

Influence of solar radiation and microwave heating on microbiological, chemical and sensory quality of fresh khoa

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In a maiden attempt in utilizing solar radiation in dairy product preservation, the solar radiation was passed on to khoa through some media in order to extend its shelf life under room temperature (32 to 37°C). Similarly, application of microwave heating technique for the same purpose was also tried. Influence of the solar radiation through plain glass (S_1) and convex lens (S_2) and microwave heating powers (ranging from 40% to 60%) for 60 sec to 80 sec on microbiological, chemical and sensory qualities of the fresh khoa was studied. The mean Standard Plate Count (SPC), Yeast and Mould Count (YMC) and spore count of fresh khoa (day-0) ranged from 0 to 4.33×10^2 , 0 to 11.66 and 0 to 9.67 cfu/g. The chemical and sensory qualities of the samples remained almost similar (8.5 points out of 9) of control (8.6 point) The application of microwave heating was observed to be quite superior in reducing the SPC, YMC, and spore count of the khoa samples.

Key words : Solar radiation, Microwave heating, Khoa, SPC, YMC, Spore count.

INTRODUCTION

Solar energy is one of the most promising of the unconventional energy sources. It has been found to be utilized in technology of drying, heating of milk (Katre and Prasad, 1992), vegetables, fruits (Bhatia, 1978 and Khurdia and Roy, 1986), generating steam/hot water for dairy plants (Katre and Prasad, 1992) etc. However, the available literature indicates that probably, it has not yet been used in dairy product preservation by improving their bacteriological quality. A lot of energy in the form of fuel, oil, steam, water, electricity, chemical is needed for products preservation and this adds to the cost of production of dairy products. Solar energy not only saves all these costs but is reported to be beneficial in maintaining high nutritional and sensory quality (Bhatia, 1978, Khurdia and Roy, 1986 and Sudheer and Das, 1999) Moreover, its use might bring pollution free atmosphere. This is certainly going to be a new approach in food preservation area because no reported literature probably indicates that the solar energy had ever been utilized in bacteriological preservation of dairy products.

Microwave energy has been gainfully utilized in the food industry for various applications such as cooking, pasteurization, sterilization, blanching, tempering baking, drying etc. Microwaveable convenience foods represents a rapidly growing segment of the food processing industry. Dairy industry applications of microwave processing

include enhancement of pasteurization, efficiency, thermising milk prior to cheese manufacturing, inactivation of bacteriophage, clarification of butter into ghee, thermization of yoghurt (Mathur and Sachdeva, 2000). However, the available literature indicates that it has not yet been used in product preservation like khoa by improving their bacteriological quality.

Both, solar and microwave energies seem to be the ideal and promising techniques for preservation of dairy products including khoa. If they prove to be effective and economical, they might pave a new path in the field of dairy industry. Considering these facts in view present investigation was planned.

MATERIALS AND METHODS

The composite samples of fresh crossbred cow milk were obtained from the University dairy farm. The present research work was carried out in the laboratory of the department of Animal Science & Dairy Science during the year 2003-2004, Post Graduate Institute, M.P.K.V. Rahuri, Dist. Ahmednagar (M.S.).

Khoa samples were prepared using the method of De and Ray (1952). The khoa samples, 200 g each were immediately filled into 250 g capacity sterilized PP squats.

Application of solar and microwave treatments :

S_0 (control) : No solar or microwave treatments to khoa samples.

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