## 1. ABSTRACT

Several strains of yeasts were isolated from palmyrah toddy, coconut toddy, grapes, banana and honey. The strains were differentiated using its morphological features.

On the basis of high crude protein content, six strains were selected for further studies. Alcohol production and growth studies were performed with six strains in a minimal medium containing 10 % sucrose as a source of carbon.

Of these six, a high protein (57 %) Saccharomyces cerevisiae strain $Y_{18}$ showing rapid growth (0.73 $h^{-1}$) and capable of producing more than 85 % efficiency in alcohol production (as an accessory character) was selected as a suitable strain for SCP production.

Under aeration the optimum growth temperature was found to be 35°C. The S. cerevisiae strain $Y_{18}$ grew well in the acidic pH (3 to 4).

The maximum biomass yield 0.35g ( dry weight)/g substrate was achieved when the sucrose concentration was between 50 to 60 $gl^{-1}$.

The strain $Y_{18}$ contained 52 % true protein and this protein had all the essential amino acids. 100g of this dried yeast powder contained $Ca^{++}$, 550mg; $PO_4^{3-}$ 150mg and $Fe^{2+}$, 50mg and the nutritionally important trace elements

such as Cu, Zn and Cr. The Pb and Cu content of this strain meet the requirement of food regulation (1974) as the Pb content was 0.98mg and Cu was very much less 0.55mg in 100g dry matter.

The quality of the protein was evaluated by feeding experiments in Newzeland (3 months old) rabbits. The postmortem and histopathological studies revealed that this S. cerevisiae strain $Y_{18}$ has no deleterious substances in the cell when fed at 11 % protein level. Body weight gain of the rabbits revealed that the rabbits fed with control diet performed well followed by groups fed with yeast and casein.

In this project the starch (soluble) and corn were selected as the source of carbon. The hydrolysis of starch was achieved by immobilized enzymes. $\alpha$-amylase and glucoamylase enzymes were immobilized separately on Cyanogen bromide activated Sepharose-4B using triethylamine. The activities of the immobilized $\alpha$-amylase and glucoamylase were 25 % and 27 % respectively.

Soluble starch (2 % w/v) was hydrolysed 75 % by passing through the immobilized $\alpha$-amylase followed by immobilized glucoamylase at a flow rate of 30ml $h^{-1}$. The S. cerevisiae strain $Y_{18}$ contained 56 % crude protein when it was grown on starch hydrolysate under the experimental condition.

Corn flour contained 80 % starch. 87 % of this starch was hydrolysed by acid hydrolysis (1N HCl) in 0.25 hours at $100^{o}$C.

In this project the starch of corn was partially hydrolysed by malting. The corn grains were allowed for germination under laboratory condition in the presence of 0.2 % $Na_2S_2O_5$.

80 % of the grains were found to be germinated. The germination was arrested when the amylolytic activity of the corn was optimal and the loss of carbohydrate was minimal.

The temperature and pH optimum for corn malt amylase (both $\alpha$ and $\beta$ ) were $50^{o}$C and 4.2 respectively. This amylase is not heat stable but is most stable at $4^{o}$C than any other temperatures.

By this malting technique nearly 60 % of the starch was hydrolysed as glucose and dextrins.