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**EVALUATION OF THE EFFECTIVENESS OF THE DAILY DIET OF  
SCHOOLCHILDREN SUFFERING FROM IRON DEFICIENCY ANEMIA FROM  
ENRICHED LOCAL PROTEIN-CONTAINING PRODUCTS**

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**ANNOTATION**

Among school children, the effectiveness of pea soup from local herbal products in the Prevention of iron deficiency disease vomiting was assessed. After the introduction of pea soup made from plant products into the daily ration, the school showed that the physical development of students and the improvement of blood indicators, the role of animal proteins in the ration of students was created in conditions of exacerbation with vegetable proteins. This created conditions to prevent defects in the physical and mental development of students.

**Key words:** school students, iron deficiency anemia disease, daily ration, pea soup, physical development

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## **ОЦЕНКА ЭФФЕКТИВНОСТИ СУТОЧНОГО РАЦИОНА ПИТАНИЯ ШКОЛЬНИКОВ СТРАДАЮЩИХ ЖЕЛЕЗОДЕФИЦИТНЫМИ АНЕМИЕЙ С ОБОГАЩЕННЫМИ МЕСТНЫМИ БЕЛОК СОДЕРЖАЩИХ ПРОДУКТОВ**

### **АННОТАЦИЯ**

В статье проведена оценка эффективности применения приготовленного из продуктов местного растительного происхождения горохового супа в профилактике развития железодефицитной анемии среди школьников. Показано, что после включения в ежедневный рацион горохового супа, приготовленного из местных растительных продуктов, улучшились показатели физического развития, а также анализы крови у школьников, при этом были созданы условия для замены животных белков в рационе учащихся растительными белками. Это в свою очередь создало предпосылки для профилактики нарушений физического и умственного развития учащихся.

**Ключевые слова:** школьники, железодефицитная анемия, суточный рацион, гороховый суп, физическое развитие

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## **ТЕМИР ТАНҚИСЛИК КАМҚОНЛИГИ БИЛАН ХАСТАЛАНГАН ЎҚУВЧИЛАРИНИ КУНЛИК РАЦИОНИДА МАҲАЛЛИЙ ОҚСИЛ САҚЛОВЧИ МАҲСУЛОТЛАР САМАРАДОРЛИГИНИ БАҲОЛАШ**

### **АННОТАЦИЯ**

Мактаб ўқувчилари орасида темир танқислик хасталиги қайт олдини олдини олишда маҳаллий ўсимлик маҳсулотларидан нўхатли шўрванинг самарадорлиги баҳоланган. Кунлик рацион таркибига ўсимлик маҳсулотларидан тайёрланган Нўхотли шўрва киритилгандан кейин мактаб ўқувчиларнинг жисмоний ривожланиши ва қон кўрсаткичларининг яхшиланиши, ўқувчиларнинг рацион таркибидаги ҳайвон оқсилларнинг ўрни ўсимлик оқсиллари билан алаштиришга шароит яратилганлиги кўрсатилган. Бу эса ўқувчиларнинг жисмоний ва ақлий ривожланишидаги нуқонларни олдини олишга шароит яратилган.

**Калит сўзлари:** мактаб ўқувчилар, темир танқислик камқонлик касаллиги, кунлик рацион, нўхотли шўрва, жисмоний ривожланиш

**The urgency of the problem.** According to WHO, more than 30% of the world's population suffers from iron deficiency anemia (IDD), most of which are children and women of childbearing age, and today it occurs among people of various ages. The prevalence of anemia largely depends on the standard of living of the population, nutrition, the quality and availability of medical care [1,2,8,14, 18,19,20].

Today in the world, among different layers of the population, there is a derailment of a healthy lifestyle, the influence of environmental factors on human health, the impact of various factors on the state of physical activity and its decrease, changes related to the derailment of nutritional status, alimentary diseases, iron deficiency anemia, iodine deficiency. condition, excess body weight and derailment of anthropometric indicators, osteoporosis, diseases of the gastrointestinal system, obesity, development of diabetes mellitus and the development of a number of functional changes and other somatic diseases are mentioned in the works of several authors[1,5,6,8,9,10,15,19,20].

According to the literature, the prevalence of CKD in pregnant women living in rural areas and the high number of children with flat feet in low-income families testify that the decision at the government level to optimize the nutrition of pregnant women is not only related to medicine, but also to social indicators. [6,7,9,12,13,17,19,20].

