

### The food value of yeasts fed to Sydney rock oyster *Saccostrea commercialis* spat

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Yeasts are common in seawater and may be natural components of the diet of oysters (1). Yeasts can be produced much more efficiently and economically than photosynthetic algae because of shorter generation times and the use of inexpensive culture media (2). Two yeasts *Debaryomyces hansenii* and *Dipodascus capitatus*, recently isolated from seawater in oyster growing areas of Port Stephens, NSW (1) two commercially produced food yeasts, *Candida utilis* and *Saccharomyces cerevisiae*; and two red pigmented yeasts, *Rhodotorula rubra* and *R. glutinis* were evaluated as live food for Sydney rock oyster *Saccostrea commercialis* spat.

The six live yeasts cultured on each of glucose and acetate as carbon sources and three dry yeast based diets (Microfeast®; Microfeast Products, Bartlesville, OK) were compared as potential algae substitutes for feeding Sydney rock oyster spat. At the 80% substitution level, two of the dry yeast based diets containing 7.6 and 21.5% total lipid gave 72 and 76%, respectively, of the dry spat weight gain obtained with the algae fed control. Weight gains of 58 to 67% of that of the algae fed control were also obtained with the following live yeast diets: *D. capitatus* and *C. utilis* cultured on either glucose or acetate and *S. cerevisiae* cultured on glucose. There was a negative correlation between the increase in spat dry weight and nitrogen free extract ( $r=-0.58$ ;  $y=30.34-0.26x$ ;  $P<0.01$ ) and a smaller positive correlation with the protein ( $r=0.51$ ;  $y=6.10+0.31x$ ;  $P<0.01$ ) content of the diets.

These correlations suggest that the food value of yeasts may be improved by reducing their carbohydrate (nitrogen free extract) content and by increasing protein content. The yeast cell wall constitutes 15-25% of the dry weight of the whole cell and consists of 80-90% complex, difficult to digest polysaccharides. The food value of yeasts can be improved by chemical treatment of the cell wall, which makes the contents of the cell more readily available for digestion.

As yeasts are cheap to produce, they may be useful as partial substitutes for live algae in diets for bivalves. Yeasts suitable for this application should be high in protein and low in carbohydrate. Supplementation of yeasts and dry yeast based diets with dried algae and gelatin-acacia capsules requires further investigation. However, low cost off-the-shelf bivalve diets of 80% dried yeast and 20% algal paste (eg *Skeletonema costatum*) appear to be achievable in the near future.

1. Brown MR, Barrett SM, Volkman JK, Nearhos SP, Nell JA, Allan GL. Biochemical composition of new yeast and bacteria evaluated as food for bivalve aquaculture. *Aquaculture* 1996;143:341.
2. Nell JA, The development of oyster diets. *Aust J Agric Res* 1993,44:557.