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Biological Activity Of Fresh Squeezed Orange Juice.

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ABSTRACT

The subject of alimentary correction of health by natural foods of plant origin, metabolically connatural to the body and exhibiting immunoprotective properties, is essential for maintaining human health. Freshly squeezed orange juice one hour after intake dramatically increases the biological activity of all body systems, especially stomach – pancreas – spleen; kidneys – bladder; liver – gall bladder, and cardiovascular systems. Thus, in case of the functional weakness of these human systems, it is advisable to use orange juice.

Keywords: Alimentary correction of health, orange juice, biological activity of organs, biological activity of orange juice.

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INTRODUCTION

The longevity and quality of human life, according to the research conducted by the World Health Organization [1], only 10% depends on the level of medical care. The main factor (50%) determining the human health is his lifestyle. A healthy lifestyle involves healthy (health bearing) nutrition, ensuring the intake of essential metabolic nutrients, connatural to human organism, and minor components of food. Therefore, the subject of alimentary correction of health by natural plant products, immunoprotectors, metabolically connatural to the body, is essential for maintaining human health [2, 3, 4].

Orange is one of the natural plant foods providing the correction of human health. This citrus includes a large variety of vitamins and minerals important for the functioning of the body. The content of vitamins, mineral nutrients and macronutrient elements, as well as the daily intake, are presented in Table 1 [5, 6].

Table 1: The average content of vitamins, mineral nutrients and macronutrient elements per 100 g of orange juice

Vitamins														
Vitamin	Vitamin A	Vitamin B1	Vitamin B2	Vitamin B3	Vitamin B5	Vitamin B6	Vitamin B9	Vitamin C	Vitamin E	Vitamin H (B7)				
Content in orange, µg	8	40	20	300	300	60	5	40.0	200	1				
Daily intake, mg	1.5	1.5	1.7	20	10	2	0.2	60	1.33	0.2				
Mineral nutrients and macronutrient elements														
Mineral nutrients	Potassium	Calcium	Phosphorus	Magnesium	Sodium	Sulfur	Chlorine	Iron	Zinc	Boron	Copper	Manganese	Fluorine	Iodine
Content in orange, mg	179	18	13	11	10	9	3	300	200	180	67	30	17	2
Daily intake, mg	1000-2000	1000	1000	400	4000-5000	500-1000	3400	10-20	15	2-5	2	2	2-4	0.15-0.2

The availability of bioflavonoids in the orange contributes to neutralization of free radicals and elimination of harmful microorganisms. Vitamins B1, B2 and B3 ensure the normal evolution and functioning of the central nervous system, contribute to the growth of the organism and enhance the synthesis of antibodies (enhance immunity). Vitamin B5 activates the nervous system, regulates the amount of adipose tissue, and encourages production of adrenal hormones. Vitamin B6 is involved in the production of hormones and enzymes, as well as it activates the metabolism of amino acids. Vitamin H (B7) is essential for the metabolism of vitamin B3. Vitamin B9 (folic acid) encourages the immune system, metabolism of proteins and fats, is involved in the formation of hemoglobin and red blood cells as well as regulates fission. That is why orange prevents fetal malformations of the child in women of reproductive age. Assimilation of folic acid (vitamin B9) requires availability of vitamins B1, B6 and C. Because orange contains all of these components, folic acid is fully absorbed from orange by the organism [7]. The use of orange is especially essential for the correction of ascorbic acid (vitamin C) content, since a great need in this vitamin and the body's inability to synthesize it led to the necessity of using ascorbic acid in therapeutic and prophylactic purposes [8]. The major useful properties of the orange are due to the high content of vitamin C. It is a highly effective antioxidant, needed by the body to regulate many processes, including collagen production. Ascorbic acid has anti-inflammatory and regenerating effect on many tissues. It enhances the body's resistance against certain infectious agents, contributes to absorption of iron and calcium, and excretes copper, lead and mercury from the body [8, 9]. The orange contains a sufficient amount of phosphorus, calcium and magnesium (see Table 1). Calcium and phosphorus improve the condition of bones, teeth, hair, and skin. Magnesium is particularly

important to normalize the activity of cardiovascular system. The lack of magnesium leads to decrease in vascular tone and cardiac muscle. When eating orange or drinking orange juice, magnesium in combination with vitamin C, enhance the physical and psychological stress resistance of the body.

