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Epidemiology

Group food rations in military nutrition in field conditions and in the nutrition of civilians and rescue services in crisis situation

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Summary:

This work presents the current system of the nutrition of Polish soldiers in field conditions as well as civilians and rescue teams in crisis situations using group food rations. Group food rations are characterized both in respect of energy and nutritional value and in respect of their assortment and packaging. Main strands of research of the Military Research and Deployment Center for Food Services are presented, which are aimed at modernizing group food rations, taking into consideration both factors resulting from the training process and the nature of service, food requirements of soldiers as well as contemporary trends in packaging, preparation and the possibilities of heat processing.

Key words: Group food rations, nutrition in crisis situations.

Introduction

Due to the nature of their service and work, professional soldiers should be considered a unique professional group. Soldiers' nutrition depends on their location and environmental conditions. With regard to the place of task performance, one can differentiate between stationary and field conditions. Preparing meals in stationary conditions is related to the use of kitchen and canteen facilities in separate and purpose-built buildings, while preparing meals in field conditions depends on the use of specialist kitchen equipment set within a specially separated space. The nature of field conditions determines the need for introducing a special system of the nutrition of soldiers stationed in such conditions. In order to provide correct nutrition for soldiers in field conditions, group food rations "PS-ląd" designated for the Land Army and "PS-m" for the Navy are used [1,2,3].

Group food rations currently used for the nutrition of soldiers in field conditions

Group food rations are composed of a range of food products located in one package (a waterproof carton box), which contains 5 or 10 daily rations (Fig. 1).

A daily ration is a set amount of food products designed to provide nutrition for one soldier (sailor) during one day. A daily ration should comprise food products enabling the preparation of the following meals: breakfast, dinner, supper in land forces ("PS-ląd") and a night meal on ships ("PS-m"). The ration also includes

a pack of accessories required to prepare and consume meals.

Figure 1: PS-Ląd-5 Group food rations

1 – canned meat or poultry; 2 – canned meat and vegetables; 3 – thickened soup with meat; 5 – pack of accessories; 10 – juice concentrate.

In the Polish Army, depending on the food products used in the rations, 8 different sets of rations, varying in the assortment, are used, along with 7 sets of the "PS-m" rations. The energy value of each set of the "PS-ląd" rations ranges from 4,000 to 4,500 kcal; this figure for the "PS-m" rations ranges from 4,000 to 5,000 kcal. [1,2].

In each set of group food rations the breakfast is composed of canned meat (two varieties) or optionally canned meat and poultry or canned fish and processed cheese, honey or jam, durable bread or roasted grain beverage extract along with sugar in the amount which enables brewing 500 ml of a beverage.

The dinner includes thickened soup with meat, canned vegetables with meat, canned vegetables, instant groats or instant rice, pasta, dehydrated cooked potatoes, juice concentrate and durable bread.

The supper set includes canned vegetables with meat, durable bread, teabags and sugar; the "PS-ląd" ration additionally includes jam.
The nightshift meal contained in the "PS-m" ration includes chocolate and honey. The pack of accessories included in all the rations comprises natural coffee extract, sugar, hardtacks, chewing gum, candy with natural coffee extract and a napkin.

Durable bread is double foil wrapped, which provides a barrier against steam and protection against mold, and is distributed separately from the set. Such bread can be eaten hot (by removing one of the foils and placing it in a microwave oven for 4 minutes; or placing in boiling water for half an hour) or cold.

Group ration meals are prepared in field kitchens. Products included in the group food rations should meet the requirements specified in the defense norms (NO) and Polish norms (PN). Mostly they are highly-processed products in packaging which guarantees protection against external factors and provides a barrier against steam and oxygen; they are highly mechanically resistant. Canned meat (preserved as a result of the sterilization process), poultry, fish, processed cheese, thickened soups, vegetables with meat, and juice concentrates are packed in cans made of sheet steel. Other products' packaging is made of polyethylene foil or laminated foils.

