

Abstract

Assimilation of cow liver by Lucilia illustris (Dipt., Calliphoridae) larvae was studied in laboratory. The larvae were cultured from hatching to the end of development in the respiration chambers of an infra-red gas analyser (IRGA), and respiration was measured as CO₂ production. Assimilation was calculated in both carbon and energy units. In this organism the Cr₂O₃ indicator method proved unsuitable for measuring food consumption.

In early larval development respiration showed two linear phases, which are suggested to be correlated with the first two instars. Both the cumulative and the instantaneous net production efficiency, K₂ (production/assimilation), were calculated. Integration of the latter to the final larval weight produced results similar to those obtained by direct determination. K₂ varied both with temperature and with the developmental stage of the larvae (weight). Efficiency was highest during the most intense growth phase, or little before it, then being 88 % in carbon units (90 % in energy units) at 25 to 30°C. At this optimal temperature the cumulative K₂ to the end of the feeding period was 82 % (84 %); in changing temperature conditions the corresponding K₂ was 77 % (79 %). The value in bioenergetic research of instantaneous concepts and of expressing results in terms of carbon is discussed. The application of IRGA to animal respiration measurements is also discussed.