بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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MONA MAGHRABY

APPLICATION OF COLD STERILIZATION TECHNIQUE IN SOFT CHEESE INDUSTRY

By

FARIDA IBRAHIM YOUNIS

B.Sc. Agric. Co-oper., Higher Institute of Agric. Co-operation, Shoubra El-Kheima, 1997

M.Sc. Agric. (Dairy Sci. & Tech.), Fac. of Agric., Ain Shams University, 2005

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This thesis for the Ph.D. degree has been approved by:

Dr. Fawzy Sayed Ibrahim Osman …….…….……

Professor of Dairy Science and Technology, Faculty of Agriculture, El Minia

Dr. Samah Mohamed Shalaby …….

Professor of Dairy Science and Technology, Faculty of Agriculture, Ain Shams University

Dr. Osama Ibrahim Elbatawy …..……...…….

Associate Professor of Dairy Science and Technology, Faculty of Agriculture, Ain Shams University

Dr. Atef El – Sayed Fayed ……...…….

Professor Emeritus of Dairy Science and Technology, Faculty of Agriculture, Ain Shams University

Date of examination: / / 2020

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Under the supervision of:

Dr. Atef El – Sayed Fayed
Professor Emeritus of Dairy Science and Technology, Department of Food Science, Faculty of Agriculture, Ain Shams University (Principal supervisor)

Dr. Osama Ibrahim Elbatawy
Associate Professor of Dairy Science and Technology, Department of Food Science, Faculty of Agriculture, Ain Shams University

Dr. Ahmed Saber EL-Sisi
Head Researches of Dairy Technology, Food Technology Institute, Agriculture Research Center

ABSTRACT

Farida Ibrahim Younis Abd El-Aal: Application of Cold Sterilization Technique in Soft Cheese Industry. Unpublished Ph.D. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2020.

This research aims to assess the effect of different ozone dozes *versus* heat treatment on some chemical and microbiological properties including pathogens of raw milk, from which two of the most common white soft cheeses in Egypt, namely Domiati and Kariesh cheeses were chosen to be made.

Firstly, raw cow' milk was subjected either to heat treatment at 72°C for 15 sec or ozonation with ascending times every 5 for 30 min using an ozone generating device from the air (Electric Anion Ozonizer, Healthy Life, Model, AK-102, UK) at the rate of 400 mg O_3/h. On the other hand, autoclaved (at 115°C /15 min) skimmed milk was separately inoculated with 0.1% age broth cultured either with *Staphylococcus aureus*, *Bacillus cereus*, *Escherichia coli*, *Salmonella typhimurium* or *Shigella flexneri* exposed to the previous ozonation dozes.

Secondary, Domiati and Kariesh cheeses were made conventionally using the suitable milk for each (Full cream for the former and skimmed milk for the latter) previously either heat treated at 72°C for 15 sec or ozonized for 20 or 30min. Domiati cheese milks were salted (5%), renneted (5ml/10 kg) and the resultant cheeses were pickled for 3months at 25 ± 2°C. While those of Kariesh cheese were cultured (2% yoghurt starter) and the obtained cheeses were dry salted (2%) and kept at 5 ± 2°C for 3 weeks.

The obtained results reveal that, the initial log count in raw cow's milk was 7.22, 3.11, 2.18 or 3.15 cfu/ml for total bacterial, yeasts and molds, *Enterobacteriacae* or psychrotrophes, respectively. Those required at least 15, 20, 20 or 30 min ozonation at the rate of 400 mg O_3/h to be

significantly equal or less than those of 4.32, 1.05, <1 or 1.60 of the heat treated one at 72°C for 15 sec towards these microorganisms in order. While, the initial inoculated log counts of certain pathogenic strains including, *Staph. aureus, B. cereus E. coli, S. typhimurium* and *Sh. flexneri* were 8.3, 8.5, 8.4, 8.2 and 7.4 cfu/ml, in order. The corresponding log count reduced to <1 after 25, 25, 20, 20 and 30 min of ozonation at the same rate, respectively. Neither the heat treatment at 72°C for 15 sec nor the ozonation for any time at the previous rate led to any significant difference neither in the contents of total solids, fat, protein, lactose, ash, titratable acidity (TA) nor the pH value of cow's milk.

In comparison with the other procedure (heating or ozonation) of cheese milk treatment, both cheese varieties contained significantly lower in; dry matter (DM) water soluble nitrogen/total nitrogen (WSN/TN), formol, Schilovich, gumminess values and body and texture as well as total sensory scores but higher in the yield %, protein/DM, TA %, log count of yeasts and molds and flavor score when made from heat treated milk, of which Domiati cheese was also distinguished with higher values of fat/ DM, lactose/DM, ash/DM, hardness and total bacterial log count (TBC) as well as pH, and springiness values lower than those made from ozonized milk. While both of lactose/DM, fat/DM, ash/DM and pH values as well as appearance score of Kariesh cheese were not exhibited any response towards the treatment of skimmed milk prior cheese making. Heat-treated milk Kariesh cheese had lower hardness value and log count of *Streptococci* and *Lactobacilli* as well as higher springiness. The flavor score of both types of cheese was higher when their milks were ozonized at the lower dose.

Along the storage period of both cheese varieties, it was associated with significant increments in all compositional components, ripening indices, hardness and gumminess values studied Opposite to the lactose/DM and pH values as well as log count of yeasts and molds, those thereby decreased. Neither by the kind of milk treatment nor the

prolonging of storage period led to any significant change in the salt/moisture content and cohesiveness criterion of both types of cheese. While, springiness value was increased in Domiati cheese but decreased in Kariesh cheese. Neither coliform bacteria, *Staphylococcus aureus* nor *Salmonella typhimurium* was detected in all Domiati and Kariesh cheeses, regardless their milks treatments, whether when fresh or along storage period. During which TBC increased after 1 month and then decreased in Domiati cheese as well as log counts of *Streptococci* and *Lactobacilli* increased in Kariesh cheese. During pickling period, scores of all sensory criteria of Domiati cheeses, opposite to the appearance, increased gradually until the end of the pickling period (3 months). Nevertheless, both of appearance, flavor and total scores of Kariesh cheese lowered while the body and texture score enhanced gradually until the end of the cold storage period (3 weeks).

Finally, this study provides a realistic solution to small laboratories for the manufacture of cheese, which controls most of the processed milk, a new idea applicable to the production of safe food instead of using preservatives, whether authorized or unauthorized, to cover its inability to acquire pasteurization devices in violation of the legislation.

Key words: Ozone, Pathogens, Domiati cheese, Kariesh cheese, Texture profile, Ripening indices.

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