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Microbiological Evaluation Of Raw Milk And Soft Cheese In Sohag Governorate.

**PhD. V. Sc. Thesis
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1442 H – 2020 A.D.

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Summary

A total of 250 samples; 150 samples of raw milk (50 samples each from dairy farms, dairy shops and street vendors), 50 samples each of Domiati and Kareish cheese were randomly collected from dairy farmers, farmer's houses, dairy shops, street vendors and groceries in Sohag, Egypt. A survey was conducted to determine the microbiological quality of the examined milk and soft cheese samples.

Domiati cheese was prepared from pasteurized milk containing 10% sodium chloride. *Nigella sativa* seed oil (0.1 and 0.2%) was added. Cheese batches were stored in their whey at room temperature and examined periodically every week at day (0, 7, 14, 21, 28, 35 and 42).

The results obtained showed that:

1-Microbiological quality of raw milk and soft cheese samples:

• Total aerobic count:

All the examined samples of raw milk were contaminated with aerobic bacteria with average count values of 3.8×10^8 , 1.05×10^{10} and 1.17×10^{10} CFU/ml for dairy farms, street vendors and dairy shops, respectively. In soft cheeses aerobic bacteria were detected in 100% with average count values of 6×10^7 and 3.1×10^9 CFU/g in Domiati and Kareish cheese, respectively.

• Total coliforms and faecal coliforms count:

Coliforms were detected in 96, 84 and 96% of the examined raw milk samples with average count values of 2.2×10^5 , 1.6×10^6 and 1.5×10^6 CFU/ml for dairy farms, street vendors and dairy shops, respectively. In soft cheese coliforms were detected in 26 and 94% with average count values of 1.7×10^3

and 4.1×10^4 CFU/g in Domiati and Kareish cheese, respectively.

Fecal coliforms were present in 50, 44 and 54% of the examined raw milk with average count values of 1.6×10^3 , 2.1×10^3 and 1.8×10^3 CFU/ml for dairy farms, street vendors and dairy shops, respectively. In soft cheese fecal coliforms were detected in 12 and 86% with average count values of 2.3×10^2 and 1.3×10^3 CFU/g in Domiati and Kareish cheese, respectively.

• ***E. coli* count:**

E. coli was isolated from 12, 20 and 24% of raw milk samples with average count values of 1.4×10^2 , 2.6×10^2 and 2.2×10^2 CFU/ml for dairy farms, street vendors and dairy shops, respectively. In soft cheese *E. coli* was detected in 4 and 34% with average count values of 1.3×10^2 and 4.9×10^2 CFU/g in Domiati and Kareish cheese, respectively.

• **Anaerobic bacteria:**

Anaerobic bacteria in raw milk samples were present in 34, 42 and 48% in dairy farms, street vendors and dairy shops, respectively. While in soft cheese were found in 32 and 38% in Domiati and Kareish cheese samples, respectively

• **Psychrotrophic count:**

All the examined samples of raw milk were contaminated with psychrotrophic bacteria with average count values of 1.6×10^6 , 6.1×10^6 and 4.2×10^6 CFU/ml for dairy farms, street vendors and dairy shops, respectively. In soft cheese psychrotrophic bacteria were detected in 50 and 88% with average count values of 1.4×10^4 and 1.14×10^5 CFU/g in Domiati and Kareish cheese, respectively.

• *Staph. aureus* count:

Staph. aureus was isolated from 34, 44 and 48% of raw milk samples with average count values of 8.1×10^3 , 9×10^3 and 2.2×10^4 CFU/ml for dairy farms, street vendors and dairy shops, respectively. In soft cheese *Staph. aureus* was detected in 40 and 42% with average count values of 1.9×10^5 and 1.1×10^5 CFU/g in Domiati and Kareish cheese, respectively.

• Yeast and mold count:

Yeasts in raw milk samples were present in 40, 42 and 46% with average count values of 1.2×10^3 , 2.5×10^3 and 2.9×10^3 CFU/ml for dairy farms, street vendors and dairy shops, respectively. In soft cheese yeasts were detected in 66 and 70% with average count values of 2.7×10^4 and 6.6×10^5 CFU/g in Domiati and Kareish cheese, respectively.

