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Characteristics of Farm-Level Practices Attributed to Postharvest Milk Losses in Smallholder and Pastoral Systems in Kenya

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Abstract

This study characterised milk production, handling and marketing practices in sample herds from three production systems: smallholder rural, smallholder peri-urban and pastoral camel in Kenya. These practices, when not adequately applied, contribute to reduction in milk production and quality. Postharvest milk losses, occurring as a result of reduced quality, quantity and economic value of milk can be minimized through proper practices. A cross sectional survey followed by laboratory analysis of milk and feed samples was conducted. Data was analysed using descriptive, inferential statistics and regression models. Pre-milking hygiene and handling procedures were implemented most herds in rural (90%) and peri-urban (71%) but not in pastoral herds due to insufficient access to water. This resulted in higher Log₁₀SCC (somatic cell count) level in camel milk (7.4 cells ml⁻¹) compared to cows' milk in smallholder system (5.4 cells /ml). Smallholder peri-urban herd tended to have higher Log₁₀SCC (5.4 cells ml⁻¹) than rural (5.3 cells ml⁻¹). Intensification of production in peri-urban herds may be the reason since hygienic constraints for the milking environment are higher. In rural, aluminium containers were predominantly used for milking (63%) and milk storage (62%), and plastic containers for bulking and transportation (68%). Rural farmers predominantly practiced free grazing (83%), while peri-urban practiced diversified feeding, integrating Napier grass (28%) and crop residues (18%). This led to higher nutritive value of rations for rural farmers compared to peri-urban reflected in milk (12 kg herd⁻¹ d⁻¹ vs 9 kg herd⁻¹ d⁻¹). Feed composition did not meet cows' requirements in both systems. Feeding in pastoral was matched to available feed resources including shrubs in the rangelands and *Euphorbia tirucalli* in the peri-urban town. Morning milk was mostly sold through formal market in rural (80%), peri-urban (59%) and pastoral herds (97%). The prominence of small traders in marketing morning milk in smallholder peri-urban (35%) was also noted. Evening milk was mostly sold to informal market (63% and 92% in rural and peri-urban respectively). Milk market participation was based on quantity rather than quality and price negatively influenced participation to formal markets. Therefore reinforcing training in milk hygiene, handling and feeding will improve quality, thus reduce postharvest milk losses.

Keywords: Feeding practices, milk market outlets, on-farm milk handling practices, pastoral systems, postharvest milk losses, smallholder