Oranges and orange juice more than any other fruit contain pectin and dietary fiber, which in combination with organic acids and essential oils greatly enhance the appetite, motility and secretion of gastrointestinal tract. In addition, pectin increases the synthesis of vitamins and reduces sugar and cholesterol in the blood. As orange is rich in potassium, which helps to eliminate excess fluid from the tissues, the consumption of sufficient amount of fruit and the orange juice reduces blood pressure, prevents oedemata, especially in cardiovascular diseases accompanied by deficiency of potassium [10].

The popularity of orange juice in cosmetology can be explained by the availability of citric acid and vitamins contained in the fruit. Citric acid whitens the skin, removes pigment spots and gives a healthy color [9].

The use of orange juice in folk medicine is widely known [11, 12]. It normalizes bowel function and prevents constipation. Its use is recommended in case of anemia and diseases of the liver and kidneys. There is orange diet, based on the red orange juice that helps to fight against body overweight. Orange juice has long been used as an antipyretic, at haemoptysis, for the treatment of infected wounds and ulcers, as well as for treatment of kidney stone disease [13].

The aim of the present study was to determine the natural effect of fresh squeezed orange juice on the human body, as well as to reveal the change of the biological activity of human body organs.

MATERIALS AND RESEARCH METHODS

To analyze change in the state of biological activity of body organs under the effect of the orange juice we have used the software and hardware system RUNO (thermoalgotometry). The diagnostics was based on the reflectory connection between the activity of autonomic centers and the sensitivity of skin zones. The **less** the sensitivity threshold of corresponding acupuncture points of the organ’s meridian the **higher** the biological activity of the respective organ. Professional medical diagnostic system RUNO is included in the State register of medicines and medical products, and certified by the Ministry of Health of the Russian Federation. Today it is the most accurate, complete, and at the same time, the simple technology for express-diagnostics, which allows identifying the variations in the activity of the functioning of organs within 3-5 minutes.

The study was conducted on healthy men and women [14, 15] under the most socially significant age from 20 through 69 years.

To obtain “control measurements” of the average annual biological activity of the organs, measurements of the biological activity of organs of the healthy people were performed every 2 weeks during 3 years (since November 2012 through October 2015) in the fasted state from 7.00 a.m. to 8.00 a.m. To identify the average biological activity of the organs, 557 measurements were carried out during this period. The number of measurements and the average age of the studied groups are presented in Table 2.

Table 2: The number and the average age of healthy men and women tested in control measurements conducted in various age groups

Age group	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years
Number of testees	40	165	65	169	118
Average age of the group, years	27.7±0.02	37.0±0.08	43.1±0.03	51.7±0.02	64.0±0.01

To assess the *change* in the biological activity of the organs under the effect of 50 ml of used fresh squeezed orange juice, 38 persons were tested twice *immediately after* drinking the juice and *one hour*

after ingesting it in the same time period of the day (from 7 a.m.) employing the software and hardware system RUNO.

RESULTS AND DISCUSSION

The analyzed databases were created in Microsoft Excel 2003. The variational series were constructed with regard to each of the following indicators:

1. The age of the testees;
2. Measurements of the biological activity of twelve body meridians:
 - 2.1 “control measurement” of the biological activity of the organs;
 - 2.2 the biological activity of each organ *immediately after* ingestion of fresh squeezed orange juice;
 - 2.3 the biological activity of each organ *one hour after* ingestion of fresh squeezed orange juice.

The average value of indicators based on the mode, meridian, moments techniques, and the boundaries of their confidence intervals, were revealed. The critical level of significance was taken as $p = 0.05$. Indicators of the biological activity status of the organs are presented in Table 3 and shown in Fig. 1.

Table 3: The average values of indicators of biological activity status of body organs

