APPLICATION OF XANTHAN AND TRAGACANTH GUM, MALTODEXTRIN AND RICE BRAN OIL FOR IMPROVING OF LOW FAT WHITE SOFT CHEESE ATTRIBUTES

BY

AYAT AHMED AHMED KHDER
B.Sc. Agric. Sci. (Dairy Science), Fac. Agric., Cairo Univ., 2003

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APPROVAL SHEET

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Title of Thesis: Application of Xanthan and Tragacanth gum, Maltodextrin and Rice Bran Oil for improving of Low fat white soft cheese attributes.
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ABSTRACT

The present study was carried out to enhance the quality of Egyptian style low fat white soft cheese using three different hydrocolloids and Rice Bran Oil (RBO). Six treatments cheeses containing three hydrocolloids (2 conc. of each) were evaluated compared to their counterpart low and full fat control cheeses (LFC & FFC). To evaluate the effect of Rice Bran Oil (RBO) on quality of that cheese, four treatments cheeses containing different RBO (25, 50, 75 & 100%) and control FFC were conducted. All cheeses were analyzed chemically, microbiologically, rheologically (TPA) and organoleptically when fresh and periodically every 30 days during pickling in 11% NaCl for 90 days in the refrigerator. Hydrocolloid cheeses had higher yield, moisture, S/DM, MNFS and M:P ratio than their control LFC. They showed a great improvement in texture parameters and pronounced enhancement in all organoleptic parameters as a result of hydrocolloids addition. Sensorial, fresh XG1 & XG2 gained close total score to their counterpart control FFC. Hydrocolloids pickled cheeses increased moisture, M:P ratio, MNFS% and decreased pH compared with their control LFC. Over 90 days pickling, gradual increased values of F/DM, TP, TP/DM, Salt, S/DM, ash & acidity and nitrogen fractions of all cheeses were showed with higher rate for hydrocolloids cheeses. At 60 days pickling, XG2 cheese had the lowest decrease for all texture parameters rendering that cheese less hard, gummy and springy and chew than FF control cheese indicating that pickling period is the best for such cheeses. TVB, PB & LB increased counts were observed up to 60 days of pickling thereafter were declined, however yeasts & molds showed continuous increased counts with slower rate by picking advance. As total score, 90 days pickled TG2 cheese showed the best overall acceptability followed the control FFC. During pickling, all cheeses with RBO had gradual loss for moisture, MNFS% & M:P ratio, while F/DM, protein, S/M, ash & acidity as well as nitrogen fractions values gradually increased. FFC received the highest score for total impression followed by RBO cheeses (T1 up to T3), while full RBO cheese (T4) received the lowest total judging score and had unfavorable oily flavor that was more pronounced with pickling extent. **In conclusion,** Xanthan gum (0.07 & 0.1%) was the best hydrocolloid for LFC making either fresh or ripened for 60 days in refrigerator, while Tragacanth gum (0.75%) was the best for 90 days pickling. An acceptable white soft LFC could be also produced by mixing milk fat with RBO up to (1:3 or 75% RBO).

Keywords: Hydrocolloids, Rice bran oil, FFC, LFC, Physiochemical parameters**.**

DEDICATION

I dedicate this work to my lovely family to my parents, my husband, my brother, my sisters. Also I feel deeply grateful to my daughters Rodina and Renad for all the support they lovely offered during my post-graduate studies.

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LIST OF ABBREVIATIONS

Abbreviations	Mean
AHA	American Heart Association.
APP.	Appearance.
ANOVA	Analysis Of Variance.
A.V.	Acid Value.
B & T	Body & Texture.
^{o}C	Degree centigrade, degree Celsius, unit of measurement for temperature.
CBS	Cocoa Butter Substitute.
CFU	Colony form unit.
C/F	The ratio of Casein to Fat.
CHD	Cardiovascular Heart Disease.
CKC	Control Karish Cheese.
CO	Canola Oil.
CMC	Carboxy methyl cellulose
Cm	Centimeter.
CN	Casein
C.V%	Coefficient of Variation.
d	Denisity.
DCC	Dairy Cream Cheese.
DE	Dextrose Equivalence.Defined as a measure of the reducing sugar content.
DF	Degree of Freedom.
EB	Emulsifiers Blend.
e.g.	for example
EOS	Egyptian Organization for Standardization Quality Control.
EPS	Exo poly-saccharides
ES	Egyptian Standard Specification.
et al.	and others.
FAO	Food and Agriculture Organization.
FDM	Fat-in-Dry Matter.
FFC	Full-Fat white soft Cheese.
Fig.	Figure.
FID	Flame ionization detector.
F value	F-test static.
G	Glycerol mono stearate.

G′	Storage modulus.
G″	Loss modulus.
g	Gram.
GL	Glycolipids.
GLC	Gas liquid chromatography.
GRAS	Generally Recognized As Safe.
hr	hour
ICMSF	International Committee on Microbiological Specifications for Foods.
IDF	International Dairy Federation.
IUPAC	Standard Methods for the analysis of oils, fats and derivatives.
i.e.	that is.
Kcal/g	Kilo calories per gram.
KDa	Kilo Dalton.
Kg	Kilo gram.
KPa	Kilo Pascal.
KSCN	Potassium thiocyanate.
LBC	Lipolytic bacteria count.
LDL	Low Density lipoprotein cholesterol Level.
LFC	Low-Fat white soft Cheese.
L.S.D	Least Significant Difference Test.
M & Y	Moulds and yeasts.
M	Molar.
MD	Maltodextrin.
MF	Milk Fat.
min	mint.
ml	milliliters.
mm	milimeter
MMTs	Multi Market Trading System
MNFS	Moisture in Non-Fat Substance.
M:P	Moisture to Protein.
MPC	Milk Protein Concentrate.
MS	Mean Square.
MSNF	Moisture in Non-Fat Solids.
MSCN	Modified Sodium Caseinate.
MTG	Microbial Trans-Glutaminase.
NaCl	Sodium Chloride.
N	Newton.