

## ENERGY EXPENDITURE AND FOOD INTAKE OF SOLDIERS UNDERGOING ARDUOUS TRAINING

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When provisioning soldiers with fresh food, the Australian Army uses the Australian Defence Force Ration Scale (ADFRS), a nutritionally balanced set of food entitlements. This scale has been designed to yield between 13000 and 14000 kJ/man/day. To adequately provide for soldiers involved in arduous training the ADFRS can be issued with one of two supplements. The Arduous and Extended Operational Duties Supplement (ADS) yields an extra 3500 kJ/day and the Cadet Apprentice Supplement (C/AS) an extra 1500 kJ/day.

To assess the need for these supplements the energy expenditure (EE) and food intake of the following groups were determined; (1) paratroopers during ground training and parachute descents, averaging two descents/day; (2) Army apprentices; (3) Army recruits in barracks and in the field; (4) jungle training at the Army's Battle School.

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 of the Department of Community Services and Health. The mean P:F:C:A ratio for all groups was 14:35:48:3.

Daily EE shown in the table was determined by three methods: (1) The doubly-labelled water method (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 factorial method (Fac) in which a detailed record is made of activities of subjects and the energy cost of each activity had been determined by indirect calorimetry. (3) The food intake-energy balance method (FI/EB) in which total food intake and changes in body fat are measured, and EE is calculated from the equation:  $EE = \text{energy intake} - \text{change in body energy}$ .

Training Type	Subjects n	Duration (days)	EE (kJ/man/day)		
			DLW	Fac	FI/EB
Paratroops: descents	10	5	17000	-	16400
: ground training	10	7	14000	-	-
Apprentices	12	14	14200	-	15000
Recruits: barracks training	138	7	-	16700	17100
: field training	39	7	-	18200	-
Jungle training	4	7	19100	19000	>17800

It is concluded that there is a physiological basis for the issue of the ADS to paratroops, recruits and soldiers at the Battle School. Secondly there is a requirement for a C/AS. Continued issue of these supplements to the ADFRS will contribute to the good health of Australian soldiers. Thirdly, fat intake is generally less than that of young civilian Australian men (English et al. 1987). However, the Armed Forces are continuing their attempts to reduce the fat intake of service personnel.

ENGLISH, R., CASHEL, K., BENNETT, S., BERZINS, J., WATERS, A. and MAGNUS, P. (1987). National Dietary Survey of Adults, 1983, No. 2 Nutrient Intakes. Dept of Community Services and Health. AGPS, Canberra.