

ENERGY EXPENDITURE AND FOOD INTAKE OF SOLDIERS IN THREE OPERATIONAL ENVIRONMENTS

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The primary means of feeding Australian soldiers in operational environments is the combat ration pack (CRP). Four types of CRP, each with five menus, are used to provide food for one day for one soldier, groups of ten soldiers, or a single meal. When eating CRP, no other food sources should be necessary to sustain a soldier in the field for up to a month. Current CRP provide between 10000 and 12000 kJ/day. As part of continuous validation of CRP, their suitability as an energy source was assessed.

Energy expenditure (EE) and food intake (FI) studies were conducted on three infantry exercises in the following environments: (1) Australian desert; (2) Jungle in West New Britain; (3) Australian alpine.

FI was estimated by recording all CRP and other items consumed. Some snack foods and alcohol were consumed by participants in the alpine exercise. The relative proportions of energy intake derived from protein, fat, carbohydrate and alcohol (P:F:C:A) were estimated using a nutritional database based on the NUTTAB tables published by the Department of Community Services and Health.

EE (see table) was estimated by two means: (1) The doubly-labelled water technique (DLW) where subjects ingest a known amount of the stable isotopes deuterium and oxygen-18, and determination of the elimination rates of these isotopes allows estimation of carbon dioxide production and hence EE; (2) The food intake-energy balance method (FI/EB) in which changes in body fat are measured and EE calculated from the equation: $EE = FI - \Delta \text{body energy}$.

Terrain	Subjects (n)	Duration (days)	FI (kJ/day)	EE (kJ/man/day)		Diet (%)
				DLW	FI/EB	P:F:C:A
Desert	7	9	12000	14200	16000	13:32:55:0
Jungle	10	10	9500	15700	15900	16:27:57:0
Alpine	8	7	14000	20000	20600	16:34:40:10

Whilst it has been demonstrated that current CRP do not provide sufficient food to meet the daily EE of soldiers, the solution is not simply one of providing additional ration items. Soldiers already discard heavy or disliked items to lighten their equipment load. The solution is to balance several factors: (1) To provide highly acceptable rations; (2) Develop lightweight, energy dense ration components; (3) When feeding soldiers with fresh food before and after periods of CRP consumption, make sufficient food available to overcome the energy deficit. As CRP are not intended to be the sole source of food for extended periods of time, some deficit can be tolerated by fit adults, however, the gap presently existing between intake and expenditure will be reduced.