

Symposium 1: Nutrition and Physical Activity

Combat rations and military performance – do soldiers on active service eat enough?

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Background - Defence food technology aims to provide an easy-to-prepare and palatable, nutritionally complete combat ration pack (CRP) which has minimal weight and volume and maximum shelf life under all climatic extremes. The nutritional aims are to identify the optimal nutrient mix to sustain the soldier in the face of operational stressors such as fatigue, intense physical activity, extreme climate and negative psychological factors and to encourage consumption.

Review - Two studies of CRP consumption, which differed in duration and design, were conducted recently by DSTO Scottsdale. The first study was conducted in far northern Australia over 12 days during a routine patrol-training exercise¹ and the second in the jungle of Sabah, Malaysia for 23 days of adventure training.² In the first study three groups received either: freshly prepared foods (fresh group, 15 MJ, n = 13), full CRP (15 MJ, n = 10) or half CRP (7.5 MJ, n = 10). Under consumption by the full CRP group resulted in CRP groups experiencing similar weight loss (mean of 3%), protein catabolism and immune suppression while the fresh group maintained their weight and protein balance and cell-mediated immune status. CRP groups reported greater fatigue than the fresh group. All soldiers experienced poor sleep quality and declining folate and iron status, but no decrement in physical fitness or cognition. In the second study soldiers who were involved in building walking tracks (Tawau Hills, n = 20) and tree-top observation platforms (Danum Valley, n = 11) were fed with CRP (Tawau Hill group) or fresh meals (Danum Valley group). Soldiers were able to self-select their food from available supplies. Soldiers supplied with CRP ate between 0.8 and 1.3 packs per day. After 23 days mean weight loss of both groups was 5.5%, there were no decrements in physical and mental performance and good immune status was maintained. Food consumption was encouraged by, the novelty of new foods, ability to socialise and take meal breaks, ability to self-select food items and number of serves, adequate sleep, good morale, and good hydration status.

Conclusions - On the positive side these studies indicate that adaption to reduced energy intake (of up to 50% of estimated requirement) is shown over the short-medium term so that there is no detriment to physical and cognitive performance and that when the entire CRP is consumed (ie around 15MJ per day) soldiers can maintain moderate to hard physical activity for 3 weeks without loss of physical fitness, immune function or cognitive ability. On the negative side the studies revealed that significant although small weight loss can be expected after only 12 days of feeding with CRP and that CRP feeding is associated with increased fatigue, mild immune suppression, loss of body protein, decreased stores of antioxidants, folic acid, vitamin B6, vitamin K and iron.

References

1. Booth CK, Coad RA, Forbes-Ewan CH, Thomson GF, Niro PJ. The physiological and psychological effects of combat ration feeding during a 12-day training exercise in the tropics. *Milit Med* 2003;168 (1):63-70.
2. Booth CK, Coad RA, Roberts W. The nutritional, physiological and psychological status of a group of British sappers after 23 days of adventure training in the hot wet tropics. DSTO-RR-0243. Fishermans Bend: DSTO Platforms Sciences Laboratory 2002.