CZECH ARMY COMBAT RATIONS, RECOMMENDATIONS FOR THE FUTURE

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Abstract: *The article deals with the combat rations used in the Army of the Czech Republic to ensure the feeding of soldiers in field training. The author describes the division according to the STANAG 2937 standard and points to the problem arising from the storage of combat rations under extreme climatic conditions. In these conditions, microbiological, chemical and biochemical changes occur on some food components. For this reason, the article describes and suggests some changes in the composition of combat rations, depending on the area of possible deployment of Czech army forces.*

Key words: combat ratoin, eating in field.

INTRODUCTION

The day-to-day supply of soldiers in the field is challenging, requiring a complex organization and the use of considerable resources. In some cases, it is not possible to eat in the field warm meals three times a day. For this reason, modern armies working on the development and introduction of food for soldiers who can not be provided with a hot meal. These rations are generally called combat rations. The attention paid to the development of combat rations is evidenced, in particular, by the long period of their use, the increasing number of variants and the change of individual components of combat rations. The basis of the combat rations is food that can be consumed without complicated preparation after warming or in some cases in the cold state. The basic requirements for combat rations are quality, long shelf life and country specific food according to the standard and customs of the country. Combat rations are specifically designed for the armed forces but can also be used in the civilian sector for people affected by humanitarian or natural disasters.

Most NATO armies have combat rations. The rations are intended for use in various combat situations and climatic conditions. Because of this, they may have a different composition and nutritional value. Standardization Agreement STANAG 2937 recommends that rations for individuals include pre-prepared dishes as the main food component, which can be consumed without the addition of water, preparation or mixing and, if necessary, also without heating. The shelf life of the prepared dishes should be at least 2 years at ambient temperature and at least 6 months at 40 ° C. [1]

Food for of czech soldiers are regulated by the Decree of the Ministry of Defence No. 266 and No. 272/1999 Coll. and Decree of the Ministry of Defence no. 105/2008 Coll., which stipulates diet doses and food supplements. In the decrees, both the energy and nutritional values of dietary meals per person per day and the average food composition are set. Each rations is determined by the energy value and by these nutritional factors: total protein, animal proteins, vegetable proteins, fats, linoleic acid, carbohydrates, calcium, phosphorus, iron, vitamins A, B1, B2, PP and vitamin C. [2]

1 DIVIDING COMBAT RATIONS DUE THE STANAG 2937

The issue of food rations is solved in STANAG 2937 - Survival Emergency and Individual Combat Rations - Values and Packing. The aim of the standard is to standardize nutritional values and provide basic elements in the composition of each dose, thereby allowing the use of doses by soldiers of all NATO armies. According to STANAG 2937 the doses are divided:

1.1 Survival Ration

The survival dose is intended for those who need to stay alive with minimal energy and limited drinking water. Emphasis is placed on the small volume of the dose. Dose requirements are 100g carbohydrates, especially glucose and oligo or polysaccharides that are formed by glucose. The minimum supply of drinking water contained in this dose is different depending on ambient temperature, for cold and mild environments it is 500 ml and for a warm environment it is 2000 ml. [1]

1.2 Emergency Ration

Nutrition dose calculated to ensure the operational capabilities of military personnel for a short period of time (at least 24 hours). The main determination of the emergency dose is to maintain the soldier's operational capabilities for a short period of time in case of interruption of regular food supply. When choosing a batch formulation, the drinking water availability is free. The emergency dose should consist of concentrated foods with a minimum energy value of 1000 kcal. Required energy should be ensured from 40-70% carbohydrate, 20-40% fat and 10-20% protein. The dosage should be consumed without heating and adding water. At the same time, it should contain an instant drink. [1]

