

New Packaged Food Rations in the Armed Forces of the Czech Republic

Nouvelles rations alimentaires conditionnées au sein des forces armées de la République tchèque

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Abstract

In cases when it is not possible to supply soldiers with fresh and thermally processed food, it is necessary to use a system of packaged food rations (PFRs). Current PFRs in the Army of the Czech Republic (ACR) are no more suitable both energetically and with respect to logistics. New PFRs consist of separate packages for individual daily meals and include a dehydrated ration with lower package weight as well. New PFRs also involve special rations with a higher energy value, or rations intended for Special Forces. New PFRs can be randomly combined and in addition to the ACR, they are applicable to catering the civilian population in emergency situations.

Key words: Packaged food rations, the Army of the Czech Republic (ACR), food packages, catering provision in field conditions.

Résumé

Lorsqu'il n'est pas possible de distribuer aux soldats des aliments frais et soumis à un procédé thermique, il est nécessaire d'utiliser un système de rations alimentaires conditionnées. Les rations alimentaires conditionnées utilisées actuellement par l'armée de la République tchèque ne sont plus adaptées, tant du point de vue énergétique sur le plan de la logistique. Les nouvelles rations consistent en des emballages séparés pour les repas quotidiens individuels et comprennent une ration déshydratée dont le poids de l'emballage est moindre. Les nouvelles rations comportent également des rations spéciales ayant une valeur énergétique plus élevée, ou des rations destinées aux forces spéciales. Les nouvelles rations peuvent être combinées de manière aléatoire et, en plus de l'Armée, elles sont utilisables pour le ravitaillement de la population civile dans les situations d'urgence.

Mots clés : Rations alimentaires conditionnées, Armée de la République tchèque, emballages alimentaires, approvisionnement en restauration dans des conditions de terrain.

Introduction

Members of the Armed Forces are a specific group of people in which in many cases high physical and mental fitness and combat readiness, even in extreme conditions are required. Nutrition plays an important role in maintaining good health, therefore optimization of nutritional status is considered as an important condition for the full performance of the specific occupation of military professionals (1,2,3).

Nutritionally balanced diet of troops has a direct impact on the health status, physical and mental readiness for performing demanding military tasks and it is a basic prerequisite for creating functional and combat-capable armed forces. In cases where it

is not possible to supply soldiers with fresh and thermally processed food from field or stationary kitchens, a system of packaged food rations has to be used. A packaged food ration (PFR) is thus defined as a package of non-perishable food intended for immediate consumption in a cold or heated state (4,5).

Since 2002, combat food rations have been introduced in the Army of the Czech Republic (ACR). These packaged food rations correspond in composition and nature to individual combat food rations according to STANAG 2937 MED. Despite extending the number of variants of current Czech PFRs, this is the form of packaged food rations that has been in use for almost twenty years. The existing PFRs are no longer satisfactory both energetically and biologically. Nowadays, there are also different requirements concerning logistics, expiry date or ration packaging in a modern military.

Requirements for new packaged food rations

STANAG 2937 is an agreement that specifies the requirements of operational rations for military use. This document provides a legislative framework for standardizing nutritional values of combat food rations (6). The project, managed by the Logistics Agency of the Ministry of Defence, responds to the current needs of troops to provide meals for individuals when a stationary or a field kitchen is not available. The design of new packaged food rations is intended to improve the existing PFRs supplied to the ACR and to expand their variety. The main change in newly designed PFRs is a practical division into several packages according to individual daily meals. This eliminates the impractical packaging in one large bulky paper box. Another requirement was introduction of a

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flameless heater for heating Ready-to-Eat rations and reduction of the batch weight while maintaining all evaluated indicators. The new PFR concept reflects requirements of the NATO standardisation document. The modularity of rations allows to satisfy also individuals with food intolerances. The requirement to extend the range, improve sensory and functional properties while maintaining the energy and biological value of the ration has been taken into account. Newly designed PFRs will allow combinations of staple food rations to be tailored to the amount of energy output or to the troop type. The food ration has to be also applicable in every situation and environment. Extending the shelf life of the food in the packaged ration is also important. A recommended adequate nutrient composition of rations will ensure the energy needs of individuals or groups, given the requirements of troops and the evolution of the combat situation (7,8,9). The safety and quality of individual food components have been tested in laboratories of the Military Veterinary Institute. Foods and food supplements were included in PFRs based on current medical recommendations and in accordance with expert opinions of the Czech Nutrition Society.