Group food rations should be stored in temperatures from 4°C to 20°C; storage in 25°C is permitted, but its duration must not exceed 30 days in a year. The minimum shelf life of rations is 21 months [1,2].

Directions for the development of group food rations

Research is currently being carried out at the Polish Army's Military Research and Deployment Center for Food Services on the modernization of group food rations. It is a major challenge for the food service, both in terms of food products and packaging materials used in completing food rations.

According to the preliminary tactical and technical objectives (WZTT), the future "PS" group food ration will aim to provide complete, all-day nutrition for a group of soldiers, with the assumption that it will not be used for more than 30 consecutive days. Based on the studies of the energy expenditure of soldiers of various types of forces and services, it was assumed that the energy value of a ration composed of three meals should not be less than 4,500 kcal [4,5,6]. The ration should be composed in such a way that the percentage of energy coming from protein is not less than 10% of the entire ration, and the percentage of energy coming from fat should be within the 35%–40% range. [1,2].
The content of vitamin and minerals should be compliant with the norms of the recommended daily intake [7].

It is assumed that the ration will be packed as separate breakfast, dinner and supper sets

comprising 20 meals. In order to provide variation in nutrition in the period of minimum 5 days, the sets will be available in at least 5 assortment variations. In addition, every set will comprise at least two basic dishes and a wide range of extras, such as fruit, vegetables, desserts and condiments, which will give consumers the opportunity to choose and arrange the optimal meal for them.

In order to diversify the assortment of soldier nutrition, there is a possibility of including desserts (creams, cookies), canned fruit, mueslitype breakfast cereals and processed cheeses in the food rations. It is crucial to include xylitol-sweetened chewing gum in the rations; xylitol has anti-caries and disinfectant qualities. Due to the fact that the Polish rations hitherto did not encompass this kind of products, it is necessary to draw on the experiences of the armies of the USA, France, Belgium or Norway.

It is assumed that the "PS" group ration should have a shelf life of at least 24 months when stored in temperatures from 4°C to 25°C. Packaging has an immense impact on the durability of products. Therefore, it is assumed that the currently used steel sheet packaging will be replaced by aluminum and plastics. Products such as canned meat and vegetables, starch additives (rice and groats, pasta), vegetables and canned fruit will be packed in hermetically closed plastic trays containing 10–20 servings of a dish, while canned meat, fish, processed cheese and desserts — in one-serving aluminum cans.

In compliance with the current international trends in food packaging, it is assumed that multi-layer high-barrier foils will be used for packaging of soups and juice concentrates. The advantages of this type of packaging include its light weight and greater resistance to external conditions, especially air humidity. In addition, this kind of packaging displays high barrier characteristics in relation to gases (oxygen, carbon dioxide, steam), UV radiation, while also having very good mechanical qualities. Another advantage is the possibility of making a side cut facilitating opening ("easy open"). Foil packaging also makes it possible to use attractive labeling, which raises the aesthetical value of food rations and has a positive impact on limiting the food monotony.

It is assumed that single packaging used for products included in the rations will make it possible to heat up meals in field kitchens and will enable consumer self-service with a minimum involvement of catering staff.

Apart from the food, the sets will also include non-food products, such as napkins, cutlery and single-use dishes (trays) in a quantity required to consume the entire assortment of dishes included in the sets.

With regard to the non-food items envisaged to be placed in the rations, intensive research is being carried out on adapting chemical heaters to group rations. The use of such heaters is perceived as an alternative for field kitchens, which are troublesome during the relocation of troops.

As a result of an already initiated procedure of modifying group food rations, soldiers carrying out tasks in field conditions will gain the opportunity to take advantage of meals of the highest available standard.

Field equipment used for the preparation of meals based on group food rations.

Apart from the food, field kitchen equipment is also part of the food supply means. Food supply comprises a range of activities related to establishing the needs, collecting and maintaining the stocks of food, their continuous replacement and meal preparation. The aim of food supply is providing soldiers with meals at the right time, with the right energy and nutrition value.

