

## PEMANFAATAN *WHEY* PADA KEJU HALLOUMI SEBAGAI SUBSTRAT PRODUKSI NATA DE *WHEY* OLEH BAKTERI *Acetobacter xylinum*

Oleh

Nabilah Septianingrum

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### ABSTRAK

*Whey* merupakan limbah cair dari proses pembuatan keju yang mengandung berbagai senyawa organik dan berpotensi mencemari lingkungan. *Whey* keju halloumi memiliki nilai BOD sebesar 15 mg/L dan COD 32.160 mg/L, melebihi ambang batas limbah cair. Kandungan nutrisi seperti protein, laktosa, dan mineral menjadikan *whey* berpotensi dimanfaatkan kembali, salah satunya sebagai bahan baku *nata de whey*. Penelitian ini bertujuan untuk mengetahui pengaruh variasi konsentrasi sukrosa dan lama fermentasi terhadap karakteristik *nata de whey*. Penelitian dilakukan menggunakan Rancangan Acak Lengkap Faktorial (RAL-Faktorial) dengan dua faktor perlakuan, yaitu konsentrasi sukrosa (10%, 12%, dan 14%) dan lama fermentasi (10 hari, 12 hari, dan 14 hari). Parameter yang diamati meliputi analisis fisik, kimia, serta uji sensoris melalui uji hedonik dan *ranking*. Data dianalisis menggunakan uji normalitas dan homogenitas untuk menentukan uji lanjutan berupa ANOVA dua arah diikuti *Tukey's HSD*, atau *Spearman* diikuti *Mann-Whitney*. Sementara itu, data uji sensoris dianalisis menggunakan uji *Mann-Whitney* dan *ranking*. Berdasarkan hasil yang penelitian, pada uji *Mann-Whitney* dengan nilai signifikansi 0,05, variasi konsentrasi sukrosa dan lama fermentasi memiliki pengaruh terhadap karakteristik fisik dan kimia *nata de whey* ( $p$  value < 0,05). Hasil uji hedonik dan *ranking* terbaik adalah formulasi *nata de whey* dengan konsentrasi sukrosa 14% dan lama fermentasi 14 hari. Nilai persentase penurunan BOD limbah *whey* keju halloumi setelah diolah yakni sebesar 84,67%, sedangkan persentase penurunan COD sebesar 99,26%.

**Kata kunci:** *Acetobacter xylinum*, Lama fermentasi, *Nata de whey*, Sukrosa, *Whey* keju halloumi

Pembimbing Utama : Dr. Wildan Fajar Bachtiar, S.T., M.Sc.

## UTILIZATION OF HALLOUMI CHEESE WHEY AS A SUBSTRATE FOR NATA DE WHEY PRODUCTION BY *Acetobacter xylinum* BACTERIA

by

Nabilah Septianingrum

SV/481145/SV/19737

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### ABSTRACT

Whey is a liquid waste product from the cheese-making process that contains various organic compounds and has the potential to pollute the environment. Halloumi cheese whey has a BOD value of 15 mg/L and a COD value of 32.160 mg/L, exceeding the liquid waste threshold. Nutrients such as protein, lactose, and minerals make whey potentially reusable, one of which is as a raw material for nata de whey. This study aims to determine the effect of varying sucrose concentrations and fermentation duration on the characteristics of nata de whey. The study was conducted using a Complete Randomized Factorial Design (CRFD) with two treatment factors: sucrose concentration (10%, 12%, and 14%) and fermentation duration (10 days, 12 days, and 14 days). The parameters observed included physical and chemical analyses, as well as sensory tests through hedonic and ranking tests. Data were analyzed using normality and homogeneity tests to determine further tests, such as two-way ANOVA followed by Tukey's HSD, or Spearman followed by Mann-Whitney. Meanwhile, sensory test data were analyzed using Mann-Whitney and ranking tests. Based on the research results, in the Mann-Whitney test with a significance level of 0.05, variations in sucrose concentration and fermentation duration had an effect on the physical and chemical characteristics of nata de whey ( $p$ -value < 0.05). The best hedonic test and ranking results were obtained from the nata de whey formulation with a sucrose concentration of 14% and a fermentation duration of 14 days. The percentage reduction in BOD of halloumi cheese whey waste after processing was 84.67%, while the percentage reduction in COD was 99.26%.

**Keywords:** *Acetobacter xylinum*, Fermentation duration, Halloumi cheese whey, Nata de whey, Sucrose

Supervisor : Dr. Wildan Fajar Bachtiar, S.T., M.Sc.