A PACKED BED SOLID-STATE CULTIVATION SYSTEM FOR
THE PRODUCTION OF ANIMAL FEED: CULTIVATION,
DRYING AND PRODUCT QUALITY

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SUMMARY

A standing column packed bed bioreactor was constructed to enable packed bed
operation during solid-state cultivation (SSC) of sago starch by R. oligosporus
UQM 145F, to be followed by in situ drying of the microbial product. The
essential amino acid composition of the microbial product was determined from
the samples obtained from the cultivation with a substrate loading of 250 g.

INTRODUCTION

In comparison with submerged liquid cultivation, solid-state cultivation has the
advantage that the high concentration of dry matter allows a reduction in the size
of equipment to be used and reduces the cost of drying the final product.
Although strong research efforts have been made to improve the SSC
process, little attention has been given to the drying of the microbial product.
A standing column packed bed bioreactor was constructed as an
improvement on Sartorius packed bed bioreactors (Gumbira-Sa'id et al.,
1991, 1992) to enable packed bed operation during SSC of sago starch at
larger scale, and in situ drying of the microbial products. Artificial drying in the
oven or sun-drying, followed by milling, are the main downstream processes
applied to microbial protein enriched products (Trevelyan, 1974; Daubresse et
al., 1987). This study has attempted to introduce drying of the microbial
products in situ, by passing hot dry air (in contrast to the humid air supplied
during the culture) through the system at completion of the process. Drying
the microbial product in the column has advantages, since the wet product
does not have to be unloaded from the column, and the efficiency of the
equipment can be increased. This should be advantageous at pilot plant
scale, since unloading the wet microbial product is not always practical
(Durand et al., 1988).