Molds were present in 38, 32 and 28% of raw milk samples with average count values of 4.1×10^2 , 6×10^2 and 1.09×10^3 CFU/ml for dairy farms, street vendors and dairy shops, respectively. In soft cheese molds were detected in 32 and 22% with average count values of 1×10^4 and 4.3×10^5 CFU/g in Domiati and Kareish cheese, respectively.

Yeasts and molds were present in 40, 42 and 46% of raw milk samples with average count values of 1.6×10^3 , 2.9×10^3 and 3.4×10^3 CFU/ml for dairy farms, street vendors and dairy shops, respectively. In soft cheese yeasts and molds were detected in 66 and 70% with average count values of 3.16×10^4 and 8.01×10^6 CFU/g in Domiati and Kareish cheese, respectively.

2-Evaluation of antimicrobial potential of *Nigella Sativa Seed Oil* (NSSO) in Domiati cheese:

- **Total bacterial count:**

Total bacterial count reached a maximum of growth rate after 21 days in all samples, then reduction in growth rate was observed till reached 8.74 log CFU/g for 0.2% NSSO, 9.76 log for 0.1% NSSO and 10.81 log for control by the end of day 42 of storage at room temperature. Results showed that adding NSSO (0.1 or 0.2%) to cheese produced a reduction % of 5.29, 9.71% and 8.82, 19.15% for zero and 42nd day of storage respectively.

- **Total coliforms count:**

Coliforms were not detectable in 21st day of storage at room temperature in soft cheese supplemented with 0.2% NSSO, while were still present in 0.1% and control ones. Results showed that adding NSSO (0.1 or 0.2%) to cheese produced a reduction % of 14.9, 7.5% and 22.65, 100% for zero and 21st day of storage respectively.

- ***E. coli* count:**

E. coli rapidly lost its viability in cheese made from milk containing 0.2% NSSO to be undetectable by 14th day, while it could be detected in that made by 0.1% NSSO and control ones till 21st day. Results showed that adding NSSO (0.1 or 0.2%) to cheese produced a reduction % of 23.38, 15.25% and 35.06, 100% for zero and 21st day of storage respectively.

- **Psychrotrophic count:**

Psychrotrophic bacteria grew in enriched and control cheese till reached 4.45, 5.49 and 6.80 log CFU/g in 0.2%, 0.1% enriched cheese and control cheese, respectively. Results showed that adding NSSO (0.1 or 0.2%) to cheese produced a reduction % of 14.12, 19.26% and 19.21, 34.56% for zero and 42nd day of storage respectively.

- ***Staph. aureus* count:**

Staph. aureus counts reached the maximum at 21st day, then there was a dropping in all cheese batches till reached 4.00, 4.95 and 6.65 log CFU/g in 0.2%, 0.1% enriched cheese and control cheese, respectively by the end of day 42. Results showed that adding NSSO (0.1 or 0.2%) to cheese produced a reduction % of 4.61, 25.56% and 11.54, 39.85% for zero and 42nd day of storage respectively.

- **Total yeast and mold count:**

Total yeast and mold count showed growth from 7th day till reached 6.41 log CFU/g for 0.2% NSSO enriched cheese, 7.71 log for 0.1% NSSO enriched cheese and 9.61 log for control one by the end of day 42 of storage at room temperature. Results showed that adding NSSO (0.1 or 0.2%) to cheese produced a reduction % of 0, 19.77% and 4.49, 33.3% for 7th and 42nd day of storage respectively.

- **Na Cl%:**

Salt content showed gradual increase in all cheese batches till reached 7.4, 7.6 and 7.36% in control cheese, 0.1% NSSO enriched cheese and 0.2% NSSO enriched cheese, respectively by the end of day 42 of storage.

- **Titrate acidity %:**

Titrate acidity % was increased by increasing the storage period to reach maximum values 0.62, 0.60 and 0.48 % for control cheese, 0.1% NSSO enriched cheese and 0.2% NSSO enriched cheese, respectively by the end of day 42 of storage.