

## **Design and performance assessment of flat-plate solar milk pasteurizer for arid pastoral areas**

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### **Abstract:**

A solar milk pasteurizer consisting of flat-plate water-heating collector and a 1.5-mm thick stainless steel cylindrical milk vat was designed and tested in an arid pastoral area of northern Kenya. The milk vat had a capacity of 80 L and a 50-mm wide hot water jacket insulated with 38-mm thick fiberglass. Hot water produced by the collector was used for pasteurizing milk. The optimum quantity of milk that could be pasteurized by this device under the study conditions was 40 L, and the average temperature difference between hot water and milk being pasteurized was  $8.1 \pm 1.4$  °C. Total bacterial counts in pasteurized milk were less than  $10^4$  cfu/mL while coliform counts were negative. This low-cost solar milk pasteurizer is appropriate for arid pastoral areas without grid electricity, where milk marketing is an important income source, and where most of the milk is boiled using fire-wood.