

EFFICACY IN ASSESSING THE NUTRITIONAL AND BIOLOGICAL VALUE OF GINGER GELATIN CAPSULES IN PATIENTS WITH COVID-19

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ABSTRACT

The purpose of the study: To study the nutritional, biological value and effectiveness of a new food supplement of ginger in a gelatin shell in patients with COVID-19.

Research methods and materials. A new ginger food product in a hard gelatin shell, developed by SHANAZ LLC; coronavirus patients, case histories.

Results: ginger in a gelatin capsule, developed in collaboration with SHANAZ LLC (Uzbekistan), which contains sufficient nutrients, minerals, vitamins and dietary fibers. The study of effectiveness in patients with COVID-19 showed a decrease in body weight, ensuring the function of the digestive organs, the exclusion of metabolic products, and the normalization of metabolic processes.

Conclusion. Ginger in a gelatin capsule contains proteins (g) 1.8 ± 0.104 , fats (g) 0.8 ± 0.076 , carbohydrates (g) 15.8 ± 0.55 ; dietary fiber (g) 2 ± 0.275 , total calorie (kcal) - 80 ± 1.445 . The composition contains vitamins and mineral elements that play a primary and secondary role in strengthening the immune system.

Key words: ginger in soft and hard gelatin capsules, patients with COVID-19, blood biochemical parameters.

INTRODUCTION

Nutrition is a factor that determines the immune status of the body, and the main cause of immunodeficiency in the world is malnutrition. [3,4,9,10,11].

«Your food should be your medicine and your medicine should be your food» – This point of view of Hippocrates, as in the rest of the world, has established restrictions on the movement and communication of people in our country, associated with an increase in the incidence of severe acute respiratory infection COVID-19 (Coronavirus disease 2019), etiologically associated with the new coronavirus SARS-CoV-2. Experts from the World Health Organization (WHO) have described the situation with the spread of COVID-19 less than three months after the onset of the disease as a pandemic [7,8,9,10,11]. WHO and PHEIC (Public health emergency of international concern) have declared the 2019-2020 coronavirus epidemic. emergency of international concern [17,18,19]. With the onset of the COVID-19 pandemic, the World Health Organization (WHO) has identified nutrition as one of the key factors in protecting public health during quarantine. The WHO European Office for the Prevention and Control of Noncommunicable Diseases has developed a number of the most needed regulations. It is known that nutrition plays a key role not only in various diseases, but also in the prevention of health disorders in quarantine [13].

Objective: to study the nutritional, biological value and efficacy of the ginger gelatin capsule (ginger) fresh dietary supplement in patients with COVID-19.

Research methods and materials. The materials for the study are a new food product from ginger in a hard gelatin capsule, developed by "SHANAZ" LLC, obtained by pressing with the addition of mineral, vitamin and plant extracts enriched with OMEGA-3, OMEGA-6 fatty acids and the medical history of patients with coronavirus infection.

In the process of scientific research, a complex of organoleptic, physicochemical, clinical, biochemical, calculation and statistical methods was used, depending on the following tasks.

Scientific research was carried out in: at the Department of Children, Adolescents and Nutritional Hygiene of the Tashkent Medical Academy (TTA), in the 1st and 2nd infectious dispensaries of the Zangiata district of the Tashkent region, in the testing center of the Institute of Plant Raw Materials named after Academician S.A. Yunusov. The following properties of a new food product made from ginger (ginger) in a hard gelatin capsule were studied. [9]:

- humidity, acidity, gluten (15113.4-91, 15113.5-91, 202239-91).
- According to the Keldahl method - crude protein (State Standard 0846-91);
- According to the Rushkovsky method - total lipids in the (State Standard 0846-91) Soxhlet apparatus;
- after firing in a muffle furnace - application (A.P.Yermakov, 1972).

The effectiveness of a new food product from ginger (ginger) in a hard gelatin capsule was carried out in the 1st and 2nd infectious dispensaries of the Zangiata district of the Tashkent region. The main group included 31 patients with COVID-19 infection in the main group and 30 patients in the control group. In patients, the body mass index, biochemical parameters of blood were studied.

In cooperation with the team of "SHANAZ" LLC, a new nutrient has been developed - a hard gelatin capsule of ginger (ginger), which is obtained by pressing with the addition of minerals, vitamins, plant extracts, as well as other substances that are mixed and then obtained from them in the form of soft and hard capsules.

