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Combined effect of milk source and pre-acidification method of cheese milk on yield, meltability and colour of mozzarella cheese

O.G. Palliyaguru and N.M.N.K. Narayana*

Department of Animal Science, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka

Abstract

Mozzarella, a soft un-ripened variety of cheese originated in Italy belongs to pasta-filata or stretched group of cheeses and has shown a remarkable growth in production over the last century. The yield and the desirable properties of mozzarella depend on a number of factors including type of milk and pre-acidification method of cheese milk. A 3×3 factorial arrangement of treatments in a completely randomized design was used to find out the combined effect of milk source {cow (CM), buffalo (BM) and mixed (CM:BM 1:1 ratio)} and the method of pre-acidification {starter culture (SC): *Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus* 1:1 ratio, acetic acid (AA) and citric acid (CA)} of cheese milk on yield, meltability and instrumental colour of mozzarella cheese. Cheese made using BM and pre-acidified with SC served as the control. Main effects of milk source and method of pre-acidification showed a significant ($p < 0.05$) effect on yield of cheese whereas interaction effect was not significant ($p > 0.05$). The yield of cheese made from BM ($13.97 \pm 0.78\%$) was observed to be higher than that of the cheese made from CM ($8.88 \pm 0.52\%$) as well as mixed milk ($9.96 \pm 0.54\%$). Further, cheese milk pre-acidified using CA and AA showed a higher cheese yield (11.26 ± 2.27 and $11.41 \pm 2.43\%$, respectively), compared to that of the cheese milk pre-acidified with SC ($10.15 \pm 2.18\%$). A significant ($p < 0.05$) interaction effect between milk source and method of pre-acidification of cheese milk was observed for meltability and b^* value (variation from yellow to blue colour) of the resultant cheese. Meltability was superior in mozzarella cheese manufactured from CM pre-acidified using CA (9.13 ± 0.28 cm) compared to the control (4.03 ± 0.05 cm). Cheese made using CM pre-acidified with CA and AA showed significantly ($p < 0.05$) higher b^* values (22.99 ± 1.46 and 20.19 ± 2.80 , respectively) compared to the control (14.98 ± 1.37). Therefore, the milk source and the method of pre-acidification of cheese milk are closely linked to the yield, meltability and colour of mozzarella cheese and hence, careful selection of raw materials and manipulation of processing conditions are required to get an optimum quality end product.

Keywords: Combined effect, Instrumental colour, Meltability, Mozzarella, Pre-acidification.

***Corresponding Author:** nayana@ansci.ruh.ac.lk