

Jareeporn Boonlom 2012: Using Ultraviolet Irradiation Combined with Pasteurization to Extend Goat Milk's Shelf Life. Master of Science (Food Safety), Major Field: Food Safety, Department of Animal Science. Thesis Advisor: Assistant Professor Sasitorn Nakthong, Ph.D. 101 pages.

The aim of this study was to use ultraviolet irradiation to reduce microorganisms in goat's milk before and after pasteurization and also to measure shelf life after the irradiation and applications of ultraviolet irradiation combined with pasteurization. Raw and pasteurized goat's milk samples were passed through ultraviolet irradiation (UV- C 253.7 nm.) with flow rates of 0.85 ml/s, 1.2 ml/s and 1.7 ml/s with recirculation for either 1, 2 or 3 times. The pasteurized milks treated with and without the ultraviolet irradiation were then stored at 4°C for 15 days. The milks were tested for their composition, physical; chemical; biological properties as well as acceptability using a sensory ranking test.

The results showed that the ultraviolet irradiation could reduce microorganisms in goat's milk. The reduction of the microorganisms was dependent on flow rate and recirculation. The lowest flow rate and maximum time of recirculation (0.85 ml/s, 3 times of recirculation) yielded the greatest reduction in total microorganisms in both raw and pasteurized goat's milk samples. It may be hypothesized that this was because the milks were exposed to the ultraviolet irradiation for longer than at fast flow rates or less recirculation. However, for the lowest microorganism condition, the sensory acceptability was ranked as least acceptable. Overall, the pasteurized milk samples treated with the ultraviolet irradiation showed a tendency to have a longer shelf life than the untreated milk. Their composition, physical and chemical properties fell within the ranges for fresh milk's standard values, as defined by the Thai industrial standard. Two treatments of ultraviolet irradiation to reduce microorganisms in goat's milk can be proposed. First, it could be used to reduce initial microorganisms in raw goat's milk before processing to products. Second, it could be used as an additional tool to reduce microorganisms in pasteurized milk after the pasteurization to extend the milk's shelf life. In the second case, it should be done with sensory acceptability in mind. Short periods of ultraviolet irradiation exposure or fast flow rate and less recirculation yielded greater acceptability using a ranking test. In conclusion, pasteurization combined with ultraviolet irradiation could be applied in small milk factories or cottage industries to extend pasteurized milk's shelf life.

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Thesis Advisor's signature