920/B/Poster

Optimization and acceleration of alcohol fermentation process in pineapple peel vinegar production

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Pineapple (*Ananas comosus L.*) is an important economic crop in Sri Lanka and its peel (40-50 % of whole fruit) is usually discarded during its processing. The present study was conducted to optimize and accelerate the alcohol production process of pineapple peel vinegar which usually takes 20 days in the normal process. Optimization of two main steps *i.e.*, preparation of juice using pineapple peel and alcohol fermentation procedures were considered. Efficiency of each step was evaluated by measuring the formed alcohol % and changes of brix value. The collected pineapple peel was washed with water followed by steam blanching for 2 minutes. Peel was blended and juice collected following filtration. Alcohol fermentation was done at 29 ^{0}C with baker's yeast. In order to optimize the alcohol fermentation, addition of yeast and sugar amounts were determined. Baker's yeast was added separately at 0.27% and 3% levels to the pineapple peel juice to determine the optimum amount of yeast. Sugar was added to adjust the Brix to 16%, 18% and 22%,respectively, to determine the optimum Brix. Efficiency of adding sugar was determined by adding sugar at a time for 18% and gradual addition of similar sugar content in 3 consecutive days. Blanching of peel before extraction of juice reduced enzyme activation which suppressed the fermentation process. The optimum Brix was identified as 18% ($p<0.05$). There is no significant difference between the two different amount of yeast used ($p>0.05$). The gradual addition of sugar yielded 13.5% of alcohol on the 5th day of fermentation ($p<0.05$) which facilitated acetic acid production by 7 days in the latter stage. Adding of sugar at a time can cause stress to yeast and retard the fermentation process. Thus it can be concluded that alcohol fermentation in vinegar production can be optimized with gradual addition of sugar required to adjust the Brix level of 18% with 0.27% of yeast within five days of fermentation at 29 ^{0}C.

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