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NUTRITION OF SOLDIERS IN BATTLE CONDITIONS: THE EVOLUTION FROM THE ZAPORIZHIAN SICH UNTIL TODAY

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Abstract. *Nutrition of soldiers in battle conditions: the evolution from the Zaporizhian Sich until today. Gulich M.P., Petrenko E.D., Lubarskaya L.S., Deputat Yu.M. Nutrition of military personnel in the field or during combat operations is of great importance for maintaining force performance. An indispensable element in the provision of military personnel with food is individual "dry rations", which are most often formed based on the nutrition of one soldier for one to three days. Of interest was the question of how the nutrition of the military personnel changed in combat operations meanwhile. Objective – to study the historical aspect of nutrition in battle conditions during the period from the Zaporizhia Sich to the present day. Materials and methods – literary sources, regulatory documents, research results. The information retrieval and the theoretical analysis method are used. The literature data, legislative and regulatory documents, the results of scientific research related to the nutrition of Ukrainian service personnel in the combat operations for the period from XVII-XXI centuries are analyzed. The evolution of "dry operational ration" over several centuries took place depending on the development of the food industry: from dry products that do not spoil with long-term keepeng (crackers, cereals, dry meat, dry fish), dry food concentrates and canned foods to ready-to-eat first and second courses. The caloric content of dry rations from the middle of the twentieth century ranged from 3100 kcal to 3350 kcal. In the Ukrainian army it is from 3,500 kcal to 3,800 kcal, and only for Joint Force Operation (JFO) – 4,100. Until recently, the energy value (caloric value) of dry rations was calculated without taking into account the actual energy consumption of service personnel in carrying out combat operations. Further studies on improving the nutritional standards of service personnel should be aimed, first of all, at establishing real energy costs when they perform their mission, including military ones.*

Реферат. *Питання солдат в бойових умовах: еволюція від Запорізької Січі до сьогодення.*

Гулич М.П., Петренко Е.Д., Любарська Л.С., Депутат Ю.М. Питання військовослужбовців в польових умовах або в час виконання бойових дій має велике значення для підтримання боєздатності військ. Незамінним елементом в забезпеченні особистого складу харчування є індивідуальні «сухі пайки», які частіше за все формуються за розрахунок на харчування одного військовослужбовця на один-три дні. Інтерес представляє питання, як змінювалося харчування особистого складу військ в бойових умовах за час виконання бойових дій за період від Запорізької Січі до наших днів. Матеріали та методи – літературні джерела, законодавчі акти, результати наукових досліджень. Використано інформаційно-пошуковий метод та метод теоретичного аналізу. Проаналізовані літературні дані, законодавчі акти, результати наукових досліджень, пов'язані з харчуванням українських військовослужбовців в умовах бойових дій за період XVII – XXI століття. Еволюція «сухого пайка» в час виконання бойових дій відбувалася залежно від розвитку харчової промисловості: від сухих продуктів, які не псуються (сухари, крупи, сухе м'ясо, суха риба), сухих харчових концентратів до готових до вживання перших та других страв. Калорійність сухих пайків з середини XX століття становила від 3100 ккал до 3350 ккал. В українській армії вона становить від 3500 ккал до 3800 ккал, а тільки в час спільних операцій (СОО) – 4100 ккал. До недавнього часу енергетичну цінність (калорійність) сухих пайків розраховували, не беручи до уваги фактичне енергетичне споживання військовослужбовців при виконанні бойових дій. Подальші дослідження з покращення харчових стандартів військовослужбовців повинні бути спрямовані, в першу чергу, на визначення реальних енергетичних витрат при виконанні ними завдань, включаючи військові.

и консервов до готовых к употреблению первых и вторых блюд. Калорийность сухих пайков со середины XX столетия колебалась от 3100 ккал до 3350 ккал. В украинской армии от 3500 ккал до 3800 ккал и только для участников ООС - 4100. Энергетическая ценность (калорийность) сухих пайков до последнего времени рассчитывались без учета фактических энергозатрат военнослужащих при выполнении ими боевых задач. Дальнейшие исследования по совершенствованию норм питания военнослужащих должны быть направлены, прежде всего, на установление реальных энергозатрат при выполнении ими задач по назначению, в том числе и боевых.

