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Extending the shelf-life of raw milk in sub-Saharan Africa using a passive cold chain solution

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Abstract

In most sub-Saharan countries, milk marketing systems suffer from poor milk quality, unfunctional quality control systems, and no pricing based on quality or demand/supply fluctuations. Much of the marketed milk passes through unorganised (informal) transactions such as farmer-to-consumer direct transactions on a contractual basis, at producer or trader-owned small milk shops, and open local markets. In Ethiopia, the volume of milk channelled through the formal milk market accounts for less than 20 % of the total volume of milk marketed at the national level. Except in a few cases, only morning milk, collected by dairy cooperatives, individual traders, and milk processors, reaches the few processing plants operating in and around Addis Ababa. Moreover, only a small proportion (under 10 %) of the milk producers in high dairy potential areas have access to the formal milk market channel most of whom do not sell evening milk because they are not able to cool their milk, safely store and transport it the following day.

IKIC Impact Ventures BV, a Belgium-based company, is piloting a passive cold chain solution that preserves evening milk till morning. The solution uses thermostatic batteries (Orbs) with stainless steel casings containing a phase-changing material, which allows a stable and predictable cooling environment for temperature-sensitive products such as milk.

This study monitored the temperature and pH of milk stored in three treatments: i) filled milk cans with Orbs and fitted in an insulating case, ii) milk cans with Orbs stored without an insulating case and iii) cans filled with milk, without Orbs and without an insulating case. The results show that this recent technology effectively lowered temperature and slowed down acid formation in milk. Using an insulating case improved the effectiveness of the technology which maintained milk quality overnight in Ethiopia, making evening milk suitable for processing the next day.

Keywords: Ethiopia, food safety, IKIC impact ventures, milk cooling, milk quality, preservation