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The development of hotcake products with reduced staling and reduction of microbiological growth

A thesis presented in partial fulfilment of the requirements for the degree of

Master of Technology

In

Food Technology

At

Institute of Food, Nutrition and Human Health

Massey University, Palmerston North, New Zealand

Enchong Zhang

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Abstract

Staling and microbiological spoilage are major issues in the market development of hotcake products. This project is aiming at reduce the staling rate of hotcake product during storage and review the methods that could be effective in reducing microbiological spoilage of hotcakes at ambient temperature.

The staling rate was reduced by incorporation of anti-staling ingredients into the formulation. A combination of anti-staling ingredients including Dimodan PH 320/B-M, a distilled monoglyceride; DATEM Palsgaard 3502, a Diacetyl Tartaric Acid Ester of Mono- and Diglycerides; and also Novamyl 10000 BG, a bake stable alpha amylase was effective to reduce the staling rate of hotcake when incorporate them into the hotcake formulation. The staling rate of hotcake products was reduced from 0.14N/day to 0.085N/day in commercial trial. In addition, the sensory results indicated the customers can not perceive a stale hotcake for the new formulation developed in this research and they also can not perceive the changes between original formulation and the new formulation.

Two applicable antimicrobial spoilage approaches were used; these were to increase the level of calcium propionate preservative and to reduce the oxygen content level to below 1% using O_2 absorber or 100% CO_2 in the packaging. The commercial trial showed decreasing the oxygen content level to less than 1% in the packaging and increasing the level of preservatives increased the shelf life by 1 or 2 days under the ambient storage condition used.
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List of Abbreviations

AF: Amylofresh
BG: Novamyl 10000BG
BHA: Butylated hydroxyl anisole
BHT: Buylated hydroxyl toluene
BP: Barrier pouch packaging
CA: Controlled atmosphere
Cont: Control
CFU: Colony forming unit
DATEM (DT): Diacetyl tartaric acid esters of mono and diglycerides
Dim: Dimodan PH 320/B-M, distilled monoglyceride
DP: Degree of polymerization
FB: Flour base
LDPE: Low density polyethylene
LSD: Least significant difference
MAP: Modified atmosphere packaging
NA: No Available data
Pro: Novamyl Pro BG
SAS: Sodium aluminium sulphate
SALP: Sodium aluminium phosphate
SSL: Grindsted ® SSL P 86 K, Sodium stearoyl lactylate
Std: Standard
TPA: Texture profile analysis
TPC: Total plate count
VDFF: Van Dyck Fine Foods Ltd.