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Hygienic Justification for the Nutritional, Biological Value and Effectiveness of Functional Nutrition of Wheat Shoots "Maysara"

Shaykhova Guli[1,*], Aknazarova Dilafruz[1], Zokirkhonova Shakhzoda[2]

[1]Department of Hygiene of Children, Adolescents and Food Hygiene of Tashkent Medical Academy, Uzbekistan
[2]Department of Pediatric Therapeutic Disease, Tashkent State Dental Institute, Uzbekistan

Abstract *Relevance of the topic:* the nutritional value of food is one of the most important factors determining the health of the population. One of the reasons for the increase in morbidity and mortality is insufficient dietary intake of complete proteins, vitamins, macro- and microelements. *The purpose of this work is:* hygienic substantiation of the nutritional and biological value of the functional food product wheat shoots "Maysara". *Materials and research methods:* the material for the study was the functional food product "Maysara", wheat shoots. Physicochemical, organoleptic, and clinical studies were used.

Keywords Functional food product "Maysara" wheat shoots, Nutritional value, Clinical studies

1. Introduction

Nutrition is one of the fundamental factors that determine the health of the population, ensuring normal growth and development of children, promoting active longevity, and increasing the body's resistance to adverse environmental factors. Deficiency or excess of macro- and micronutrients both causes the direct occurrence of diseases (anemia, obesity, endemic goiter, etc.) and reduces the body's resistance to acute respiratory and infectious diseases, and creates conditions for the development of one or another pathology (cardiovascular diseases systems, metabolic diseases, digestive systems, etc. [1,2,3,4]. According to WHO (2005), ¾ of the population in most countries of the world suffer from diseases, the occurrence and development of which is associated with poor nutrition. In this regard, all these diseases are called nutrition-dependent, emphasizing the leading role of nutritional factors not only in their development, but also in prevention, treatment, maintenance of remission, and improvement of prognosis [5,6,7].

Biologically active additives (BAA) to food are natural (identical to natural) biologically active substances intended for consumption along with food or for inclusion in food products. [8,9,10].

The purpose of using dietary supplements is to enrich the diet with deficient nutrients and biologically active compounds, as well as probiotics and prebiotics. Dietary supplements are obtained from plant, animal or mineral raw materials, as well as by chemical or biotechnological methods, and all of them are divided into several groups depending on their origin and chemical composition: based on protein, lipids, carbohydrates, dietary fiber, micronutrients, natural minerals, as well as animal and plant based, based on seafood, probiotic microorganisms and single-celled algae and yeast. Biologically active food supplements are mainly intended for use in the diet of a healthy person for preventive purposes as one of the dietary techniques for eliminating nutritional imbalances. They make it possible to make a final correction of the diet, ensuring the supply of those components (mainly micronutrients), the deficiency of which in the diet cannot be eliminated through traditional products. Dietary supplements can also be used as part of dietary (therapeutic) nutrition. At the same time, however, it is necessary to further confirm their dietary effectiveness in the manner prescribed by the rules of biomedical research and clinical trials of dietary products. Many dietary supplements contain adaptogenic and tonic substances, stimulate the body's defenses, increase overall stability and vitality; physical and mental performance; reduce the negative impact of the environment and stress. Extracts from various plants (aralia, levea, lemongrass, radiola rosea, zamanikha, eleutherococcus, ginseng, etc.), animal organs (deer antlers, etc.), elixirs and balms from medicinal herbs, pollen, propolis (bee glue), royal jelly (a beekeeping product, also called royal jelly), mumiyo.

* Corresponding author:
guli.shayhova@gmail.com (Shaykhova Guli)
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Young wheat grass is one of the most valuable types of greens, known and useful due to its particularly high chlorophyll content. The importance of the latter is especially emphasized in medical research in recent years. Due to its chemical structure, the chlorophyll molecule is almost identical to the hemoglobin molecule. The main difference is that the hemoglobin molecule is based on iron, and chlorophyll is based on magnesium. Thanks to this similarity, living chlorophyll molecules actively participate in the life processes of the body and stimulate them. Chlorophyll cleanses the body, stimulates the production of hemoglobin and red blood cells, cleanses the intestines and regulates digestion, has an anticarcinogenic effect, helps reduce internal inflammation and infections, promotes wound healing, eliminates bad breath, cleanses the respiratory tract, stimulates milk production in nursing women, stimulates blood circulation and much more.

