

The Effect of UV Light Treatment and Processing Method on the Microbial Reduction of Pasteurized Whole Milk.

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Ultraviolet light (UV) irradiation may be an alternative to added preservatives and is of interest to the dairy food industry as a potential low cost, non-thermal method of preservation. The objective of this study was to determine the impact of UV treatment immediately before or after pasteurization on microbial reduction in whole milk.

A total of four controls and four test variables were produced. The controls were single pasteurized or double pasteurized milk with or without the UV processing equipment. The test variables were UV light followed by pasteurization or pasteurization followed by UV light at either 138 J/L or 920 J/L. Fresh, whole milk was standardized to 3.5% fat and each variable thermally processed at 166°F for 16 seconds and homogenized at 500/2000 psi. A Sure Pure Photo-Purification unit was used for UV light treatment. Microbial testing was completed every three days until 21 days post processing. All variables were replicated five times.

The results show that the observed reduction in microbial load was from 91,000cfu/ml to 20cfu/ml, 16cfu/ml, 13cfu/ml and 19cfu/ml for the controls of single pasteurized with UV processing equipment, single pasteurized without UV equipment, double pasteurized with UV equipment and double pasteurized without UV equipment respectively. On the other hand, the observed reduction in microbial load was from 91,000cfu/ml to <10cfu/ml, 13cfu/ml, <10cfu/ml and 14cfu/ml for UV treatment at 920 J/L followed by pasteurization, UV treatment at 138 J/L followed by pasteurization, pasteurization followed by UV treatment at 920 J/L and pasteurization followed by UV treatment at 138 J/L respectively. At the end of three week microbial study, there was an increase in microbial counts for all controls and test variables except for UV treatment at 920 J/L followed by pasteurization where the microbial population was still below 10cfu/ml. Results indicate that when raw whole milk is treated with UV light at 920 J/L followed by pasteurization, there is a reduction in microbial load and the low microbial load is maintained throughout 21 days.