



**ENHANCEMENT OF OAT MILK SUSPENSION
STABILITY VIA ENZYME HYDROLYSIS
MANIPULATION**

by

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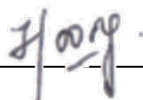
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DECLARATION BY AN AUTHOR

This dissertation is composed of my original work, and contains no material previously published or written by another person except where due the reference has been made in text. The context of my dissertation is the result of work I have carried since the commencement of my research project and does not include substantial part of work has been submitted to qualify for the award of any degree or diploma in any university or other tertiary institution.

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LIST OF ABBREVIATIONS

| Abbreviation | Caption |
|--------------------------|--|
| min | minute |
| Cu_2SO_4 | Cooper Sulphate |
| H_2SO_4 | Sulphuric Acid |
| NaOH | Sodium Hydroxide |
| NH_3 | Ammonia |
| HCl | Hydrochloric acid |
| HNO_3 | Nitric Acid |
| Control | Oat milk without Viscozyme L treatment |
| V05T30 | Oat milk with 0.5% Viscozyme L with 30 min reaction time |
| V05T60 | Oat milk with 0.5% Viscozyme L with 60 min reaction time |
| V1T30 | Oat milk with 1.0% Viscozyme L with 30 min reaction time |
| V1T60 | Oat milk with 1.0% Viscozyme L with 60 min reaction time |

PENINGKATAN KESTABILAN SUSPENSI DALAM SUSU OAT DENGAN MANIPULASI ENZIM HIDROLISIS

ABSTRAK

Objektif kajian ini adalah untuk menghasilkan susu oat yang bernutrisi dan stabil dengan menggunakan kombinasi pelbagai enzim. Alternatif berasaskan tumbuhan susu oat terdiri daripada zarah suspensi yang tidak larut, iaitu bahan yang terdapat daripada tumbuhan seperti sellulosa, hemisellulosa dan pektin yang menyebabkan pemendapan dan mengganggu kestabilan susu oat. Ezim Viscozyme L mengandungi pelbagai karbohidrase yang telah digunakan untuk mengurai zarah suspensi supaya zarah menjadi kecil dan membebaskan nutrisi yang terdapat di dalam matriks polisakarida. Dalam kajian ini, empat rumusan enzim Viscozyme L digunakan untuk menghasilkan sampel yang mempunyai perbezaan kepekatan dan masa, termasuk sampel kawalan. Analisis yang dijalankan dalam kajian ini ialah kandungan nutrisi, mineral, beta-glucan dan asid penitratan, jumlah pepejal terlarut, kestabilan suspensi dan kestabilan penyimpanan. Jumlah pepejal terlarut dan kandungan ash dan kalsium menunjukkan peningkatan dengan peningkatan kepekatan Viscozyme L dan masa hidrolisis. Susu oat yang diformulasi dengan 1% dan 0.5% dengan masa hidrolis 30 dan 60 min menunjukkan nilai kestabilan suspensi yang tertinggi. Susu dipasteur yang dirumus dengan 1% Viscozyme L selama 60 min menunjukkan kestabilan penyimpanan yang baik seperti sampel control. Susu disterilkan tempoh hidrolisis yang pendek dengan kepekatan 0.5% dan 1.0% menunjukkan kestabilan penyimpanan yang lebih baik daripada sampel yang mempunyai tempoh hidrolisis yang panjang. Daripada kajian ini menunjukkan Viscozyme L membantu meningkatkan kandungan mineral dan pepejal terlarut disamping menambahbaik kestabilan suspensi dan kestabilan penyimpanan.

ENHANCEMENT OF OAT MILK SUSPENSION STABILITY VIA ENZYME HYDROLYSIS MANIPULATION

ABSTRACT

Objective of this study was to produce nutritious and stable oat milk by applying multi-enzyme combination. Oat milk plant-based alternative is made up of suspension particles, which come from insoluble plant materials such as cellulose, hemicellulose and pectin that prone to sedimentation and result in instability of oat milk. Viscozyme L contain variety of carbohydrases was used to hydrolyzed suspension particles and reduce its particles size as well as liberated the nutrient incorporated in polysaccharide matrices. Four formulation using different concentration and hydrolysis time of Viscozyme L and control were used in this study, 0.5% and 1.0% for 30 and 60 min. In this study, proximate analysis, total soluble solid, mineral analysis, beta-glucan content, titration acidity, suspension stability and storage stability were carried out. The total soluble solid, ash content and calcium showed increased significantly by increasing the concentration and hydrolysis time of Viscozyme L. Oat milk treated with 1% Viscozyme L for 30 and 60 min gave highest suspension stability compared to the other samples. Pasteurized oat milk formulated with 1% Viscozyme L for 60 min showed good storage stability as control samples. For the sterilized oat milk, shorter hydrolysis time with both 0.5% and 1.0% Viscozyme showed good storage stability compared to control and sample with longer hydrolysis time. This study demonstrated that, Viscozyme L can improve mineral content and total soluble solid in the oat milk as well as improve suspension stability and storage stability.