

-52- Summary of

**Effect of Lecithin as Emulsifier on Some Properties of Spreadable and
Blocks Processed Cheese**

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By

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SUMMARY

Processed cheese is one type of cheese, likely, and attractive, the most common and consumption of many groups worldwide. Its consumption has increased in Egypt during the last decade of the last century, because of its high nutritional value due to the content of the dairy component and non dairy components, as well as many natural materials improvement for taste, odor, commensurate with the needs and tastes of consumers. On the other hand its ability to save for long .times at room temperature

The properties of processed cheese influence by cheese composition of the blend, as well as the quality of the emulsifying salts used in manufacturing. The main problem with emulsifying salts is that their formulation unknown (secret) and they are very expensive. In an attempt to save hard currency and reduce the costs of the industry resulting from the import emulsifying salts from abroad that were :conducted this study in order to study

**Using of soybean lecithin as an emulsifier individually or in -١
compound with commercial emulsifiers in manufacture of
.spreadable and blocks processed cheese**

**Chemical, rheological, microbiological and organoleptic properties -٢
.of resultant cheese as affected by addition of lecithin**

.Keeping quality during storage of resultant cheese samples -٣

**Optimizing the condition of processed cheese manufactured by -٤
.using lecithin as an emulsifier**

Preliminary work indicated that the use of concentration more than 60% lecithin in emulsifying salt mixture resulted in rejected processed .cheese from technological and sensory evaluation point of view

- :The study is included two parts

:Part I: Properties of spreadable processed cheese containing lecithin

Production of spreadable processed cheese by adding of 3% emulsifying salts mixture to the mixture prepared for the industry.

Mixture of emulsifying salts is consisting of (JOHA S9 special + :Lecithin) with the following proportions

(Treatments (Trt	
Mixture of Emulsifying Salts	
Level of Substitution	
(%) with Lecithin	
JOHA S9 special + 0.0% % ٣.٠٠ (CONTROL) ٠.٠	Trt1 Lecithin
JOHA S9 special + 1.2 % % ١.٨ ٤.٠	Trt2 Lecithin
JOHA S9 special + 1.5 % % ١.٥ ٥.٠	Trt3 Lecithin
JOHA S9 special + 1.8 % % ١.٢ ٦.٠	Trt4 Lecithin

:The obtained results can be summarized as follows

No significant differences between spreadable processed cheese .١ containing lecithin and Control in the content of dry matter, fat/dm, salt/dm, ash/dm and T.N/dm. It's ranging between (44.69 to 45.11, 35.0255 to 35.0564, 4.7018 to 4.7199, 6.2155 to 6.2323 and 7.7417 to .7.8024 %) respectively

Refrigerator storage for cheese at 6 ± 2 °C for 120 days had no significant differences in the content dry matter, fat/dm, salt/dm, ash/dm and T.N/dm for all treatments

Lecithin had a significant effect on pH-value, acidity % and S.N/dm. It led to increase in pH-value and S.N/dm, while it led to a decrease in titratable acidity compared to control

pH-value and S.N/dm were ranged between 5.88 to 5.94 and 1.3068 to 1.3548 % for control and Trt4 respectively, while titratable acidity ranged between 0.96 to 0.99 % for Trt4 and control

All samples of cheese storage at refrigerator temperature 6 ± 2 °C for 120 days led to a significant increase in the percentage of acidity and the percentage of S.N/dm, while leading to significant decrease in the pH- value

All treatments of spreadable processed cheese containing lecithin had higher in meltability and oil separation compared to the control. It's ranged between 19.80 to 20.40 mm and 4.63 to 5.17 cm² for control and Trt4 respectively. While storage for 120 days at refrigerator temperature 6 ± 2 °C occurred a significant decrease in meltability and a significant increased oil separation in all treatments

Using of lecithin had a significant effect on some characteristics of texture (Texture Profile) of spreadable processed cheese, which led to the increase in hardness, springiness, while led to decrease in cohesiveness and adhesiveness compared to the control

Trt4 was the highest in the hardness 191.1 gm and springiness 10.51 mm, while it was the lowest in cohesiveness 1.82 gm/cm and Trt3 it was lowest in adhesiveness 10.15. On the other hand control was lowest in the hardness 67.50 gm and springiness 10.23 mm, while it was the highest in the cohesiveness 2.86 gm/cm and adhesiveness 47.75

Storage at a refrigerator temperature 6 ± 2 °C for 120 days occurred a significant increase in hardness, springiness and adhesiveness, while leading to significant decrease in cohesiveness in all treatments

Gumminess and chewiness are two secondary parameters derived from hardness, springiness and cohesiveness. Any change in value of hardness, springiness or cohesiveness led to change in gumminess and chewiness. Spreadable processed cheese containing lecithin was higher in gumminess and chewiness than control. Values of gumminess and chewiness were ranged between 193.1 to 377 gm/cm and 1974.9 to 3920.8 gm/cm respectively for control and Trt3. Also storage period had a significant effect on these properties. It occurred a significant increase in all treatments

