

The effect of the gut flora on the growth response of the chick to fish solubles. By G. F. HARRISON and M. E. COATES, *National Institute for Research in Dairying, Shinfield, Reading*

The earlier suggestion that the growth-promoting activity of fish solubles may be by modification of the intestinal microflora (Harrison & Coates, 1964) has now been tested. Germ-free chicks, reared in Gustafsson type isolators, and control groups in conventional quarters, were given a diet based on maize and soya-bean meal with or without 5% fish (herring) solubles. The mean body-weights at 4 weeks were: germ-free without fish solubles 337 g, with fish solubles 350 g; conventional without fish solubles 303 g, with fish solubles 340 g. The growth increase with the solubles was significant ($P < 0.001$) in conventional quarters but not in the germ-free isolators.

To study the effect of the gut flora of conventional chicks on the growth of germ-free chicks, fresh droppings from conventional birds, or the droppings sterilized by autoclaving, were introduced into germ-free isolators. The droppings were spread on the diet, with and without fish solubles, at the rate of about 1 g per chick. Mean body-weights at 4 weeks were: no droppings, no fish solubles 353 g, with fish solubles 373 g; sterilized droppings, no fish solubles 338 g, with fish solubles 369 g; fresh droppings, no fish solubles 283 g, with fish solubles 313 g. The growth increase with fish solubles was significant ($P < 0.05$) only when fresh or sterilized droppings were given. The highly significant depression in growth ($P < 0.001$) caused by fresh droppings was not fully counteracted by fish solubles.

In further experiments, an aqueous extract of fresh droppings from conventional birds was sterilized by filtration and a single dose of 0.2 ml was given to germ-free chicks on diets with and without fish solubles. No significant differences in body-weight were observed at 4 weeks.

These findings indicate that dietary fish solubles had a small, non-significant effect on growth of germ-free chicks, but significantly improved growth when birds were given fresh or autoclaved droppings. It appears that the growth-promoting activity of fish solubles requires the presence of the non-filterable fraction of chick droppings that depresses growth. Although the effect seems to be largely dependent on the presence of a microflora it is evidently not entirely so, since a small dose of autoclaved droppings also depressed growth; dietary fish solubles completely counteracted this depression but only partially reversed the more severe depression in birds given fresh droppings.

REFERENCE

Harrison, G. F. & Coates, M. E. (1964). *Br. J. Nutr.* **18**, 461.

A rapid method for the estimation of thermic energy in rats. By D. S. MILLER and M. J. STOCK, *Department of Nutrition, Queen Elizabeth College, London, W8*

The technique to be described has been developed to reveal relative changes in thermic energy due to variations in dietary treatments and to the administration of