Meridian	Vb	F	P	G	E	Rp	C	Jg	V	R	Mc	Tr
	Gall bladder	Liver	Lungs	Large intestine	Stomach	Pancreas - Spleen	Heart	Small intestine	Urinary bladder	Kidney	Pericardium (vascular system)	Triple heater (hormonal system)
Control measurement	100.17 ±1.49	100.74 ±1.19	100.65 ±1.17	101.40 ±1.22	99.90 ±1.20	101.83 ±1.41	101.69 ±0.95	100.82 ±2.31	100.96 ±2.31	99.99 ±1.39	100.45 ±1.14	101.88 ±0.99
Immediately	98.8 ±4.71	98.4 ±3.24	97.3 ±3.36	97.9 ±2.52	95.7 ±3.91	95.2 ±4.14	95.9 ±2.42	96.4 ±2.78	103.0 ±4.91	97.8 ±4.30	96.8 ±3.21	100.3 ±3.15
After an hour	96.4 ±4.86	95.6 ±4.11	98.7 ±4.22	97.6 ±2.76	97.8 ±3.37	94.0 ±5.33	100.0 ±2.81	99.5 ±3.00	93.9 ±5.71	97.8 ±3.36	98.4 ±3.44	98.7 ±2.99

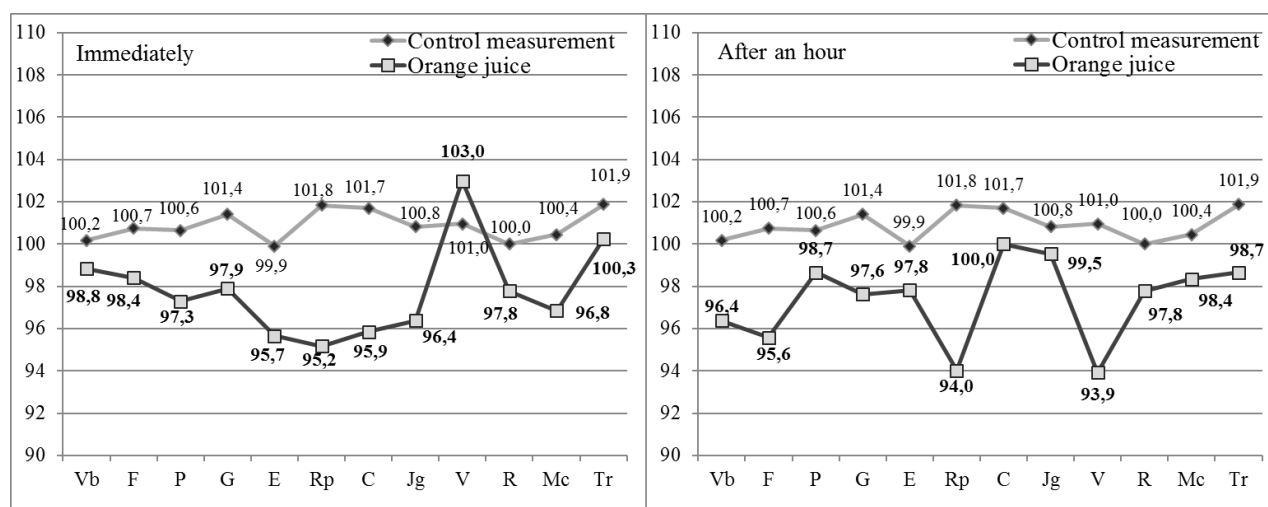


Figure 1: The indicators of the biological activity status of the organs.

The change of the biological activity of the organs, when ingesting orange juice with regard to “control measurement” are presented in absolute values and percentage ratio in Table 4 and shown in Fig. 2.

Table 4: The change of the biological activity of the organs in absolute values (Δ , points) and percentage ratio (Δ , %) against the indicators of biological activity obtained for “control measurements”

Meridian	Vb	F	P	G	E	Rp	C	Jg	V	R	Mc	Tr	
Immediately	Δ , points	1.33	2.34	3.36	3.51	4.24	6.65	5.83	4.45	-2.02	2.22	3.61	1.62
	Δ , %	1.33	2.33	3.33	3.46	4.25	6.53	5.74	4.41	-2.01	2.22	3.59	1.59
After an hour	Δ , points	3.79	5.17	1.98	3.77	2.09	7.81	1.69	1.29	7.04	2.22	2.10	3.21
	Δ , %	3.78	5.13	1.97	3.72	2.09	7.67	1.67	1.28	6.97	2.22	2.09	3.15