The study of nutritional value and organoleptic indicators of soft and hard gelatin capsules "Ginger" revealed that the form of release of gelatin capsules is hard and soft, the predominant color and smell of raw materials and oils have the characteristics of this product. During this period, body weight, BMI, waist and hip area were assessed. In the hospital, in agreement with the doctors, clinical and outpatient blood tests were carried out: hemoglobin (Hb), erythrocytes (RBC), lymphocytes (WBS), glucose, alanine aminotransferase (ALT), aspartate aminotransferase (AST), protein, total urea, creatinine). The study was conducted at the beginning and end of diet therapy and its effectiveness was evaluated. The data obtained during the study were performed on a personal computer using Microsoft Office Excel-2013 software packages.

Research results and discussion. In cooperation with "SHANAZ" LLC, we have developed a mixture of minerals, vitamins, plant extracts and other substances and other additives made from oil, gelatin capsules - ginger, as well as in the form of soft and hard capsules.

Gelatin capsule - while studying the organoleptic characteristics and nutritional value of ginger food supplement, the distinctive features of this type of food supplement were studied. The study shows that the content of the raw material of the gelatin capsule - the oil has its own specific color and smell.

A nutritional study showed that the ginger gelatin capsule contains 1.8 ± 0.104 (g) protein, 0.8 ± 0.076 (g) fat, 15.8 ± 0.55 (g) carbohydrates; dietary fiber 2 ± 0.275 (g), total energy consumption 80 ± 1.445 (kcal). Contains individual vitamins (B1, C, D, E, K) and minerals (zinc, iron, selenium, magnesium, copper, etc.).

100 g of the product contains the following vitamins: vitamin B1, thiamine (mg) - 0.25 ± 0.001 ; vitamin S (mg) 5 ± 0.001 ; vitamin E 0.26 ± 0.025 ; Vitamin K (μg) 0.1 ± 0.01 ; vit. PP- 0.75 ± 0.01 .

In addition, the food supplement retains the following minerals: potassium (mg) - 415 ± 2.717 ; calcium (mg) - 16 ± 0.466 ; magnesium (mg) - 43 ± 0.768 ; sodium (mg) - 13 ± 0.505 ; phosphorus (mg) - 34 ± 0.529 ; iron (mg) - 0.602 ± 0.036 ; selenium (mcg) - 0.7 ± 0.037 ; zinc (mg) - 0.34 ± 0.037 .

This product was developed by the Ministry of Health of the Republic of Uzbekistan and the State Standard of the Republic of Uzbekistan "Technological guidelines for drinking soft and hard gelatin capsules", approved under the number TC (technical condition) 202224500-14:2019 [1,2].

The next stage of the biomedical evaluation of a new food product with gelatin capsules was aimed at the most objective assessment of the effectiveness of its clinical trial in patients with coronavirus. At the first stage, patients digested a new food product (allergy, nausea, vomiting, dyspepsia and other indications for 3 days). After the completion of this phase of the study, a second phase of in-depth study of the effect of the new product on metabolic processes in patients with coronavirus was carried out. Patients with coronavirus under our supervision received a standard diet No. 11 in the clinic. Purpose of appointment: to provide good nutrition, moderate stimulation of the secretory function of the digestive tract, normalization of motor function.

Products are allowed in varying degrees: ground and heat-treated - boiled, steamed, refined, fried without a hard glaze (fried with flour or stale breadcrumbs on top). Products from chopped vegetables rich in connective tissue, or fiber. It is forbidden to give the following foods: long and difficult to digest, affecting the gastric mucosa, very cold and hot foods. Chemical composition: proteins 100-120 g (60% animal proteins), fats 90-100 g (25% vegetable), carbohydrates 400-420 g; energy value 11.7-12.6 MJ "(2800-3000 kcal); sodium chloride - up to 15 g, free liquid 2.5 liters. Diet: 5-6 times a day in small portions.

The study group included 31 patients with COVID-19 infection in the main group and 30 patients in the control group at their own discretion. The main age group ranged from 17 to 64 years with an average age of 50.4 ± 1.5 years (31 patients, including 16 men and 15 women), in addition to the main treatment, "ginger" hard gelatin capsules were taken with meals 3 times a day. The course of treatment was 60 days, it should be noted that the patients were discharged at home (within 10 days) after discharge from the hospital, on their own initiative, with the introduction of the above products, a new therapeutic diet was prescribed. Patients received ginger in gelatin capsules free of charge. The study was carried out for three months.

Clinical examination of patients in our study revealed the following: weakness, fatigue, headache, dizziness, fever, shortness of breath, fatigue, some diarrhea, severe psychoemotional disorders.

