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Saccharomyces cerevisiae Biomass production from rice hydrolysate

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In this study, the cheap broken rice was used. The rice flour (160g) was made to a paste with water (500ml) and the enzyme termamyl (3.3ml) and glucoamylase (2.6ml) were added. The pH was adjusted to 5.0. Total volume was made up to 1l. The hydrolysis was terminated when the dextrose equivalent (DE) was near 95. The hydrolysate was strained in a screw press. The rice extract contained (gl^{-1}) protein 5.94, elemental nitrogen 1.58, total sugar 159.7 and reducing sugar 134.4. The rice extract was diluted to have $100gl^{-1}$ reducing sugar and supplemented with (gl^{-1}) yeast extract, 2.5; bacteriological peptone, 1.15; $(NH_4)_{2HPO4}$, 0.50 and $MgSO_4.7H_2O$ 0.025. This medium was referred as M1 and used for the cultivation of *S. cerevisiae* at 30°C and pH 6.0, for 24h, while shaking at 100rpm. As controls glucose ($100gl^{-1}$) medium M2 with suppliments as on M1 and rice extract without any supplementation M3 were used. Biomass was monitored, as dry weight, reducing sugar and alcohol were determined. Biomass obtained was 18.5, 7.3 and $6.5gl^{-1}$, the alcohol produced was 27.6, 23.0, and $13.8gl^{-1}$ in M1, M2 and M3 the residual sugar present was 0.2, 8.65 and $13.9gl^{-1}$ in M1, M2 and M3 respectively. In rice flour the protein content is $59.4gl^{-1}$. If the protein present in the rice flour was hydrolysed, the requirement for yeast extract and bacteriological peptone could be either reduced or eliminated. Hence in the next set of experiments, the pH of rice hydrolysate was adjusted to 7.0, neutrase, 2.5, 5.0 and 7.5 ml^{-1} was added and incubated at 42°C with shaking at 100rpm for 5h. The hydrolysate was strained; the extract contained increasing amounts of protein (6.4, 9.0 and $11.3gl^{-1}$) and elementary nitrogen (1.7, 3.0 and $3.1gl^{-1}$) when increasing amounts of 2.5, 5.0 and $7.5ml^{-1}$ neutrase were added. This enriched medium was used for yeast cultivation without any supplementations. The biomass obtained was 12.5 15.2 and $15.8gl^{-1}$ and the ethanol produced was 18.4, 16.5 and $16.1gl^{-1}$ respectively in the hydrolysate prepared using 2.5, 5.0 and $7.5ml^{-1}$ neutrase respectively. These results indicate that the protein in rice extract hydrolysed by neutrase could be utilized for the cultivation of yeast. Thus the hydrolysis of the protein eliminated the need for yeast extract and bacteriological peptone addition to the medium.