Comparative Growth Kinetic Studies of Two Strains Saccharomyces cerevisiae Isolated from Dates and a Commercial Strain

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Abstract : Dates, main products of the oases, due to their therapeutic interests, are considered highly nutritious fruit. Several studies on the valuation biotechnology and technology of dates are made, and several products are already prepared. Isolation of the yeast Saccharomyces cerevisiae, naturally presents in a scrap of date, optimization of growth in the medium based on date syrup and production biomass can potentially expand the range of secondary products of dates. To this end, this paper tries to study the suitability for processing dates technology and biotechnology to use the date pulp as a carbon source for biological transformation. Two strains of Saccharomyces cerevisiae isolated from date syrup (S1, S2) and a commercial strain have used for this study. After optimization of culture conditions, production in a fermenter on two different media (date syrup and beet molasses) was performed. This is followed by studying the kinetics of growth, protein production and consumption of sugars in crops strain 1, 2 and the commercial strain and on both media. The results obtained showed that a concentration of 2% sugar, 2.5 g/l yeast extract, pH 4.5 and a temperature between 25 and 35°C are the optimal conditions for cultivation in a bioreactor. The exponential phase of the specific growth rate of a strain on both media showed that it is about 0.3625 h-1 for the production of a medium based on date syrup and 0.3521 h-1 on beet molasses with a generation time equal to 1.912 h and on the medium based on date syrup, yeast consumes preferentially the reducing sugars. For the production of protein, we showed that this latter presents an exponential phase when the medium starts to run out of reducing sugars. For strain 2, the specific growth rate is about 0.261h-1 for the production on a medium based on date syrup and 0207 h-1 on beet molasses and the base medium syrup date of the yeast consumes preferentially reducing sugars. For the invertase and other metabolits, these increases rapidly after exhaustion of reducing sugars. The comparison of productivity between the three strains on the medium based on date syrup showed that the maximum value is obtained with the second strain: p = 1072 g/l/h as it is about of 0923 g/l/h for strain 1 and 0644 g/l/h for the commercial strain. Thus, isolates of date syrup are more competitive than the commercial strain and can give the same performance in a shorter time with energy gain.

Keywords : date palm, fermentation, molasses, Saccharomyces, syrup

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