Anemia adversely affects growth and development among school-aged children. It is known that even mild anemia or before the clinical stage of anemia can cause health complications. Anemia leads to impaired production of oxidative energy in skeletal muscles, delayed physical and mental development, and reduced work capacity [2,4,11,12,16,19].

Assessment of nutrition, macro- and micronutrient status of school-age students and prevention of diseases caused by it is one of the most important problems in the field of preventive medicine.

**Materials and methods of research.** In the hygienic assessment of the daily eating habits of schoolchildren living in rural areas of Fergana region in different seasons of the year, 481 (61.3%) were girls.

Somatometric (height, body weight, chest circumference) conducted based on the standards of physical development of schoolchildren [R.T.Kamilova, 1998] implementation based on the anthropometric method served to ensure clarification of the assessment of physical development indicators.

The effectiveness of peas from local plant products on the physical development of schoolchildren diagnosed with iron deficiency anemia was evaluated.

Children's height, body weight, chest circumference, blood erythrocytes and hemoglobin were evaluated.

Statistical processing of the research results was done using the "Statistica for Windows 7.0" personal computer application package.

**Analysis of the obtained results.** We aimed to evaluate the effectiveness of the Pea soup with mainly local chickpeas in the treatment of anemia in children with anemia.

The statistical analysis of the nutritional and biological value of these local products shows that their content is sufficiently rich in vegetable protein, and it actively participates in increasing the energy value of the organism.

Before evaluating the effectiveness of pea soup, we, together with the technologists of the Union of Cooks of the Republic of Uzbekistan, developed a recipe for a number of products for the purpose of organizing a healthy diet for schoolchildren, summarized them as a methodical guide, and were approved by the Ministry of Health of the Republic of Uzbekistan, and permission to use these products was obtained. The recipe of the food is presented in table 1.

**Table 1**

**Chickpea soup technological map (cooking recipe)**

*Processing method - thermal processing, thermal processing.*

*Recipe for one meal per student (gross and net quantity of products)*

№	Product (semi-finished product) name	7-11 years old		Over 11 years old	
		Брутто, г	Нетто, г	Брутто, г	Нетто, г

1	Cattle and mutton	57	37	68	44
2	Point	25	25	37	37
3	Potatoes	23	20	28	22
4	Green	15	12	18	15
5	Onion	10	8	12	10
6	Vegetable oil	6	6	7	7
7	Salt	2	2	2	2
8	Water	250	250	300	300
9	Food volume		250		300

During our research, chickpea soup was distributed to children diagnosed with iron deficiency among elementary school students, and their health status was monitored.

From the hygienic analysis of the effect of the main food products on the body, it can be emphasized that it consists in evaluating the effectiveness of the nutritional and biological value of the consumed products.

Assessment of the effect of food products on the growth and development of the growing organism, perhaps, on the formation of organs and systems, the effect of food products on functional systems is presented in the works of several authors.[1,8,9,10].

In the hygienic analysis of the effect of chickpea soup with added local chickpeas on the physical development of children, the effect of the determined period mainly affects the body weight, the analysis of the effect on the height mainly at 3 and 6 months gives reliable indicators, positive results were also presented during the experiment. Evaluation of the effect on the anthropometric indicators of school students who consumed pea soup.

Tables 2 and 3 show the anthropometric indicators of school students (boys and girls) who consumed chickpea soup.

From the obtained results, it can be seen that the analysis of the anthropometric indicators of the boys showed a positive result from 1.02 to 1.05% of the height of the boys, while the pea soup had an effective effect on the 9-year-old boys, it can be seen from the effective effect on the body weight index. It was recorded in 9-year-old children and increased by 1.55% compared to the norm.

It can be seen from the analysis of the chest circumference that in this case, the positive effect was determined from 1.05% to 1.21%, and in this case, it was also seen that it increased by 1.21%, i.e. by 1.3 cm, in 9-year-olds.

Chickpea soup mainly had a positive effect on the body weight of girls, the body weight increased from 1.14 to 1.42%. This indicator increased to 1.42% in 10-year-olds, 1.25% in 11-year-olds, and 1.24% in 8-year-olds.

The effect on the chest circumference is less than the weight, but it has a positive result, and the obtained results increased from 1.08 to 1.12%.