Packaged food rations - characteristics

Packaged food rations are designed as a customizable assembly of different basic rations, supplements and packages. The system consists of the following elements:

- packaged food ration - individual, basic version, consisting of separate packages of breakfast, lunch and dinner with the energy and biological value of the basic dietary allowance according to the Decree No. 266/1999 Coll.;
- packaged food ration - individual, dehydrated version, consisting of separate packages of breakfast, lunch and dinner with the energy and biological value of the basic dietary allowance according to the relevant Decree;
- food supplements 'C' and 'D' - intended to cover the 'C' and 'D' food supplements in accordance with the relevant Decree. Food supplement C is issued for particularly arduous service and food supplement D is issued for continuous military training;
- supplementary packages - air and air-borne, intended to cover the differ-

ences in energy and nutritional values of the basic ration and the ration for airmen and paratroopers in accordance with the Decree No. 266/1999 Coll. These snack packs will expand the offer to 5 meals a day and thus increase the energy value of PFRs (10).

For the time being, the current number of rations includes 6 types of breakfast, 6 types of lunch and 6 types of dinner. Of these, three food rations are made up of dehydrated ingredients (PFR 6). Thus, these are packaging variants of PFR 1 - PFR 6. **Tables 1-3** show the composition of PFR 1. The selection and consumption will be possible in a combined way, with several dozen combinations. The size of the bags according to different types of PFRs is from 270x350 mm up. The weight of basic PFRs

(variants 1-5) is from 1,400 g up. The weight of dehydrated PFRs (variant 6) is less than 1,000 g. The additional types of PFRs have a weight in the range of 130-270 g depending on the composition of individual rations. The energy value of each PFR variant is approximately 13 700 kJ. This is the energy value and weight for the whole day (breakfast, lunch, dinner packages).

The individual packaged food ration consists of three packages - breakfast, lunch, dinner, in all variants. It is thus designed to provide food for soldiers for 24 hours a day if they cannot be provided with hot meals. Food supplements C and D are intended to supplement PFRs in more challenging conditions. The air and airborne packages are intended for consumption by the troop specialties listed (**Tables 4, 5**).

Table 1. PFR 1, Breakfast.

PFR 1				
BREAKFAST - B1				
Component content	Weight (g)	Energy value		
		100g (kJ)	product (kJ)	product (kcal)
Graham cracker crust	70	1 417	992	237
Tuna salad	120	773	928	222
Snack biscuit	24	1 890	454	108
Fruit jam	40	992	397	95
Chocolates	25	2 296	574	137
Instant drink	40	1 560	624	149
Coffee	2	0	0	0
Tea	1,5	0	0	0
Sugar	8	1 680	134	32
In total	330,5		4 103	980

Table 2. PFR 1, Lunch.

PFR 1				
LUNCH - L1				
Component content	Weight (g)	Energy value		
		100g (kJ)	product (kJ)	product (kcal)
Chicken, sweet and sour sauce, rice	340	711	2 417	578
Vegetable salad	210	340	714	171
Dessert	40	1 705	682	163
Chocolates	35	2 296	804	192
Chewing gum	2,8	1 010	28	7
Instant fruit drink	40	1 680	675	161
Coffee	2	0	0	0
Sugar	8	1 680	134	32
Salt	2	0	0	0
In total	679,8		5 454	1 304

Table 3. PFR 1, Dinner.

PFR 1				
DINNER – D1				
Component content	Weight (g)	Energy value		
		100g (kJ)	product (kJ)	product (kcal)
Meat balls, tomato sauce, pasta	340	675	2 295	548
Instant soup	35	1 564	547	131
Graham cracker crust	70	1 417	992	237
Snack biscuit	24	1 809	434	104
Isotonic drink	10	1 474	147	35
Chewing gum	2,8	1 010	28	7
Tea	1,5	0	0	0
Sugar	8	1 680	134	32
Salt	2	0	0	0
In total	493,3		4 577	1094

In general, the basic food ration is intended for the daily troop regimen. That means mainly stationary operations at a fixed location (base, field camp) and short movements for one or two days with a small load (up to

15 kg). The food ration, supplemented with food supplements and diet extensions, is then designed for high physical activity of the military unit. It concerns longer troop movements of 4-6 days with a load of 20 kg

or more in a moderate or difficult terrain, mountainous terrain, out of contact with their own forces, e.g. airborne unit (11,12). Ready-made sterilized meals form the main part of food packages, both nutritionally and in terms of weight. It is a combination of a basic meal with a side dish. These meals are included in every lunch package and every dinner package. Ready-to-Eat dehydrated meals contain a dehydrated mixture for meal preparation. Their weight is thus significantly reduced. The flameless ration heater (with instructions for use) is a self-contained exothermic chemical heater that is water activated and used for heating ready-made food.