1.3 Individual Combat Ration

The basic requirement for an individual dose of food is to ensure complete and complete nutrition of the soldier for one day, taking into account the constant and strenuous physical and mental activity of the soldier. Individual ration should have the possibility of simple and rapid warming, but also cold consumption. Its packaging should be resistant to damage during transport, with low volume and weight. The dose should be designed for a maximum consumption time not exceeding thirty consecutive days. The minimum energy value of the dose must not fall below 13 400 kJ (ca. 3200 kcal). Energy intake must be at least 10% protected by proteins, of which at least a third of the animal origin should be present. Plant proteins should have the highest biological value. The minimum portion of the fat in the foods contained in the dose is 35%, but must not exceed 40% of their total energy value. The rest of the energy should be mainly carbohydrates. The composition of vitamins and minerals should correspond to the recommendation of the US Nutrition Board. The greatest amount of added vitamins and minerals should be most commonly consumed by most staff in food. Another ingredient that the batch must contain is a substitute for pastries. For the baking substitute, it is also necessary to add a suitable skim or spreads (salami, cheese, marmalade) to the food batch. For beverages, the instant drink should also be in the form of a tea or fruit drink. Eating main meals should be possible from the original package without any preparation or addition of water and in case of emergency also without heating. Dosage should be given if necessary to water tablets, but their inclusion in the batch is not necessary. A very important requirement is also their durability, which should not be less than two years in temperate climates. [1]

1.4 Requirements for packaging and additional equipments

If the packaging material requires special opening tools (can opener), it must also be included in the dose. The dose should also include a heater. The dose package must contain information on the type of dose, minimum durability and "NATO Approved". In addition, a table and instructions for preparation and consumption should be placed in the dose. All information must be written in the national language and both official languages of NATO. For emergency and survival doses, the packs must be watertight and durable and dust-proof for individual batches. The packages of individual components of all batches must also be watertight. [1]

2 COMBAT RATIONS IN THE CZECH ARMY

In the nineties of the last century, the Czech Army used food cans to keep food in the field. Due to changes in training management and the concept of modern combat, in 1996 began developing new combat rations in accordance with the standard STANAG 2937. The development was completed in 1998 and started the deployment of new combat rations into the Czech Army.

2.1 Combat ration

According to STANAG 2937, the new dose of food was designated as a combat ration of individual food for all-purpose use. Doses have been developed as a full-day one-day meal for individuals who can not deliver a standard meal. The result of this development was a combat ration that provides a nutrition with sufficient caloric and nutritional value.[3]

The development of the combat rations for the Czech army took place in two three-year stages. The first stage of the development was Combat ration I and II. The new doses corresponded to almost all the requirements of the Czech standards and the STANAG 2937 standard, except for the possibility of consuming combat rations for thirty consecutive days.

Two combat rations differing only from main meals did not provide sufficient food variability for long-term use.[3]

For this reason, the development of other combat rations variants was launched in 2008. Development and testing ultimately brought to the Czech army four new types – Combat rations IV, V, VI and VII. The newly developed doses differ not only from the main meal but from other ingredients (vegetable snack, fish spread, honey, etc.). The newly created doses have been delivered to the Czech army since 2010. [3]

Combat rations used in the ACR are fully compatible with the combat rations used by NATO armies. They are useful not only for the needs of the army but also for the needs of the components of the integrated rescue system.

Picture 1 Combat ration [6]

2.2 Combat ration – T

Existing combat rations supplied to the Czech army are intended for use in the Central European mild climate. When they are used in foreign missions, combat rations are often

stored in long-term non-refrigerated areas. Due to long-term exposure to extreme temperatures, the sensory properties of foods change, making them inedible.

For these reasons, research of new combat rations for extreme conditions was begun in 2011. The new combat ration should be divided into three separate meals, two of which allow for hot consumption. The composition, energy and nutrition value must be in accordance with STANAG 2937, with the possibility of using and storing in extreme climatic conditions. The new Combat rations -T should be created in seven variants and should replace the current Combat rations I-VII within five years of its development and introduction into the Czech army. Now the Combat rations – T are developed, but their introduction into Czech army not started yet.