We know that among 10-11 and 12-year-olds, taking into account the development of secondary sexual characteristics, a wave condition was observed in their physical development.

It is necessary to take into account the undulating changes in the growth and development laws among the students of the group who ate the pea soup, which should be taken into account when creating a daily diet for schoolchildren and determining the physiological parameters of the product.

In somatometric indicators, the compatibility of body weight and chest circumference with respect to height is one of the main criteria for assessing the hormonal level of physical development of students. The somatometric indicators of girls are mostly positive around the neck and chest among 8-year-olds, while body weight is positive.

Among 10-year-old girls, it has increased by 1.40%.

Table 2

**Results of anthropometric indicators of boys after consumption of chickpea soup**

age	Number of students	height			Weight			Кўкрак қафаси айланаси		
		F/M*	before research	after research	F/M*	before research	after research	F/M*	before research	after research
8	4	125,24±4,0	124,91±3,8	125,2±3,9	24,95±0,79	23,5±0,73	23,6±0,76	60,03±1,9	59,3±1,9	59,6±1,9
9	6	128,05±4,1	127,92±4,1	128,61±4,2	26,26±0,84	25,2±0,83	26,6±0,87	60,94±2,0	59,8±2,1	61,1±2,2
10	7	135,5±4,3	134,6±4,3	135,1±4,4	31,05±0,98	30,7±0,96	31,2±1,0	64,01±2,1	63,4±2,3	63,0±2,4
11	6	138,3±4,4	137,3±4,5	137,8±4,5	32,21±1,0	32,3±1,1	32,8±1,2	64,69±2,1	64,3±2,5	64,7±2,3
12	5	143,08±4,6	142,8±4,8	143,2±4,9	35,35±1,1	35,1±1,2	35,6±1,3	67,77±2,2	67,2±2,4	67,7±2,5

\*F/M is a physiological norm

Table 3

**Results of anthropometric indicators of girls after consumption of chickpea soup**

age	Number of students	height			weight			Chest circumference		
		F/M*	before research	after research	F/M*	before research	after research	F/M*	before research	after research
8	6	122,57±3,8	122,22±3,8	122,44±3,9	23,32±0,73	22,94±0,72	23,51±0,73	58,37±1,8	57,61±1,8	58,31±1,9
9	8	128,53±4,1	127,9±4,1	128,45±4,2	26,22±0,83	25,61±0,78	26,10±0,81	59,47±1,9	58,91±2,0	59,42±2,1
10	7	134,16±4,2	133,61±4,3	133,91±4,4	30,15±0,95	29,91±0,97	31,19±1,1	62,03±2,0	61,11±2,2	62,15±2,3
11	6	139,12±4,3	138,4±4,5	138,9±4,6	31,99±1,0	30,77±1,0	31,55±1,1	63,93±2,0	63,34±2,3	64,15±2,4
12	6	146,76±4,6	145,5±4,7	146,2±4,8	35,07±1,1	36,95±1,2	37,5±1,3	65,37±2,1	64,61±2,3	65,31±2,5

\*F/M is a physiological norm

Analyzing the anthropometric parameters, it is clear that the protein contained in peas from protein-containing plant products is well absorbed, saturates the body, but we must take into account that the digestion process takes place a little later.

Pea soup is one of the most effective protein-rich products based on the demonstrated effects of peas in pea soup on physical development.

It should be noted that positive results have been obtained in the physical development of schoolchildren after the inclusion of plant products in the daily diet, and it shows that conditions have been created for students to replace animal proteins in the diet with vegetable proteins.

Based on the results, we scientifically substantiated the possibility of using a partial replacement, not a complete replacement, to prevent deficiency in the body of students.

Students with iron deficiency anemia among schoolchildren were treated with pea soup.

Figures 1 and 2 show the results of blood analysis of school students who consumed chickpea soup.