According to the literature, obese patients are more prone to infection [3.8]. Their immune system is trying to fight excess body fat, so they are unable to fight viruses. Research scientists show that the age of patients and comorbidities such as

obesity, cardiovascular, pulmonary, diabetes, are the strongest predictors of their hospitalization. According to the World Obesity Federation (WOF), obesity significantly worsens the course of coronavirus infection (COVID-19). Individuals with a BMI of 30 and above are advised to take extra care, and for obese individuals, prevention of infection is paramount. The WHO Centers for Disease Prevention and Control reports that people with heart disease and diabetes are at higher risk of complications from COVID-19 [11,12,13,15]. Obese patients with disease and requiring intensive care have problems in patient management, since intubation of obese patients is difficult, it is also more difficult to obtain diagnostic imaging of the pathology (due to weight limitations in imaging devices) [4,5,6]. Thus, weight control is an important factor not only for health, but also for preventing the severe course of COVID-19. Numerous sociological studies show that the most effective for this purpose is the use of a diet that reduces calories [2,3]. According to the literature, obese patients are more prone to infection [11]. Their immune system is trying to fight excess body fat, so they are unable to fight viruses. The following diseases were observed in patients aged 18 to 69 years who participated in our study: obesity, cardiovascular diseases, diabetes mellitus, overweight and obesity of I, II and III degrees. I and II degrees of obesity were observed in patients older than 60 years (38.05%). The results of treatment showed that over a three-month period, the body weight of the subjects in the main group significantly decreased by 3-4.3 kg, in the control group by 1-1.3 kg (Table 1).

Table 1**Body mass index in patients with coronavirus**

№	Parameters	Control group		Main group	
		Before treatment	After treatment	Before treatment	After treatment
1	Age	53,2±0,98		50,7±0,39	
2	Height (sm)	168,6±1,75		167,3±1,73	
3	Weight (kg)	73,5±1,49	72,2 ±1,13*	72,6±1,46	68,3±1,08**
4	BMI (kg/sq.m ²)	25,8±3,87	25,4±3,9*	25,94±2,73	24,41±0,61*

Note: * - the differences are significant relative to the indicators of the group of physiological norms (* - R<0.05, ** - R<0.01).

Intoxication is not only a disease-specific condition, but also a consequence of taking highly toxic drugs during treatment, prolonged stay of patients in an isolated environment, low mobility, etc. Symptoms of poisoning, such as weakness,

chronic fatigue, loss of taste, hearing, vision, muscle pain, in many cases psycho-emotional disorders, exacerbation of the pathology of the gastrointestinal tract (GIT) for a long time after discharge from the hospital, it is known that in addition to the respiratory system is also a "gateway" for the entry of coronavirus into the body [3,11,13,14].

An analysis of the literature shows that the use of specialized dietary preventive products during the period of detoxification and quarantine and self-isolation in patients with coronavirus is more effective [2,3]. All this requires intensive research, as well as rehabilitation measures not only after illness, but also after clinical recovery and even after the patient is discharged from the hospital. The results of a clinical study of the effectiveness of the use of gelatin capsules - ginger, showed a decrease in body weight in the study of patients with coronavirus for three months; loss of appetite; reducing the load on the digestive organs; exchange and release of other toxic products; normalization of metabolism; normalization of the gastrointestinal tract; improvement of the functional state of the liver and gallbladder, kidneys, skin; it was also noted that vitamins and trace elements are in balance.

After taking a specialized preparation - a gelatin capsule for 2-3 months, patients notice a significant improvement in their condition, a decrease in pain, discomfort, and an increase in the quality of life.

Laboratory studies in patients with coronavirus revealed detoxification properties, improvement in the function of the main organs and systems, the participation of products in the metabolism of xenobiotics and endotoxins, which manifested themselves after taking the "ginger" gelatin capsule. This is confirmed by the hepatoprotective, antioxidant, hypocholesterolemic effects that appear in large-scale clinical studies identified in laboratory studies.

The data in tables 2 and 3 reflect the results of a biochemical blood test before and after taking "ginger" in patients with coronavirus. In the main group, there was a significant increase in hemoglobin up to 13%, in the control group - up to 6.47%. The most pronounced reductions were observed in small groups of patients with reduced concentrations of ECG and CRP, with changes in the original group in the original group (8.03 ± 1.067) and in the control group (10.89 ± 1.6), respectively. Studies in the main group revealed a statistically significant decrease in glucose concentration from the initial concentration to 29.8%, and in the control group to 15.9%.

