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ASSESSING FARM LEVEL PRACTICES AFFECTING MILK PRODUCTION, QUALITY AND POSTHARVEST LOSSES IN SMALLHOLDER DAIRY AND PASTORAL CAMEL HERDS OF KENYA

PhD Thesis summary

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Abstract

Farm level post-harvest milk losses (PHL) in smallholder and pastoral milking herds that occur at milking, pooling, evening storage or at the farm gate delivery may be associated with many farm practices. This study tested the hypotheses that feeding practices influence production and quality of milk, and that milk market outlets influence milk hygiene and PHL. Data was obtained in cross sectional survey, on-farm milk and feed sampling for quality and microbiological tests and targeted on-farm interventions to improve feeding and milk quality. Hypotheses were tested with Chi-square tests, analysis of variance and logistic regression. Mastitis prevalence within smallholder dairy herds was 1.69 times more in rural than in peri-urban farms while prevalence within pastoral camel herds was 1.56 times more in rangelands than in peri-urban herds. Mastitis positive milk samples had higher incidences of *Staphylococcus aureus* than of *Streptococcus* species, both in smallholder (57.9% vs 23.7%) and pastoral (41.6% vs 36.5%) herds. High SCC was associated with high prevalence of mastitis and *Staphylococcus aureus*. High SCC ($\geq 4 \times 10^5$ cells/ml) was associated with PHL in pastoral (58.8%), in smallholder rural (27%) and in smallholder peri-urban (7%) herds. Feed diversity, quantity and quality (energy and crude protein) offered were better in rural than in peri-urban smallholder herds but had little influence on milk yields. Feeding green forages with crop residues and concentrates attained higher milk yields (10 kg to 14 kg per cow/day) in smallholder herds. Feeding in pastoral herds included *Euphorbia tirucalli* in the peri-urban where nutritional quality was better than in rangelands and feeds had influence on SCC and milk composition. Targeted intervention to improve feeding and milk quality in smallholder herds enabled the intervention group to produce 19.9 -19.2% more milk relative to control group, but intervention did not influence change in milk quality. Smallholders participating in both formal and informal markets produced more milk (21.9 kg/day) than those participating only in formal (≤ 14.7 kg/day) or informal (≤ 11.3 kg/day) market outlets. Milk quality was generally higher in informal compared to formal market outlets and milk price less than KES 28 a litre discouraged participation in formal markets ($p=0.032$). These results show that substantial PHL results from milk handling hygiene practices and that feeding practices influence volume and quality of milk produced while markets where farmers sell milk has influence on milk handling hygiene and PHL experienced.

Keywords: Action research, Milk hygiene, Milk market outlets, Udder health.