

## THE THERMOGENIC EFFECTS OF PURE FOODS IN MAN

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The thermogenic effect of food may be defined as the post-prandial rise in heat production. Although the increments in heat production for carbohydrates, fats, and proteins are generally held to be different and characteristic of these food sources when eaten, there is not complete agreement on this point (Garrow and Hawes 1972). In the present study four subjects were used to measure the thermogenic effect of a single meal of (i) 600 g of aqueous casein, (ii) 450 g of aqueous glucose, (iii) 59 g of vegetable oil and (iv) a mixture of these three sources in isoenergetic amounts. The gross energy of all meals was 2.09 MJ.

Heat production was calculated from measurements of gaseous exchange in a whole-body indirect calorimeter (Farrell 1980) using the confinement method. The first measurement was made on subjects, fasted overnight (>12 h), from 0800-0900 h to establish the baseline value. The subject was then given the test meal and observations were made at 30-min intervals until 1500 h. The results are shown in the table.

The increment in heat production of 4 subjects above the baseline value expressed as a % of the gross energy of the 4 test meals

	1	2	3	4	Mean
Protein	32.3	12.4	48.4	20.5	28.4 <sup>a*</sup>
Fat	5.9	5.5	4.6	6.6	5.2 <sup>b</sup>
Carbohydrate	9.0	6.1	8.6	18.8	10.6 <sup>b</sup>
Mixture determined	18.3	7.0	16.5	14.8	14.2 <sup>b</sup>
Mean of first three meals	15.7	8.0	20.6	11.3	13.9

\* Values with the same superscript (a-b) are not significantly different (P>0.05)

The mean increment for the casein meal was higher (P<0.05) than for the other foods but was also variable between subjects. The mean values for each food component are in agreement with those published in the literature. There was close agreement between the increment found for the mixture of the three food sources and that predicted.

The small number of subjects used here, although characteristic of such experiments (see Garrow and Hawes 1972), allows only preliminary conclusions to be drawn from this study. But it appears that the thermogenic effect of a meal is not only characteristic of the composition of food but also of the individual. This observation may be helpful in explaining why some individuals appear to exist without becoming obese on what appear to be large daily amounts of food and a normal energy expenditure.

FARRELL, D.J. (1980). In 'Energy Metabolism', p. 279, ed. L.E. Mount. (Butterworths: London).

GARROW, J.S. and HAWES, S.F. (1972). Br. J. Nutr. 27:211.

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