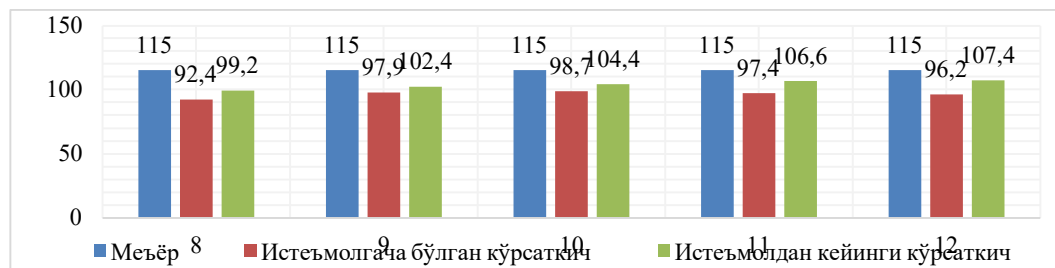
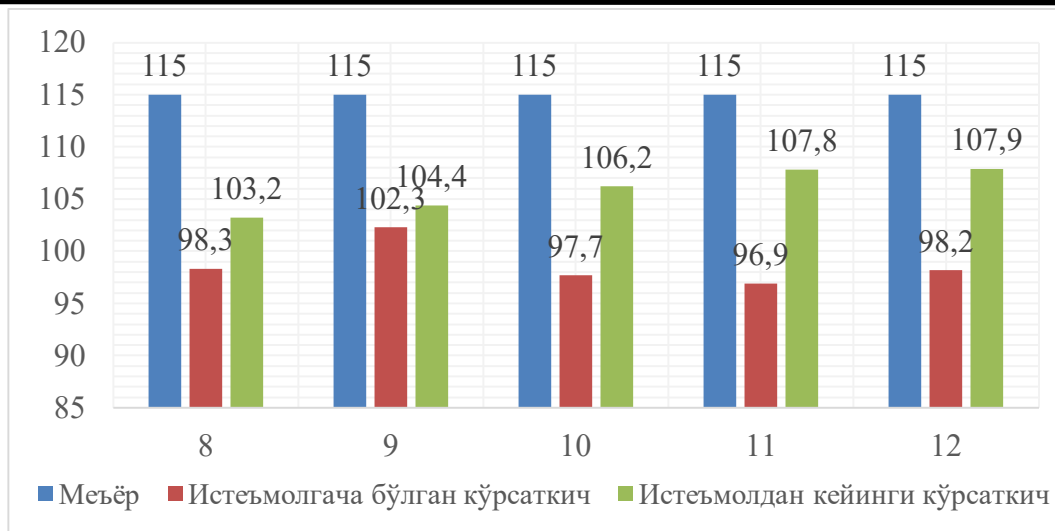


Fig. 1. The results of blood indicators after adding chickpea soup to the daily diet of schoolchildren.





**Fig. 2. The results of blood parameters after the inclusion of chickpea soup in the daily diet of girls**

Although the positive result among girls who consumed chickpea soup increased by 1.11 times, that is, by 111.2%, among 12-year-old girls, it increased by 109.87%, but these indicators are also less than the physiological norm.

It should be noted that the blood of 8-year-old boys increased by 1.07 times after consuming chickpea soup, while it increased by 1.04 times in girls.

Among 12-year-old boys who consumed chickpea soup, the amount of hemoglobin increased by 1.1 times, and among 11-year-old girls, it increased by 1.1 times.

It is worth noting that the hygienic analysis of the daily diet of students suffering from iron deficiency anemia shows that the regular inclusion of chickpea soup in the diet of schoolchildren, the correction of the main energy value by enriching their daily diet, and the improvement of the work and physical capacity of schoolchildren will improve their health. creates conditions for improvement.

Based on the obtained results and hygienic analysis, it is recommended to include chickpeas in the daily ration and strictly control its rate in order to enrich the daily ration of children with disabilities and physical development. Based on the obtained results, the following conclusions were presented:

1. It is necessary to include chickpea dishes among the products containing vegetable protein in the daily ration of schoolchildren and to follow the technology of their preparation.

2. Taking into account the effectiveness among schoolchildren diagnosed with iron deficiency anemia, after adding chickpea soup to the daily diet, conditions for restoring health will be created by increasing body weight, physical capacity and work efficiency.

3. Children who eat pea soup have positive hemoglobin values between 11 and 12 years old. Taking into account that the amount of hemoglobin increased by 1.1 times in boys at the age of 12, and by 1.1 times in the age of girls at the age of 11, by increasing the product in the diet sequentially with other protein-preserving products, by improving the blood indicators of schoolchildren, their reducing the level of illness and improving health status, healthy eating creates conditions for fulfilling the criteria.

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