Wheat germ powder has almost the same effect. If young wheatgrass (about 14 days old) is carefully harvested and dried at low temperatures, most of the chlorophyll and other nutrients from the fresh grass retain their nutritional value and biological activity. It is important that at any stage of production of wheat germ powder the correct temperature conditions are maintained (up to 45℃). This creates a highly concentrated source of nutrients, vitamins, minerals and antioxidants.

2. Purpose of the Research

Hygienic justification for the nutritional and biological value of the functional food product wheat shoots “Maysara”

To achieve this goal, we have solved the following tasks:

- the nutritional and biological value of the functional food product wheat shoots “Maysara” was studied;
- The effectiveness of using the functional food product wheat shoots “Maysara” in the prevention and treatment of iron deficiency anemia (IDA) in patients suffering from IDA was assessed.

3. Methods

To solve the problems, the following were used: organoleptic, physico-chemical, clinical and medical-statistical methods.

4. Results and Discussion

We have studied the nutritional and energy value of the functional food product wheat shoots “Maysara”.

We have studied the Maysara recipe, which is presented in Table 1. In the composition of “Maysar”, the indicators of wheat bran prevail, since they make up from 90 to 95% of the finished product.

The results of organoleptic indicators of “Maysara” are presented in table 1.

Table 1. Organoleptic indicators of functional nutrition wheat shoots "Maysara"

Indicators	Characteristic
Appearance	powder
Color	Green powder
Smell	not musty or moldy; faint odors inherent in the product components may be detected
Taste	Characteristic of wheat bran; mild flavors inherent in product components may be felt

Organoleptic indicators are specified in accordance with the recipe in the technological instructions and meet the requirements of the state standard.

Calculations (approximately) on the chemical composition of 100 grams of wheat shoots “Maysara”: the protein content is 36.5%, carbohydrates 27.4%; 2.4% fat, mass for fiber is 10%. There is no starch.

Table 2. Nutritional and energy value of food supplement “Maysara”, 100 g

Components	Proteins, g	Fats, g	Carbohydrates, g	Calorie content, kcal
Natural Wheatgrass Powder	36,9% ±0,34	2,4±0,02	5,2±0,35	296,6±1,29

Characteristic of “Maysara” is the high content of vitamins and macro- and microelements of the table. No.3,4,5.

Table 3. Content of vitamins in dietary supplement for food “Maysara”, 100 g

№	Components	Vitamin A, mg	Vitamin B9, mg	Vitamin C, mg	Vitamin E, mg
	Natural Wheatgrass Powder	0,78	19,1	0,2	25,0

In 100g of “Maysara” the content of vitamins A is 0.78 mg, vitamin B9 (folic acid) – 19.1 mg; vitamin C - 0.2 mg.

Table 4. Content of macroelements in dietary supplement for food “Maysara”, 100 g

Components	Calcium, mg	Magnesium, mg	Sodium, mg	Potassium, mg
Natural Wheatgrass Powder	22	0,3	4,2	120

As can be seen from Table 4, the calcium content is 22.0 mg, magnesium 0.3 mg and sodium 4.2 mg.

Table 5. Content of microelements in dietary supplement for food “Maysara”, 100 g

Components	Iron, mg	Zinc, mg	Copper, µg
meal	2,6±0.09	12,0±0,01	12,5 0±0,17

According to Table 5 the iron content is 2.6 ± 0.09 mg, zinc 12.0 ± 0.010, and copper 12.5 0 ± 0.17 µg.

Thus, the dietary supplement for Maysara food meets the requirements of GOST in terms of organoleptic and

physicochemical indicators.