The results of the arbitration that the organoleptic properties of spreadable processed cheese containing lecithin did not differ significantly from control. The total score ranging from 93 to 97 degree for Trt2 and Trt4, while the control 98 degree. Also, the storage at refrigerator temperature 6 ± 2 °C for 120 days resulted in significant decrease in the degree of arbitration on the organoleptic properties for all treatments

Total count of bacteria ranged from 1.80×10^3 to 1.95×10^3 cfu/gm for Trt4 and Trt2 respectively. Storage at refrigerator temperature 6 ± 2 °C for 120 days led to a reduction in the total count of bacteria

Spreadable processed cheese containing lecithin or control is completely free from fungi, yeasts, aerobic sporeformers bacteria and coliform bacteria, so for the cheese fresh and during storage at refrigerator temperature 6 ± 2 °C for 120 days

:Part II: Properties of blocks processed cheese containing lecithin

The aim of this part of the study to produce blocks processed cheese by adding 3% emulsifying salt mixture to the mixture prepared for manufacturing. Emulsifying salt mixture consists of (JOHA SE + Lecithin) with the following proportions

(Treatments (Trt

Mixture of Emulsifying Salts

(%) Level of Substitution with Lecithin

1. JOHA SE+ 0.0% Lecithin	3.1.1	Trt1
(CONTROL		
2. JOHA SE+ 1.2 % Lecithin	3.1.2	Trt2
3. JOHA SE+ 1.5 % Lecithin	3.1.3	Trt3
4. JOHA SE+ 1.8 % Lecithin	3.1.4	Trt4

- :The obtained results can be summarized as follows

Blocks processed cheese containing lecithin had no significant differences compared to control in the content of dry matter, fat/dm, salt/dm, ash/dm and T.N/dm. It were ranged between (50.77 to 51.36, 40.0442 to 40.0650, 4.6560 to 4.6927, 6.8250 to 6.8369 and 7.0577 to 7.1074 %) respectively

Content of blocks processed cheese from dry matter, fat/dm, .² salt/dm, ash/dm and T.N/dm didn't change significantly during storage .at refrigerator temperature 6 ± 2 °C for 120 days

pH-value, acidity and S.N/dm had a significant effect by adding .³ lecithin. It led to increase in pH-value and S.N/dm, but it led to a .decrease in acidity compared to control

pH-value ranged between 5.76 to 5.80 for control and Trt3, Trt4, .⁴ while the percentage of S.N/dm ranged between 0.9917 to 1.0362 % for control and Trt4. On the other hand titratable acidity ranged between .1.15 to 1.20 % for Trt3 and control

Storage period for 120 days at refrigerator temperature 6 ± 2 °C led .⁵ to a significant increase in the percentage of acidity and S.N/dm, while .leading to significant decrease in the pH- value in all treatments

Lecithin had a significant effect on meltability and oil separation .⁶ values of blocks processed cheese compared to control. Meltability and oil separation values ranged between 11.10 to 12.10 mm and 9.57 to 13.10 cm² for control and Trt4 respectively. While the storage at refrigerator temperature for 120 days occurred a significant decrease in meltability and a significant increased in oil separation in all .treatments

Found that the use of lecithin had a significant effect on some .⁷ characteristics of texture (Texture Profile) of blocks processed cheese, which led to the increase of hardness and springiness, while leading a .decrease in cohesiveness and adhesiveness compared to the control

The results showed that Trt4 was the highest in the hardness 514 gm ^{.^} and springiness 10.50 mm, while it's the lowest in cohesiveness 2.09 gm/cm and adhesiveness 15.5. On the other hand control was lowest in the hardness 189.9 gm and springiness 10.19 mm, while it was the .highest in the cohesiveness 2.59 gm/cm and adhesiveness 52.2

Storage period at refrigerator temperature 6 ± 2 °C for 120 days had ^{.^} a significant effect on characteristics of texture, it led to increase in hardness, springiness and adhesiveness, while it led to a decrease in .cohesiveness in all treatments

Found that blocks processed cheese containing lecithin was higher ^{.^} in gumminess and chewiness than control. Values of gumminess and chewiness ranged between 193.1 to 1074.3 gm/cm and 5011.9 to 11279.7 gm/cm for control and Ttr4 respectively. Also found that storage period for 120 days at refrigerator temperature 6 ± 2 °C had a significant effect on gumminess and chewiness, which led to increase in .all treatments

Organoleptic properties of blocks processed cheese containing ^{.^} lecithin did not differ significantly from control, it was obtained degrees for total score ranged from 92 to 96 degree for Trt4 and Trt2, in the same time control also obtained 96 degrees. The storage at refrigerator temperature 6 ± 2 °C for 120 days resulted in significant decrease in the degree of arbitration on the organoleptic properties for .all treatments

The results showed that total count of bacteria ranged between ^{.^} 1.98×10^3 to 2.15×10^3 cfu/gm for Trt4 and control respectively. Storage at refrigerator temperature 6 ± 2 °C for 120 days led to a reduction in .the total count of bacteria

**Fungi, yeasts, sporformers bacteria and coliform bacteria not .۱۳
detected in all samples of blocks processed cheese when fresh and
.during storage at refrigerator temperatures, 6 ± 2 °C for 120 days**