

## ABSTRACT

### THE EFFECT OF FERMENTATION MEDIA CONDITIONS AND INOCULUM CONCENTRATION ON THE SENSORY AND PHYSICO-CHEMICAL CHARACTERISTICS OF COCOA PULPA PROBIOTIC DRINKS (*Theobroma cacao L.*) WITH FERMENTATION TIME USING THE YEAST *Saccharomyces boulardii* AS A STARTER

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This study aimed to determine the effect of fermentation time, sucrose and inoculum on sensory characteristics of cocoa pulpa probiotic drink with *S. boulardii* as a starter. This study used a three-factor *Response Surface Methodology* (RSM) with 20 experimental units. Three-level independent variable with fermentation time (0, 5, 12.5, 20, and 25 hours), sucrose concentration (1.6%, 2%, 2.5%, 3% and 3.3%) and inoculum (1%, 2%, 3.5% , 5% and 6.0%). Parameters observed were total yeast, total acetic acid, total sugar and hedonic sensory test. The results of the response variables were then analyzed for variance using the *Design Expert 12* program. Analysis of variance was carried out based on the  $P_{\text{value}}$  of each response, the influential model had a  $P_{\text{value}} (<0.05)$ . The results showed that the duration of fermentation, sucrose and inoculum had a significant effect on total yeast, total acetic acid and total sugar, while the sensory results of the hedonic test only the interaction between fermentation time and sucrose had an effect on the cocoa pulpa probiotic drink. In the probiotic drink, the best optimization solution was obtained. The effect of the presence of independent variable factors can be seen from the best optimization solution on the prediction of RSM, namely the total response of yeast 7,479 Log CFU/ml, total acid 0.434%, total sugar 10,358%, score aroma and taste 3.975, color 3.453, and overall acceptance of 3.891 with *desirability* value of 0.760.

Keywords: Cocoa pulpa probiotic drink, Fermentation, *Saccharomyces boulardii*, *Response Surface Methodology*.

## ABSTRAK

### **PENGARUH KONDISI MEDIA FERMENTASI DAN KONSENTRASI INOKULUM TERHADAP KARATERISTIK SENSORI DAN FISIKO-KIMIA MINUMAN PROBIOTIK PULPA KAKAO (*Theobroma cacao L.*) DENGAN LAMA FERMENTASI MENGGUNAKAN KHAMIR *Saccharomyces boulardii* SEBAGAI STARTER**

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Penelitian ini bertujuan untuk mengetahui pengaruh lama fermentasi, sukrosa dan inokulum terhadap karakteristik sensori minuman probiotik pulpa kakao dengan penambahan *S. boulardii* sebagai starter. Penelitian ini menggunakan *Response Surface Methodology* (RSM) tiga faktor dengan 20 satuan percobaan. Variabel bebas tiga taraf dengan lama fermentasi (0, 5, 12.5, 20, dan 25 jam), konsentrasi sukrosa (1.6%, 2%, 2.5%, 3% dan 3.3%) dan inokulum (1%, 2%, 3.5%, 5% dan 6.0%). Parameter yang diamati adalah total khamir, total asam asetat, total gula dan uji sensori hedonik. Hasil variable respon selanjutnya dianalisis sidik ragamnya menggunakan program *Desain Expert 12*. Analisis sidik ragam dilakukan berdasarkan nilai  $P_{\text{value}}$  dari masing-masing respon, model yang berpengaruh memiliki nilai  $P_{\text{value}} (<0,05)$ . Hasil penelitian menunjukkan bahwa waktu lama fermentasi, sukrosa dan inokulum berpengaruh nyata terhadap total khamir, total asam asetat, dan total gula, sedangkan hasil sensori uji hedonik hanya interaksi lama fermentasi dan sukrosa yang berpengaruh pada minuman probiotik pulpa kakao. Pada minuman probiotik didapatkan solusi optimasi terbaik. Pengaruh adanya faktor variable bebas terlihat dari solusi optimasi terbaik pada prediksi RSM dengan respon total khamir 7.479 Log CFU/ml, total asam 0,434%, total gula 10.358%, skor aroma dan rasa 3,975, warna 3,453, serta penerimaan keseluruhan sebesar 3,891 dengan nilai desirability sebesar 0,760.

Kata Kunci: Minuman probiotik pulpa kakao, Fermentasi, *Saccharomyces boulardii*, *Response Surface Methodology*.