Nutrition of servicemen in the field or during special tasks away from supply bases is of great importance for maintaining the combat effectiveness of troops. An indispensable element in providing food to personnel is individual "dry rations", which are often formed on the basis of food for one serviceman for one or three days. In most countries, army rations are recruited according to national norms of physiological needs, taking into account the level of physical activity, sex and age of servicemen.

In recent years, the process of improving the nutrition of servicemen has attracted the attention not only of professionals but also of the public. Of interest is the question of how the nutrition of the personnel of the troops in combat conditions has changed in the past.

The purpose of the work is to study in the historical aspect the peculiarities of military nutrition in the conditions of hostilities for the period from the Zaporozhian Sich to the present time.

MATERIALS AND METHODS OF RESEARCH

Literary sources, legislative and regulatory documents, research results. The information-search method and the method of theoretical analysis are used.

RESULTS AND DISCUSSION

It is impossible to say that the soldier's "dry ration" that every soldier had with him during military campaigns is a new invention. In hostilities, soldiers always carried with them food that does not spoil for a long time.

Already in the Zaporozhian Sich during the military campaigns, the diet of the Cossacks was completely different than in the hut, and the set of products also changed. During the campaigns, the Cossack food was simple, did not require too much expense, was adapted to the Cossack way of life and ensured the maintenance of the Cossack army at the right level. Going on a campaign, the Cossack had to take a supply of food with him, which would be enough for several months. Naturally, only those products were taken that were well preserved, did not spoil quickly and the preparation of which did not cause any difficulties. Therefore, the basis of the diet in the campaigns were crackers, cereals, flour, lard. The water was carried in small flasks tied to a

saddle. They also took fishing nets and went fishing on occasion. Fish was a significant addition to the diet of the Cossacks during the campaigns [6, 13, 19, 21].

But it was an individual approach and the Cossacks took the products and their number independently and at their own's discretion.

Since our history from 1654 to August 24, 1991 was closely connected with the Russian Empire, and later with the Soviet Union, we further provide data relating to the nutrition of the military personnel in hostilities from the eighteenth century. . It was then that the first attempts were made to organized approach to dry rations for soldiers.

Centralized supply of food to the military personnel was first introduced by Decree of Tsar Peter I in 1700. In 1711 in the regiments the position of general-provisions master was introduced [3, 12].

At the beginning of the 18th century, the first military Statute of 1716 defined the norms of providing food for peacetime and wartime. But it does not yet have a clear division as for dry rations and the so-called diet. However, a field-type proviant is mentioned – crackers and some other products, such as dried meat, which the soldiers carried on their backs. Bags were used for this purpose, but during the Great Northern War backpacks appeared in the soldiers. In the bag or backpack provisions for only a few days of travel was carried. Monthly provisions were usually transported. If we take into account that in foreign campaigns the soldier had to carry 2 pounds of dry bread and a pound of dried meat, you can predict that for one day he carried 800 g of dry bread and up to 400 g of meat, and in addition to dried meat, it could be dried fish, additionally cereals were added at the rate of 219 g per person per day [20].

The first information about food concentrates appeared in the 18th century. The book "Lomonosov's Project and Chichagov's Expedition" mentions that during the expedition, along with a supply of various foodstuffs, "dried soup with spices and without spices was made for one and a half poods each", but such concentrates were not used for the army [17].

In fact, by the end of the nineteenth century, a soldier's dry ration or field-type proviant looked like this: a pound (about 410 g) of boiled beef, which the

soldier took from the night haul – the daily norm, crackers – 2 pounds for 2.5 days, salt – almost 50 g (12 spoons) and a flask of water – 700 g [1].

Changes in the composition of dry rations products began with the development of technologies for industrial food production.

Thus, in 1870 the first cannery appeared in the Russian Empire. For the needs of the army canned food of five types: fried beef, stew, porridge, meat with peas and pea soup were produced [2].

Canned food has been used in the Russian army since about 1877, but it was still sporadic and did not go beyond the experiment. And only in 1899 in the army the replacement of fresh meat 1 p. (409.5 g) with 72 of zolotnik (307 g) of canned meat was provided. However, from 1901 to 1907, the supply of canned food to the Russian army was abolished due to poor product quality.