It is recommended to take beneficial Maysara bran orally to treat iron deficiency anemia, reduce the risk of gastrointestinal dysfunction, incl. microflora, removal of excess cholesterol, as well as waste and toxins, maintaining normal body weight. Pectins contained in bran help improve absorption in the stomach and small intestine, and their enveloping properties, delaying gastric emptying, slow down the absorption of sugar. This increases the dietary value of the product.

Useful Maysara bran should be used with food, adding to first courses or outside meals with milk, kefir, yogurt or other liquid products, 2-3 times a day, 1-2 tablespoons.

At the second stage of work, we studied clinical trials using an open method in the hematology department of the 1st clinic of the Tashkent Medical Academy.

The examination included 30 patients with moderate and severe iron deficiency and mixed anemia. The subjects studied were conditionally divided into two groups.

- The first group (control) included 15 patients with anemia who received standard therapy; the intravenous drug ferrofer was used as a ferrodrug. Patients with anemia of mixed origin, in addition to iron supplementation, received vitamin B12 for 10 days. (Table 1)
- The second group (main) included patients who took standard therapy and "MAYSARA" WHEAT SHOOTS for 10 days (Table 6).

Patients in both groups were of comparable age and had a similar clinical picture of the disease.

5. Selection of patients. Clinical trials included patients with iron deficiency anemia and anemia of mixed etiology (vitamin B12 and iron deficiency).

The first group consisted of 15 patients with anemia aged from 28 to 75 years, average age 51.5 ± 1.4 years, of which 3 were men, 12 were women.

The second group consisted of 15 patients with anemia aged 18-63 years, average age 40.4 ± 1.3 years, of which 4 were men, 11 were women. WHEAT SHOOTS "MAYSARA" was prescribed to patients with their informed consent.

Destination scheme. Wheat shoots "MAYSARA" were prescribed according to the following scheme: for moderate and severe anemia, patients took the powder diluted in a glass of water, 1 teaspoon 1 time per day in the morning on an empty stomach.

Clinical effectiveness of wheat shoots "MAYSARA"

It is known that the basis of pathogenetic therapy for iron deficiency anemia (IDA) and anemia of mixed origin is the elimination of iron and vitamin B12 deficiency and the restoration of their reserves in the body. For this purpose, various preparations of iron and vitamin B12 are used. It should be noted that with anemia, in addition to impaired erythropoiesis, significant changes in the functional state of the erythrocyte membrane, activation of lipid peroxidation and a decrease in the antioxidant protection of erythrocytes can occur, therefore it is necessary to introduce antioxidants, membrane stabilizers, cytoprotectors, antihypoxants (such as alpha- tocopherol up to 100-150 mg per day or ascorutin, vitamin A, vitamin C, lipostabil, methionine, etc.) combined with B vitamins. In this regard, the use of "MAYSARA" wheat shoots in the treatment of anemia in addition to standard therapy is advisable.

Clinical effectiveness was assessed using objective and subjective criteria.

Objective criteria

In accordance with the clinical study protocol, peripheral blood parameters were selected as objective criteria for the effectiveness of MAYSARA WHEAT SHOOT.

Our comparative analysis of the results of treating patients with standard therapy and the inclusion of MAYSARA WHEAT SHOOT in treatment showed that an improvement in hematological parameters was observed in both groups (Tables 6 and 7).

Table 6. Peripheral blood parameters of patients with anemia of varying severity during treatment with "MAYSARA" wheat shoots

Indicators	Before treatment	By the end of treatment
General indicators (n =30)		
Hemoglobin, g/l	68,5 ± 5,1	87,6 ± 4,9
Red blood cells, x 10^{12}/l	2,4 ± 0,5	3,05 ± 0,3
Color index	0,8 ± 0,02	0,9 ± 0,07
For moderate anemia		
Hemoglobin, g/l	84,4 ± 4,5	102,7 ± 5,5
Red blood cells, x 10^{12}/l	2,83 ± 0,3	3,3 ± 0,15
Color indicator	0,81 ± 0,03	0,9 ± 0,04
For severe IDA		
Hemoglobin, g/l	52,7 ± 4,8	72,5 ± 5,1
Red blood cells, x 10^{12}/l	2,0 ± 0,33	2,8 ± 0,45
Color indicator	0,8 ± 0,06	0,9 ± 0,05