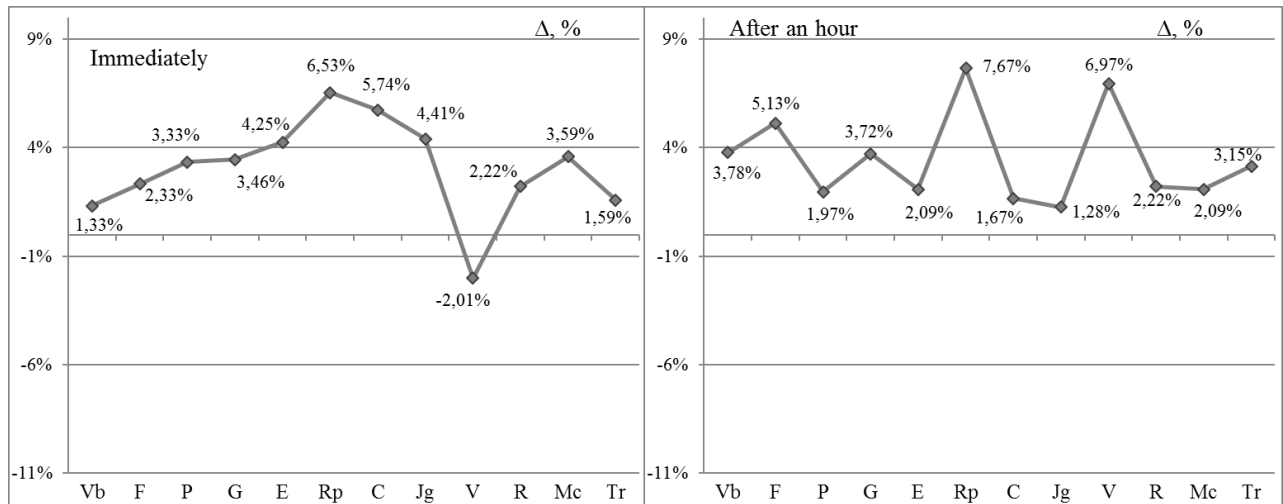


Figure 2: The change of the biological activity of the organs under the effect of orange juice in percentage ratio against the indicators of biological activity obtained for “control measurements”.

The change in the biological activity of the body organs with regard to “control” values *immediately after* intake of fresh orange juice is presented in Table 5, while similar values obtained *one hour after* the ingestion of fresh squeezed orange juice are presented in Table 6.

Table 5: The change in the biological activity of the body organs *immediately after* intake of fresh orange juice, %

Body meridian	Rp	C	Jg	E	Mc	G	P	F	R	Tr	Vb	V
%	6.5	5.7	4.4	4.2	3.6	3.5	3.3	2.3	2.2	1.6	1.3	-2.0

Table 6: The change in the biological activity of the body organs *one hour after* intake of fresh orange juice, %

Body meridian	Rp	V	F	Vb	G	Tr	R	E	Mc	P	C	Jg
%	7.7	7.0	5.1	3.8	3.7	3.2	2.2	2.1	2.1	2.0	1.7	1.3

The comparison of the results (Fig. 2, Tables 5 and 6) show that the total change of the biological activity of all organs *immediately after* ingestion of fresh squeezed orange juice is “+36.3%”, i.e. the total biological activity of the whole organism rapidly increases. Speaking the language of Oriental medicine, orange juice, when ingested, initially displays the male principle of Yang [16]. At that, the biological activity of all body systems increase. *An hour after* ingestion of the orange juice, the total change in the biological activity of all organs becomes equal to “+41.7%”, i.e. the total biological activity of the organism further increases. Speaking the language of Oriental medicine, orange juice, while absorbed by the body, displays a pronounced male principle of Yang [16].

CONCLUSIONS

In summary, we can draw the following conclusions.

1. The response of the body to fresh squeezed orange juice *immediately after ingestion* consists in the increase of the total biological activity by 36.8%. At that, particularly noticeable enhancement was noted in the biological activity of the cardiovascular system (Jg, Tr, C, Mc) and the system of stomach – pancreas – spleen (Rp, E).
2. *An hour after* ingestion of the fresh orange juice, the biological activity of each and all body organs and systems increases even greater (on total by 41.7%). Maximum biological activity was displayed in stomach – pancreas – spleen system (Rp, E), enhancement by 9.8%; kidneys – bladder system (R, V), (9.2%); liver – gall bladder system (F, Vb), (8.9%); and cardiovascular system (Mc, Jg, C, Tr), (8.2%). The system of lungs – large intestine (P, G) activates to a lesser extent (5.7%).
3. Thus, we can recommend the use of fresh squeezed orange juice for alimentary correction of health to the people suffering from functional weakness of mentioned body systems.

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