

ABSTRACT

THE EFFECT OF THE ADDITION OF HONEY AND CLOVE ON THE MICROBIOLOGICAL CHARACTERISTICS OF KOMBUCHA PULPA KAKAO DRINK

By

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This study aims to determine the effect of fermentation on total dominant microbes and nata randement, as well as the effect of adding honey and clove powder on pH characteristics, total dissolved solids (TPT), and antimicrobial activity in cocoa pulp kombucha drinks with the addition of honey and cloves. The research uses a Complete Group Random Design (RAKL) with a single factor and five repetitions. The treatment consists of four stages, namely: day 0 fermentation (F0), day 7 fermentation (F7), honey addition (FM), and honey addition and clove powder (FMC). Observed parameters include total khamir, lactic acid bacteria (BAL), acetic acid bacteria (BAA), nata randement, pH value, TPT, and antimicrobial activity against *Escherichia coli* and *Bacillus subtilis*. The results of the study showed that fermentation for seven days (F7) significantly increased the number of dominant microbes, with a total yeast count of 9.28 log CFU/mL, LAB of 9.04 log CFU/mL, and AAB of 9.05 log CFU/mL, and produced a nata yield of 11.37%. The decrease in pH indicated an increase in organic acid throughout the fermentation process. The addition of honey increased the yield, while the addition of cloves caused an increase in pH value. Antimicrobial activity showed a significant increase, as shown by the diameter of the inhibition zone against *E. coli* and *B. subtilis* in the FMC treatment, which was categorized as medium inhibition.

Keyword: Kombucha, cocoa pulp, fermentation, honey, cloves, dominant microbes, antimicrobials

ABSTRAK

PENGARUH PENAMBAHAN MADU DAN CENGKEH TERHADAP KARAKTERISTIK MIKROBIOLOGI MINUMAN KOMBUCHA PULPA KAKAO

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Penelitian ini bertujuan untuk mengetahui pengaruh fermentasi terhadap total mikroba dominan dan rendemen nata, serta pengaruh penambahan madu dan serbuk cengkeh terhadap karakteristik pH, total padatan terlarut (TPT), dan aktivitas antimikroba pada minuman kombucha pulpa kakao dengan penambahan madu dan cengkeh. Penelitian menggunakan Rancangan Acak Kelompok Lengkap (RAKL) dengan faktor tunggal dan lima ulangan. Perlakuan terdiri atas empat tahap yaitu: hari ke-0 fermentasi (F0), hari ke-7 fermentasi (F7), penambahan madu (FM), dan penambahan madu dan serbuk cengkeh (FMC). Parameter yang diamati meliputi total khamir, bakteri asam laktat (BAL), bakteri asam asetat (BAA), rendemen nata, nilai pH, TPT, dan aktivitas antimikroba terhadap *Escherichia coli* dan *Bacillus subtilis*. Hasil penelitian menunjukkan bahwa fermentasi selama tujuh hari (F7) meningkatkan jumlah mikroba dominan secara signifikan dengan total khamir 9,28 log CFU/mL; BAL 9,04 log CFU/mL; dan BAA 9,05 log CFU/mL, serta menghasilkan rendemen nata sebesar 11,37 %. Penurunan pH menunjukkan peningkatan produksi asam organik selama fermentasi. Penambahan madu meningkatkan nilai total padatan terlarut, sedangkan penambahan cengkeh menyebabkan peningkatan nilai pH. Aktivitas antimikroba menunjukkan peningkatan signifikan, ditunjukkan dengan diameter zona hambat terhadap *E. coli* dan *B. subtilis* pada perlakuan FMC, dikategorikan dalam daya hambat sedang.

Kata kunci: Kombucha, pulpa kakao, fermentasi, madu, cengkeh, mikroba dominan, antimikroba.