The minimum shelf life of PFRs is 27 months from the receipt date from the manufacturer. PFRs are designed for temperate climates and are resistant to common climatic and environmental influences such as dust, vibrations, moderate atmospheric pressure and atmospheric shock wave. The PFR marking is in Czech and English. Individual components of the rations are packed separately, the whole type is packed in three separate bags marked B - Breakfast, L - Lunch, D - Dinner with numerical differentiation and marking of the content according to the main component of the meal in the package. Rations can be consumed cold, sterilized ready-made meals are recommended to be reheated. Individual components of the ration can be opened without using any tools (13).

Benefits of new food rations

The main advantages of newly designed PFRs are a greater variety of main meals, dehydrated meals with lower pack weight and packaging of all-day PFRs into smaller individual units to better meet consumer needs. Dividing the daily rations into several packages will allow for individual selection of the foods offered according to the type of training or current climatic conditions. The individual food packaging in strength transparent bags is suitable in the form of non-vacuum packaging, where the enclosed air creates a space in the package, protecting the contents mechanically. The enclosure of components constituting one type of food in a single bag appears to be advantageous from the point of view of practical use. Individual packages are also much more storable and allow the user to store them better.

From the food rations designed, meals can be provided for any length of time. The

Table 4. PFR, Air food supplement.

PFR, P-Air				
AIR PACK - P-AIR				
Component content	Weight (g)	Energy value		
		100g (kJ)	product (kJ)	product (kcal)
Graham cracker crust	35	1 417	496	119
Pork pate	60	1 269	761	182
Dehydrated fruit/vegetable	20	1 036	207	50
Protein bar	20	1 772	354	85
Chocolates	25	2 296	574	137
Isotonic drink	10	1 474	147	35
Chewing gum	2,8	1 010	28	7
In total	172,8		2 567	615

Table 5. PFR, Parachute food supplement

PFR, P-Par				
PARACHUTE PACK - P-PAR				
Component content	Weight (g)	Energy value		
		100g (kJ)	product (kJ)	product (kcal)
Protein bar	60	1 772	1 063	254
Energy gel	35	1 180	413	99
Isotonic drink	10	1 474	147	35
Chewing gum	2,8	1 010	28	7
In total	107,8		1 651	395

composition of PFR and its nutritional values correspond to the needs of the human body exposed to excessive physical load. A great advantage of newly designed PFRs is the fact that they can be combined to form combinations, thus guaranteeing dietary variety.

Food rations are characterized by their simple preparation before use. It is also important that the proposed food rations respect domestic eating habits and contain mostly typical Czech meals. The labelling of the ration packaging is multilingual, including pictograms for use on international missions or for foreign humanitarian purposes, taking into account cultural eating patterns of the local population. The chemical heating system allows safe heating with a special heater. The barrier properties of the packaging ensure the practical durability of food while performing military tasks.

Discussion and conclusion

Ready-made meals are the main food component of PFRs in NATO armies, including the ACR. New PFRs in the ACR are characterized by their versatility of use and thus their application is not limited to troops in combat situations. Their use can also be applied in the civilian sector during emergencies and natural disasters for emergency survival of the population.

The composition of PFRs allows them to respond to rapid changes of the environment and to be adaptable to specific requirements of the situation. The nutritional value of food rations is adapted to the expected energy expenditure of the individual. PFRs are also responsive to the seasons, physical load and stress situations, which requires making up food rations from a variety of durable ingredients. Primarily, PFRs are intended for field training, deployment in foreign operations, combat readiness, or temporary feeding during crisis situations. The individual parts of PFRs, by their composition, provide energy intake for a minimum of 4 hours and can thus be used to feed other force components operating beyond 4 hours out of food service. For the needs of the Special Purpose Forces, a dehydrated ration is prepared, where the main advantage is its reduced weight.

PFRs can also be used in humanitarian actions or for dealing with natural disaster situations. A typical example is emergency catering of the population in the period of time when an emergency occurs until alter-

native catering is arranged. PFRs can thus support population with limited access to daily hot meals or provide meals when kitchens and other facilities for preparing hot meals fail. The civilian population may be provided with emergency food in cases where there is a need to ensure their survival due to the reasons such as natural disasters, cut-off from standard food supply routes or in cases of contamination of commonly available foodstuffs.

The design of new PFRs meets the energy requirements of the relevant national decree and at the same time corresponds to current trends in rational nutrition and food hygiene. The composition of the proposed meals is sufficiently rich. Further development of PFRs will depend on the feedback from users of food rations, economic possibilities of the Ministry of Defence and the development of modern food technology. Further development of newly designed PFRs for the needs of the ACR should be focused on expanding the range, improving sensory and functional properties while maintaining the energy and biological values of the food ration.

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Conflict of interests

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