Table 7. Peripheral blood parameters of patients with anemia of varying severity during standard therapy

Indicators	Before treatment	By the end of treatment
General indicators (n =15)		
Hemoglobin, g/l	69,65 ± 7,87	79,9 ± 8,9
Red blood cells, x 10^{12}/l	2,45 ± 0,34	2,75 ± 0,31
Color index	0,76 ± 0,06	0,88 ± 0,04
For moderate IDA		
Hemoglobin, g/l	82,7 ± 4,4	88,5 ± 4,4
Red blood cells, x 10^{12}/l	2,8 ± 0,1	3,0 ± 0,18
Color index	0,8 ± 0,06	0,96 ±0,03
For severe IDA		
Hemoglobin, g/l	56,6 ± 1,09	71,3 ± 4,92
Red blood cells, x 10^{12}/l	2,1 ± 0,13	2,5 ± 0,2
Color index	0,73 ± 0,05	0,8 ± 0,05

A study of peripheral blood parameters showed that the increase in hemoglobin level in the group of patients with anemia who took MAYSARA wheat shoots and standard therapy was higher than in the group of patients who

received only standard treatment and amounted to 18 g/l, while in the control group it was equal 7 g/l. Also, the increase in the number of red blood cells in the main group after treatment was slightly higher than in the control group and amounted to 0.41 and 0.25 x 10^{12}/l, respectively.

The observed more pronounced improvement in peripheral blood parameters in the group of patients treated is a consequence of an effective increase in the average daily hemoglobin levels and the number of red blood cells, which occurs under the influence of basic therapy and wheat shoots. This, in turn, indicates that MAYSARA wheat shoots contribute to a more intense saturation of the body with iron and vitamin B12 by improving its absorption and stimulates the processes of its effective inclusion in hemoglobin and activates the functions of the bone marrow.

Subjective criteria

A clinical examination of patients in the main group showed that all patients complained of general weakness, fatigue, headaches, dizziness, tinnitus, spots before the eyes, palpitations, shortness of breath, drowsiness, poor appetite, numbness of the limbs. When examining patients, pale skin and mucous membranes, dry skin, fragility and hair loss, curvature of nails, and signs of angular stomatitis were observed. The severity of these complaints and clinical symptoms of the disease depended on the severity of anemia and the duration of the disease.

Studies have shown that in the group of patients taking antianemic drugs and MAYSARA wheat shoots, there was a more significant decrease in the severity of clinical symptoms of anemia than in the control group. In patients with moderate anemia, there was an improvement in appetite and mood, and the patients became more physically active.

In patients with severe anemia, there was also an improvement in well-being, which was manifested by a decrease in dizziness, flies before the eyes, drowsiness and pallor of the skin in half of the patients. Complaints such as tinnitus, palpitations, and headaches disappeared in 25% of patients.

There were no complaints from patients during the use of MAYSARA wheat shoots.

During testing of MAYSARA wheat shoots, no side effects were found.

Thus, a clinical trial of MAYSARA wheat shoots showed that the product has the ability to enhance the antianemic effect of basic therapy for all degrees of severity of IDA, as well as anemia of mixed origin. This, in turn, is a consequence of improved absorption of iron and vitamin B12 from the composition of drugs, but also the stimulating effect of MAYSARA wheat shoots on the processes of hemoglobin synthesis, as well as the involvement of tissue iron in the processes of hematopoiesis and stimulation of bone marrow functions.

5. Conclusions

The results obtained give grounds to come to the conclusion about the advisability of using “MAYSARA” wheat shoots in wide hematological practice as a means of having a certain therapeutic effect in IDA and anemia of mixed origin of varying severity. The drug can also be recommended as a prophylactic agent to prevent the occurrence of anemia.

Destination scheme. Wheat shoots "MAYSARA" were prescribed according to the following scheme: for moderate and severe anemia, patients took the powder diluted in a glass of water, 1 teaspoon 1 time per day in the morning on an empty stomach.

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