Picture 2 Combat ration - T[7]

3 ADVERSE INFLUENCES OF COMBAT RATIONS

The soldiers of the Czech army are currently active in many foreign missions taking place in areas with extreme temperatures. It is common for temperatures to rise above 40 ° C and fall below freezing overnight. When transporting and storing o combat rations, undesirable changes to food components may occur due to extreme temperatures. These are primarily

microbiological, chemical, biochemical, physiological and organoleptic changes. For food components, for example, the following changes occur:

- the Maillard reaction complex;
- oxidation of lipids;
- carbohydrate changes.

All undesirable changes to food are happenig mostly during long-term storage at temperatures above 40 ° C. For elimination of these effect, is necessary to ensure the storage of combat rations in air-conditioned or tempered warehouses. Due to the current possibilities of storage and places of action of Czech soldiers, this requirement is often unrealistic. Therefore, efforts should be made to identify suitable foods and food supplements that can be stored with minimal risk of their deterioration due to high temperature.

Department of Logistics, University of Defense Brno and Faculty of Technology of Tomas Bata University in Zlin cooperate to test of the food, which could be used in areas with extremely high temperatures. During the cooperation, the actually solved tasks have been set.

- identifying possible food or food supplements;
- storage of food at temperatures above 40 ° C;
- analysis of transport and storage risks;
- critical combination of temperature and storage time;
- establishing storage requirements.

Reffiling of current combat rations with new components, possibly creating a new special combat ration for use at extreme temperatures, is a very complicated and time-consuming issue in our circumstances. This work must be based on a number of regulations and standards, namely:

- STANAG 2937 - Requirements of individual operational rations for military use;
- STANAG 2556 - Food Safety, Defense, and production in support of NATO operations;
- International and national legislation;
- EU Regulations;
- Czech laws and regulations/notices;
- Hazard Analysis and Critical Control Points;
- Food Safety Management systems.

4 RECOMMENDATIONS FOR FUTURE COMBAT RATIONS

There are several possible directions and approaches that we should take when completing and upgrading the combat rations. This is mainly the storage of main meals and accessories in light cans or polymer bags, the possibility of external heating or self-heating of food or use of dehydrated and instant foods. The microbiological stability and the very long shelf life of all foodstuffs are essential for at least 24 months.

For reffiling the combat rations with new foods, is possible to use for example dehydrated foods. Combat rations using dehydration are mainly used by the Nordic Armed Forces (Norway, Sweden and Finland). Finished dishes are made by dehydrating (drying) all food components and the dry mixture is packed in special weldable packages (sachets). The packaging also serves to heat the food after hot water using. The great advantage of these doses lies primarily in their weight, volume and longer shelf life. The disadvantage of dehydrated foods is the increased need for water that is needed to reconstruct dehydrated meals. A total of about 2.7 liters is needed, of which about 1.7 hot water.

Other components that can be added to combat rations should definitely include dried meat and sausages that make up for protein supplementation. Furthermore, energy or carbohydrate sticks, energy gels and grape sugar to provide energy. Last but not least, it is advisable to use dried or candied fruit for the supply of essential vitamins. All of these foods are immediately

consumable, no further heat treatment is required, and they are a source of energy and vitamin.

One of the other options for refining food for soldiers in the field can be instant soups and teas. Their addition does not significantly increase the energy or nutritional value but they are beneficial to the overall taste improvement of the combat ration. Instant soups do not have a large volume or weight and are a welcome addition to the main meal. The use of instant tea brings an advantage in the possibility of preparing the drink even with the use of cold water.

CONCLUSION

Cooperation on this very topical issue between the University of Defense Brno and Tomas Bata University of Zlin should lead to the selection of high-quality and safe food and food supplements that will be used for replenishment the combat rations for use in areas with extreme temperatures.

In all NATO member states there is ongoing development and research into the combat rations, the Czech army as a full NATO member can not be stay behind. Development and research depend on current needs of combat units and current trends in field catering. Due to its size and spectrum of ongoing combat operations, the US Army is considered to be the largest developer in the field of the combat rations. The development of combat rations is primarily driven by the use of new technologies in the production and storage of the combat rations, the use of self-heating bags for food preparation, the use of dehydrated foods and nutritional supplements such as energy sticks and gels, soluble drinks and dried meat.

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