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RESPONSE SURFACE OPTIMIZATION OF FERMENTING PARAMETERS FOR THE PRODUCTION OF BEER FROM FINGER MILLET AND APPLE JUICE BY USING BOX-BEHNKEN DESIGN

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ABSTRACT

The experiments were planned using Response Surface Methodology, Box Behnken design was used and total seventeen designed experiments were conducted to produce beer from finger millet and apple juice. Effects of independent variables with three levels for each i.e. blend ratios ((Finger millet: Apple Juice) (90:10, 85:15, 80:20)), yeast concentration (6%, 8%, 10%) and malted grain to water ratios (1:8, 1:9, 1:10) were investigated on beer quality. During study it was observed that all the independent parameters i.e. blend ratio, yeast concentration and malted grain to water ratios affected the responses (pH, Titrable acidity, colour, bitterness and alcohol content) significantly. Optimization was done using Design Expert 10.0.1 software, for free beer production. The optimum values were found to be 80.24:19.76 blend ratio, 10% enzyme concentration and 1:8 slurry ratio. The model F-value was found to be highly significant at 1% level of significance for all the responses. The values for pH, titrable acidity, colour, bitterness and alcohol content at optimum conditions were found to be 5.12, 0.12, 17.312, 18.95 and 9.25 respectively all the responses could be predicted by fitting the second order mathematical model and adequacy checked by R2.