And yet such real changes in the provision of canned soldiers' dry rations began to occur in the early twentieth century. The experience of the Russo-Japanese War has shown that in the conditions of the participation of large armies in the war, it was impossible to provide soldiers with meat by the methods fully justified in the past centuries. And if the supply of cereals, crackers, flour from the quartermaster's warehouses is possible, it is impossible to create stocks of meat and quickly spoiled products for the army in the warehouses.

Undoubtedly, the Order of the Military Department No. 571 of 1907, which put into effect the "Instructions for the use and storage in the troops of canned meat of the Quartermaster's Procurement" was issued in order to solve this problem in wartime. Supply of canned meat in wartime was introduced on January 1, 1908 [1].

However, in principle, except for the introduction of canned food, and a can of 340 g of canned meat officially covered all daily meat needs, nothing in the diet has changed: the same crackers - 1539 g in wartime and 819 g - in peacetime, the bank of canned meat (stewed essentially), sometimes other types and about 200 g of cereal. Tea and sugar were not always given, these products the soldier had to buy on their own for the so-called tea money [1, 11].

In the workers 'and peasants' Red Army (WPR) by 1940, little had changed for the better, moreover, for example, the meat portion was reduced. Now, if a can of canned food was handed out, it had to be divided into 2 people (if there was one soldier, the can was for two days), the meat could be replaced by fish.

At this time, the production of food concentrates is developing. Thus, in 1926, according to the instructions of the Main Sanitary Department of the

Red Army, the first concentrates for the army were produced. In the thirties, intensive research and experimental work on the preparation of recipes and various technologies for the production of concentrates started. And in 1932 the first research shop for the production of concentrates at the Moscow food factory was put into operation. Later the production of concentrates was organized in other cities, including Odessa [8]. Despite this, in principle, until 1940 in WPR dry rations as such was absent. In field conditions, they sought to adhere to daily dietary norms. Everything changed in 1940 as a result of the "winter war".

The need to introduce individual dry rations in the army was dictated by the Finnish war. Due to disruptions to the logistics, field kitchens could not always be deployed in close proximity to the fighting order, which had a negative effect on the combat effectiveness and political and moral condition of the personnel.

The problem of nutrition during the "winter war" was so significant that this issue was raised, among others, at a large meeting of the Central Committee of the CPSU (b), held on April 14-17, 1940 [16].

As a result of the meeting, the food service of the Red Army was tasked with introducing into the practice of food products that would have low weight and volume, could be stored long enough in any temperature conditions, did not require prior preparation and processing and had to be prepared quickly. They had to be based on various dry food concentrates in the form of briquettes. The following concentrates were developed and introduced into production: pea and pea-soy puree soup, pearl-barley soup with mushrooms, bean soup with vegetables, millet soup, vermicelli soup, borsch from dried vegetables, borsch from fresh vegetables, shchi from dried vegetables, shchi from fresh vegetables, buckwheat porridge, pearl-barley porridge, rice porridge, milk noodles, berry jelly [8].

Concentrates in the army's diet became important during the Great Patriotic War. During the war, the production of concentrates increased by 4.5 times compared to 1940. The army received more than 5 billion dishes in briquetted form, including 800 million briquettes of vegetable concentrates. However, basically mainly pea puree soup was consumed. Concentrate of this and other soups was produced in briquettes weighing 75, or in briquettes weighing 150 and 300 grams and millet porridge in 100 g briquettes. From briquettes of 75 g one portion of soup was prepared. Accordingly from briquettes of 150 and 300 g - two and four portions.

New norms of daily provision per person were developed by the Institute of the Academy

of Logistics and Supply. These norms were approved by the Resolution of the CPC of the USSR and the Central Committee of the CPSU (b)

No. 1357-551 SS of May 15, 1941 and the Order of the People's Commissar for Defense No. 208 of May 24, 1941 [15].

The new norm No. 1 introduced on June 1, 1941:

Food product	Hand out (gr.)	Breakfast (gr.)	Dinner (gr.)	Supper (gr.)
Dry rye bread	600	200	250	150
Sausage "Minska"	100	100	—	—
<i>or</i> smoke-dried roach	150	150	—	—
<i>or</i> salted herring	200	200	—	—
<i>or</i> smoke-dried fish filet	150	150	—	—
<i>or</i> rich brinsen cheese	150	150	—	—
Concentrate soup	75	—	75	—
Concentrate porridge	200	—	100	100
Sugar	35	20	—	15
Tea	2	1	—	1
Salt	10	not distributed		

The caloric content of this regular army ration, depending on the configuration, ranged from 3146 to 3292 kcal. By the way, the ration did not have any packaging, concentrates and sausage as well were just wrapped in paper. The weight of the rations was just over a kilogram.