Table 2

Hematological parameters of erythrocytes in patients observed before and after treatment, M±m

№	Indicators	Norm	Control group		Main group	
			Before treatment	After treatment	Before treatment	After treatment
1	Hb (hemoglobin)	Э; 130,0-160,0 g/l А; 120,0-140,0 g/l	109,6±6,96	116,7±8,01**	108,4±8,767	122,6±9,309***
2	(ESR)	Э; 2-10mm/hour А; 2-15mm/hour	15,67±3,57	10,89±1,6	14,7±1,358	8,03±1,067***
3	WBS (leukocyte)	4,0-9,0 10 ⁹ g/l	6,81±0,69	10,73±3,27*	5,8033±0,99	8,56±0,787**
4	Lymph (lymphocyte)	19-37 %	26,68±5,37	28,89±4,87	30,42±7,5	28,9±2,45

Note: * - differences are significant in relation to the indicators of the group of physiological norms (* - R<0.05, ** - R<0.01, *** - R<0.001)

Table 3

Indicators of ALT, AST and total bilirubin in the dynamics of complex therapy in patients with chronic hepatitis

№	Indicators	Norm	Control group		Main group	
			Before treatment	After treatment	Before treatment	After treatment
1	ALT, U/l	<40	39,17±10,32	28,67±6,12***	38,46±8,03	18,98±3,07****
2	AST, U/l	<30	41,52±9,64	23,09±3,52***	29,76±5,01	18,76±1,07***
3	Glucose, mmol/l	3,2-6,1	6,98±0,64	5,87±0,43	6,82±0,49	4,79±0,42
4	Urea, mmol/l	2,5-8,3	4,72±0,53	4,58±0,34**	5,64±0,43	4,89±0,61*
5	Total protein, g/l	46-70	71,03±1,94	70,18±1,24	71,64±1,81	67,2±2,84***
6	Creatinine μmol/l	Э: 44-115 А: 44-97	76,21±5,01	74,75±6,83	69,71±5,12	61,3±5,61

Note: * - differences are significant in terms of the group of physiological norms (* - R<0.05, ** - R<0.01, *** - R<0.001).

Consumption of a gelatin capsule "ginger" product led to a significant decrease in the concentration of urea in the blood (4.89±0.61) by 8.73% and creatinine (61.3±5.61) by 12.06%, which is formed in the body toxins allows us to

talk about the rapid excretion of metabolic products. We also studied the decrease in the concentration of key enzymes in the blood, which characterize the detoxification activity of the liver. The levels of aminotransferases (18.98 ± 3.07) and aspartaminotransferases (18.76 ± 1.07), as well as the content of total protein in the main group (67.2 ± 2.84) and in the control group (70.18 ± 1.24) at the level of the norm, i.e. change significantly (Table 3).

There was a normalization of metabolic processes, a significant improvement in lipid and carbohydrate metabolism. The diet formed with the introduction of detoxification products provides a decrease in the amount of primary and secondary peroxidation products (diene conjugates, ketodienes and carbonyls) against the background of an increase in total antioxidant activity, which suggests a decrease in antioxidant activity and resistance to the adverse effects of exogenous and endogenous factors.

The results of a clinical study showed a decrease in body weight when examining patients with coronavirus for three months; loss of appetite; reducing the load on the digestive organs; exchange and release of other toxic products; normalization of metabolism; normalization of the gastrointestinal tract; improvement of the functional state of the liver and gallbladder, kidneys, skin; it was also noted that vitamins and trace elements are in balance.

According to laboratory studies, the detoxification properties of the product were revealed after taking a specialized product of the gelatin capsule "ginger" in patients with coronavirus, the functions of the main organs and systems improved, and the participation of the product in the metabolism of xenobiotics and endotoxins was established. This is confirmed by extensive, well-established hepatoprotective, antioxidant, hypocholesterolemic clinical efficacy studies that have been identified as a result of laboratory studies.

Therefore, it is recommended for the following cases created by "SHANAZ", designed to detoxify the body:

- during self-isolation and quarantine in order to prevent poisoning and overweight;
- chronic diseases and their exacerbations; with a general deterioration in the state of the body, accompanied by a decrease in immunity, appetite, chronic fatigue and weakness;
- after drug treatment (antibiotic therapy, hormone therapy, and other drugs);
- in the presence of bad habits (smoking, drinking alcohol).

CONCLUSION

Gelatin capsule - protein (g) in ginger (ginger) 1.8 ± 0.104 , fat (g) 0.8 ± 0.076 , carbohydrates (g) 15.8 ± 0.55 ; dietary fiber (g) 2 ± 0.275 , total calories (kcal) 80 ± 1.445 . Vitamins contain B1, C, D, E, K and mineral elements (zinc, iron, selenium,

magnesium, copper, etc.), which play the main and additional role in strengthening the immune system.

