus – K_P=3,15; thiamine – K_{B1}=4,18; ribofflavinum – K_{B2}=7,91; perydoxine – K_{B6}=3,39; cevitamic acid – K_c=0,74 (Table 5.4).

Complex qualitative index of meal due to nutrient materials equation for two-level structure has been determined from formula (5.5). Due to the calculation results supper has complex quality rate – K_o=3,38.

4. Complex quality rating of daily ration. According to the canteen menu original data is calculated for determination of daily ration (Table 5.7).

Table 5.7

Calculation of macronutrients, mineral matters and vitamins content for daily ration

Nutrient materials	Name of the dish			
	Breakfast	Dinner	Supper	Total
Weight, g	785,0	1250,0	550	2585,0
Macronutrients, g:				
proteins	49,96	60,85	32,88	143,69
fats	25,67	37,74	25,55	88,96
carbohydrates	232,14	273,91	117,05	623,1
Mineral matters, mg:				
Na	2494,40	2990,43	1542,00	7026,83
K	1344,30	2394,43	618,50	4357,23
Ca	259,30	374,07	378,00	1011,37
Mg	149,20	398,37	156,50	704,07
P	638,90	1420,87	1383,00	3442,77
Vitamins, mg:				
B_1	0,67	1,70	0,43	2,8
B_2	0,53	1,08	0,91	2,52
B_6	1,17	1,37	0,41	2,95
C	31,10	32,41	4,00	67,51

Absolute values of qualitative indexes of nutrient materials are the following: for proteins – P_p=0,16; fats – P_f=0,14; carbohydrates – P_c=0,70; sodium – P_{Na}=0,47; potassium – P_K=0,25; calcium – P_{Ca}=0,07; magnesium– P_{Mg}=0,04; phosphorus– P_P=0,17; thiamine – P_{B1}=0,04; ribofflavinum – P_{B2}=0,06; perydoxine – P_{B6}=0,11; cevitamic acid – P_c=0,79. The results are brought in Table 5.4.

Quality rating of simple indexes of nutrient materials has been determined by the formula (5.3), as a result the values are the following: for proteins – K_p=1,06; fats – K_f=1,21; carbohydrates – K_c=1,03; sodium

– K_{Na}=1,04; potassium – K_K=0,74; calcium – K_{Ca}=1,00; magnesium – K_{Mg}=1,00; phosphorus– K_P=1,53; thiamine – K_{B1}=2,00; ribofflavinum – K_{B2}=3,00; perydoxine – K_{B6}=0,18; cevitamic acid – K_c=0,85.

Complex qualitative index of meal due to nutrient materials equation for two-level structure has been determined from formula (5.5). Due to the calculation results daily ration has complex quality rate K_o=2,11.

Obtained values of complex qualitative index of breakfast, dinner, supper and daily ration are brought in Table 5.4.

Due to the data, we can draw a conclusion that the biggest value of the complex index K_{0max}=3,38 is obtained in supper, the lowest value is typical for breakfast K_{0min}=1,27. Whereas, breakfast is considered to be the most balanced meal with value K_0=1,27, which is close to the optimal value of complex quantitative rating K_0=1,00. Quality rating of daily rations in hotels and restaurants provides an opportunity to determine diet balance due to the norms of physiological need for daily ration.

Conclusions. Method of quality rating of daily rations in hotels and restaurants is considered. The structure of qualitative indexes and results of experimental research of complex diet quantitative rating are represented. Taking into account the norms of physiological need of a common person, complex qualitative rate of one meal and daily ration in a canteen is calculated. For this daily ration, complex qualitative indexes for group of macronutrients, mineral matters and vitamins are identified. The most balanced values of the complex qualitative index are determined which are common to breakfast with rate K_0=1,27.

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