In the post-war period in the Soviet Union, the emphasis in the field diet of soldiers was on canned food. In the armed forces of the USSR all-military dry rations, called "Standard" was used, it consisted of cans of canned meat 250 g each, two cans of "canned meat and vegetables" (i.e. buckwheat, pearl or rice porridge with meat) 265 g each, packing of brown dry bread, tea bags and lots of sugar. It was called "Standard" No. 1. There were several types (standards) of rations, the composition of which was calculated depending on the physical activity of soldiers of certain units, including canned fish, concentrated milk. They were simply called "officer", "special forces", and officially Etalon No. 2, No. 3 and so on [18].

The caloric content of all-military rations ranged from 3100 to 3350 kcal.

Since 1985, the troops began to receive dry rations "Mountain Experimental" of two types: "Summer" and "Winter". This dry ration differed

from the previous ones for the better and was considered one of the most "nutritious" - additionally it included chocolate and lard. The set of products from this rations was balanced basing on the conditions of the highlands.

The last changes in the composition of the Soviet all-military dry ration were made in 1990 by the Order of the Minister of Defense No. 445 (Table 1). Concentrated milk, juice and tea bags were added to the new diet [10].

The caloric content of this military ration was 3125 kcal.

Since 1991, since the independence of Ukraine, the Ukrainian army has been using dry rations by the norm No. 10 to supply personnel in conditions of outrunning supply. The norm No. 10 is a daily set of dry products (dry rations), which is strictly unified and equipped with concentrates and canned food and is very similar to the Soviet-style dry ration (Table 2).

The energy value of dry rations No. 10 is 3800 kcal.

A significant disadvantage of feeding the military with dry rations No. 10 is the monotony and lack of hot food, which has a negative impact on the health of servicemen.

СУХОЙ ПАЕК			
ЭТАЛОН № 1			
Состав пайка в г			
ЗАВТРАК:		ОБЕД:	
Галеты (сухари)	— 100	Галеты (сухари)	— 100
Консервы мясные	— 250	Консервы	
Сахар	— 45	мясорастительные	— 265
Чай	— 1	Сахар	— 45
УЖИН:			
Галеты (сухари)	— 100		
Консервы			
мясорастительные	— 265		
Сахар	— 45		
Чай	— 1		
К пайку дополнительно выдается: хлеба пшеничного 1 сорта 400 г или сухарей 300 г			
Зак. 5411-74 г.			

Composition of all-army rations of 1974, artofwar.ru

In 2014-2015, the urgent task was to improve the outdated, Soviet-type dry ration, creating a more nutritious and tasty, as well as more convenient for

use in combat, as the composition of the Soviet ration did not meet the requirements for increasing mobility of modern war.

Table 1

Composition of soviet combined arms dry rations of the year 1990

1. Hardtacks «Artek»/Bread	270-300/500 g
2. Canned meat	450 g
3. Meat and cereal canned foods	250-265 g
4. Concentrated milk	110 g
5. Fruit juice	140 g
6. Sugar	60 g
7. Tea (tea bags)	3 packs.
8. Hygienic napkins	3 pieces

Norm No. 10 – daily set of dry products

Name of product	Daily amount for 1 person, grams
Hardtacks from wheat flour	300
Canned meat (of high grade, for breakfast)	325
Canned meat (chopped liver)	100
Meat and cereal canned foods (cooked cereal with meat, assorted)	650
Honey	40
Sugar	90
Instant coffee	2
Black tea	4
Paper napkins, pieces	3
Hygienic napkins, pieces	3

Since 2017, a daily field set of products has been adopted to support the Armed Forces of Ukraine - norm No. 15 (Table 3). This norm consists of 14 different variants of rations in a retort package, which provides a portion of breakfast, lunch and dinner and additionally, bottled water – 0.5 liter [7].