The preparation of meals in field conditions takes place in separated food points designated also for the storage of food stocks. They are organized usually for 300–400 people. The equipment of a food point includes usually 3–4 field kitchens, water tanks for water transport and storage, as well as a stock of food products stored on cars (Fig. 2, 3, 4).

Meals are distributed directly at food points or in designated places where the soldiers are stationed. The safety of food and water is provided thanks to hermetization of equipment used for meal storage and preparation.

Figure 3: Field kitchen for the preparation of a two-course meal

Equipment for water transport and storage

Water tanks with a capacity ranging from 3.5 to 15 m^3 are used for the acquisition, distribution, transport and short-term storage of drinking water in field conditions. Water tanks are made of acid-resistant steel sheet. Three ways of filling up the tank are used: gravitational, with a built-in engine-driven pump or with an external engine-driven pump. The equipment includes a mechanical car engine-driven pump, a hand pump and a heater for the distribution hub, such as Sirocco or Vebasto. Water tanks may be transported by road, rail, sea or air. Water tanks can be also used for extinguishing fires as they are fitted with a water nozzle.

Figure 4: Water tank for transporting up to 10 m^3 of water.

Long-term water storage equipment is designed for the storage and distribution of water for consumption and sanitary purposes. Thanks to a large total capacity of two tanks with a total capacity of 56 m^3 (2x28 m^3) it is possible to accumulate a stock of drinking water in areas where its availability is limited. A water pump with a capacity of 24 m^3/h is used for its acquisition and distribution. In addition, individual modules, depending on the needs, may be combined into one storage facility.

Figure 2: Water wagon with a capacity of 1,000 dm^3.

The equipment includes:

- A Vebasto heater with elements of the tank's heat isolation,
- A range of summer and winter hoses (electric heating),
- An engine-generator including a lighting installation,
- A wagon for transport.

Water tanks may be transported by road, rail, sea or air.

Conclusions

Taking into account the group food rations currently used in the Polish Army, and also the research and development carried out by the Military Research and Deployment Center for Food Services, in relevance to the performed tasks and the conditions of proving ground training, it should be concluded that the standards of the nutrition of Polish soldiers are not dissimilar to those adopted in other NATO armies. It should be emphasized that group food rations may be used not only for the nutrition of soldiers in proving ground conditions, but also to provide food for civilians and rescue services in the event of a natural disaster or other crisis situations.

References:

1. Defense Standard NO-89-A204:2010 – "PS-ląd" group food ration. Decision No. 169 of the Minister of National Defense of 10 May 2010 on the approval and implementation of standards relating to state defense and security The Official Journal of the Ministry of National Defense No. 10, item 110.
2. Defense Standard NO-89-A205:2010 – "PS-m" group food ration. Decision No. 169 of the Minister of National Defense of 10 May 2010 on the approval and implementation of standards relating to state defense and security The Official Journal of the Ministry of National Defense No. 10, item 110.
3. An ordinance of the Minister of National Defense of 11 December 2009 on free meals for professional soldiers and candidates for professional soldiers. Official Journal of 21 December 2009, item 1679.
4. Bertrandt J, Kłos A: Wydatek energetyczny podstawą planowania żywienia w Wojsku Polskim. Żywienie Człowieka i Metabolizm 2001; 28(Supl 1): 185-91.
5. Bertrandt J, Łakomy R, Kłos A: Dobowy wydatek energetyczny żołnierzy wojsk chemicznych podczas szkolenia na poligonie. Lek. Wojsk. 2012; 90(1): 16-9.
6. Kłos A, Bertrandt J, Bieniek R et al.: Ocena wydatku energetycznego i stanu odżywienia kadry WP w skokach spadochronowych. Postępy Medycyny Lotniczej, 2006; 13(2):183-9.
7. Jarosz M, Bułhak-Jachymczyk B: Normy Żywienia Człowieka. Podstawy prewencji otyłości i chorób niezakaźnych. IŻŻ, PZWL, Warszawa ,2008.