Decrease in body weight up to 3-4.3 kg according to the results of clinical examination; loss of appetite; reducing the load on the digestive organs; exchange and release of other toxic products; normalization of metabolism; normalization of the gastrointestinal tract; improved metabolism; improvement of the functional state of the liver and gallbladder; improvement of the functional state of the kidneys; improvement of the functional state of the skin; as well as maintaining the balance of vitamins and trace elements.

Improvement in hematological parameters, a decrease in the blood plasma of liver enzymes (AST, ALT and GGT), as well as total bilirubin, with a decrease in the concentration of liver enzymes (AST, ALT) in the blood plasma, which characterizes the detoxification activity of the liver, as it turned out, falls.

REFERENCES

1. Shayxova G.I., Ortiqov B.B., Abdullaeva D.G. Pravil'noye pitaniye pri koronoviruse. // *Axborotnoma* - 2021. - №2. - P. 52-58.
2. Andersen C.J., Murphy K.E., Fernandez M.L. Impact of obesity and metabolic syndrome on immunity. // *Adv Nutr.* - 2016. - Vol.7. - P.66–75. doi:10.3945/an.115.010207.
3. Autier P., Mullie P., Macacu A., Dragomir M., Boniol M., Coppens K., Pizot C., Boniol M. Effect of vitamin D supplementation on non-skeletal disorders: A systematic review of meta-analyses and randomised trials. // *Lancet Diabetes Endocrinol.* - 2017. - Vol.5. - P.986–1004.
4. Barnett J.B., Dao M.C., Hamer D.H. et al. Effect of zinc supplementation on serum zinc concentration and T cell proliferation in nursing home elderly: a randomized, double-blind, placebo-controlled trial. // *Am J Clin Nutr.* - 2016. - Vol.103. - P.942–951. doi:10.3945/ajcn.115.115188.
5. Carr A.C., Maggini S. Vitamin C and immune function. // *Nutrients.* - 2017. - Vol.9. - P.1211.
6. Basil M.C., Levy B.D. Specialized pro-resolving mediators: Endogenous regulators of infection and inflammation. // *Nat. Rev. Immunol.* - 2016. - Vol.16. - P.51–67.
7. Bergman P., Lindh Å.U., Björkhem-Bergman L., Lindh J.D. Vitamin D and respiratory tract infections: A systematic review and meta-analysis of randomized controlled trials. // *PLoS ONE.* - 2013. - Vol.8. - e65835.

8. Brown C.C., Noelle R.J. Seeing through the dark: new insights into the immune regulatory functions of vitamin A. // *Eur J Immunol.* - 2015. - Vol.45. - P.1287–1295. doi:10.1002/eji.201344398.
9. Calder P.C., Ahluwalia N., Brouns F. et al. Dietary factors and low-grade inflammation in relation to overweight and obesity. // *Br J Nutr.* - 2011. - Vol.106. - S5–78. doi:10.1017/S0007114511005460.
10. Cannell J.J., Vieth R., Umhau J.C., Holick M.F., Grant W.B., Madronich S., Garland C.F., Giovannucci E. Epidemic influenza and vitamin D. // *Epidemiol. Infect.* - 2006. - Vol.134. - P.1129–1140.
11. Carr A.C. Vitamin C in pneumonia and sepsis. In *Vitamin C: New Biochemical and Functional Insights*; Chen, Q., Vissers, M.C.M., Eds.; CRC Press: Boca Raton, FL, USA, 2020; pp. 115–135.
12. Wessels I., Maywald M., Rink L., et al. Zinc as a gatekeeper of immune function. // *Nutrients.* - 2017. - Vol.9. - P.1286.doi:10.3390/nu9121286.
13. World Health Organization official website accessed in March 2020. URL address: <https://www.who.int/healthtopics/coronavirus>
14. Shayhova G., Ermatov N., Abdullaeva D., Abdullaeva D. et al. To the problem of fungal Pathology in the Hot climate in children and adults. // *International Journal of Pharmaceutical Research.* - 2021. - Issue 1, Vol.13. - P.2319-2323.
15. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). *Jahon sog'liqni saqlash tashkiloti (JSST).* 31-yanvar 2020-yilda asl nusxadan arxivlandi. Qaraldi: 11-fevral 2020-yil.
16. Hundreds of evacuees to be held on bases in California; Hong Kong and Taiwan restrict travel from mainland China, *The Washington Post* (6-fevral 2020-yil).
17. Coronavirus disease 2019 (COVID-19): situation report, 47. March 2020.