

THE EFFECT OF TEMPERATURE ON THE CONSUMPTION OF FIVE ALGAL SPECIES
USED AS FOOD FOR BROODSTOCK OF THE COMMERCIAL SCALLOP
PECTEN FUMATUS

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As part of a study to determine what is required by the commercial scallop, *Pecten fumatus*, to attain spawning condition, a factorial experiment was conducted in which broodstock were fed one of five algal diets at one of four temperatures. Scallops, like oysters and mussels, are suspension feeding bivalves, reliant upon cilia on the surface of the gills to remove suspended detrital material and phytoplankton from the surrounding seawater. They have the ability to regulate the amount of material ingested and have been shown to discriminate among algal species with cells of similar size (Shumway et al., 1985). Thus, an acceptable diet may be essential for spawning conditioning to occur.

Scallops were maintained at either 11, 14, 18, or 21°C in individual aerated 10 l aquaria for a minimum of one week prior to experimentation. After 24 h starvation, scallops were fed 2×10^9 cells of either *Pavlova lutheri*, Tahitian *Isochrysis* aff. *galbana*, *Tetraselmis suecica*, *Chaetoceros gracilis* or *Chroomonas salina*. Algal cell density was monitored over 30 h and, at the completion of the experiment, faecal samples were collected to determine the effectiveness of digestion.

With the exception of *T. suecica*, the effect of temperature on algal consumption was similar for all species. No differences were found in the rate of consumption of algae at 14, 18 and 21°C, although feeding was depressed ($P < 0.05$) at 11°C. *P. lutheri* and *T. Isochrysis* cells were most rapidly filtered from the water (< 8 h), although dry weight of cells depleted in the first two hours indicated similar weights of *Chr. salina* were also ingested. The rate of ingestion of *Cha. gracilis* in terms of cell numbers and dry weight, was less than *P. lutheri* and *T. Isochrysis*.

The ingestion of *T. suecica* was depressed for the first eight hours at 11°C, and then cell density began to vary greatly. Microscopic examination of faecal samples revealed the presence of large numbers of undigested cells. As gut clearance time approximated 6 to 8 h it is likely that resuspension of undigested cells accounted for the variations in *T. suecica* cell densities. Examination of faecal samples indicated scallops were capable of digesting all other algal species tested.

Further conditioning studies will focus on temperatures greater than 11°C and will involve diets incorporating *P. lutheri*, *T. Isochrysis* and *Chr. salina*. Although results from the present study allow the estimation of maximum feed rates, optimum rates remain to be determined, as does the potential for algal species such as *T. suecica* to be effectively digested when fed at lower concentrations or as a dietary supplements.

SHUMWAY, S.E., CUCCI, T.L., GAINEY, L. and YENTSCH, C.M. (1985). *J. Exp. Mar. Biol. Ecol.* 91: 77.