Norms No. 10 and No. 15 are provided by the Resolution of the Cabinet of Ministers of Ukraine of March 29, 2002 No. 426 “On food norms for servicemen of the Armed Forces of Ukraine and other military formations and members of the rank and file, civil defense bodies and units of the State Service for Special Communications and information protection” (as amended) [14].

This set of products is an improved alternative to rations of No. 10. The advantage of the norm No. 15 is primarily determined by ready-to-eat first and second courses and a new lighter, compared to tin cans, packaging – retort package, which can store ready-made first and second courses. Norm No. 15 contains a device for heating food, napkins and disposable spoons and forks.

In addition, there is an enhanced version of the norm No. 15 for JFO participants in which the following are added to the norm: 30 g of dried fruit (assorted), 35 g of dark chocolate (cocoa not less than 56%), one chewing gum, one flameless food

heater – to prepare breakfast; one chewing gum, one flameless food heater – to prepare lunch; 200 g of ready-to-eat meat dish (beef stew, unsorted pork stew) in a retort package, one chewing gum, one flameless food heater, 2 g of instant coffee, 10 g of sugar – to prepare dinner.

In the norm No. 15 the caloric content of the daily field set of products is 3500 calories. In the enhanced version of the norm No. 15 for JFO participants directly involved in hostilities, the caloric content is increased by 600 kcal and is 4100 kcal.

It should be noted that the energy value (caloric content) of dry rations until recently was calculated without taking into account the actual energy costs of servicemen in performing their assigned tasks.

This problem still remains unresolved and needs thorough research [4]. First of all, it is necessary to determine the real daily energy expenditure of servicemen in different modes of selection, training, preparation and execution of the mission. It should be noted that at this time we have already taken the first steps in resolving this issue [5, 9]. Research continues in this direction. Based on the obtained data, appropriate recommendations will be developed for nutrition, which will ensure the metabolic requirements and energy balance of the body of servicemen when performing tasks away from the bases.

In this case, to ensure the optimal functioning of the body of servicemen in conditions of extremely high physical and emotional load in their diet, you need to calculate not only the caloric content, but also many other parameters. All products must be easy to digest, have a high degree of readiness, do not cause allergies and provide nutrition in

accordance with the requirements of the diet. At present, many countries are developing a mobile system of military nutrition, in which an important place is occupied by the issue of a new approach to food rationing based on the creation of rations in industrial conditions that can provide servicemen with food as ready to eat.

Table 3

Norm No. 15 – daily field set of products

Name of product	Ration of breakfast/lunch, grams	Ration of dinner, grams	Daily amount for 1 person, grams
Hardtacks from wheat flour	50/50	50	150
Dry bread from wheat flour or peeled rye flour	0/50	50	100
Ready-to-eat first course (borshch with meat or soup with meat, assorted) in retort package		500	500
Ready-to-eat second course (cereal with meat or vegetables with meat, assorted) in retort package	350/350	350	1050
Instant coffee	2/0		2
Tea	0/2	2	4
Sugar	10/10	10	30
Honey	0/20		20
Fruit jam (assorted)		20	20
Black powdered pepper		0,3	0,3
Salt	1/1	1	3
Disposable plastic spoon, number	1/1	1	3
Paper napkins, pieces	1/1	1	3
Wet hygienic napkins, pieces	1/1	1	3

CONCLUSION

1. The evolution of "dry soldering" for several centuries has taken place depending on the development of the food industry: from dry products that do not spoil for a long time (rusks, cereals, dried meat, dried fish), and dry food concentrates and canned food ready to eat first and other dishes.

2. The caloric content of dry rations from the middle of the twentieth century ranged from 3100 kcal to 3350 kcal. In the modern Ukrainian army – from 3500 kcal to 3800 kcal and only for participants of OOS - 4100.

3. Until recently, the energy value (caloric content) of dry rations was calculated without taking

into account the actual energy costs of servicemen when performing their assigned tasks.

4. Further research on the improvement of food standards for servicemen should be aimed, first of all, at establishing the real energy consumption of servicemen in the performance of their assigned tasks, including combat. The evolution of "dry soldering" for several centuries has taken place depending on the development of the food industry: from dry products that do not spoil for a long time (rusks, cereals, dried meat, dried fish), and dry food concentrates and canned food to ready to eat first and second dishes.

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