Production of single-cell protein from wasted date fruits by Hanseniaspora uvarum KKUY-0084 and Zygosaccharomyces rouxii KKUY-0157

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Abstract:

The aim of this study was to produce single-cell protein by using two yeast strains, KKUY-0084 and KKUY-0157, from spoiled date fruits. Based on the sequence of the variable D1/D2 domain of the large subunit (26S) ribosomal DNA of these strains, their identity was Hanseniaspora uvarum and Zygosaccharomyces rouxii, respectively. The two strains were assessed for their single-cell protein productivity in vitro and in a bioreactor. Both yeasts were able to utilise the juice of spoiled dates in a concentration gradient up to 25%; however, 20% juice was the best concentration for production of the maximum amounts of dry biomass by H. uvarum KKUY-0084 and Z. rouxii KKUY-0157 (23.5 and 20.71 g/l, respectively) at 60 h. Biomass productivity reached a maximum when the yeasts were incubated at 25 °C and pH 5.0–6.0. Addition of Mn (0.3 g/l) or Mg (0.5 g/l) had a stimulative effect on biomass production. Addition of 0.6 g/l of Mn resulted in the production of maximum dry biomass by H. uvarum KKUY-0084, while 0.4 g/l of the same metal was more appropriate for Z. rouxii KKUY-0157. Tryptone (8 g/l) as a nitrogen source increased the yield of the biomass to 34.25 and 30.75 g/l by H. uvarum KKUY-0084 and Z. rouxii KKUY-0157, respectively. In a 7-l fermentor, the highest production (48.9 g/l) of the two strains was achieved after 60 h.

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