The roles of Kenya dairy producers in the quality of marketed milk

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Key points
- Only 22% of milk samples collected from farmers at collection centres (CCs) in Metkei, Eldoret and Limuru, Kiambu were unacceptable according to standards for bacterial quality set by the Kenya Bureau of Standards (KEBS).
- Interviews revealed generally good hygiene practices by producers.
- The generally good quality of milk at farm level sharply contrasted with previous findings of milk quality from sampling of milk from traders and consumer households in urban areas where milk quality was relatively much lower, with over 60% of samples of unacceptable bacterial quality (Omore et al. 2005).

Introduction
The informal milk trade dominates the Kenya milk market with approximately 86% of milk sold unpasteurized (Omore et al., 2005). In the absence of cold chain, milk quality deteriorates very fast due to rapid bacterial multiplication. Quality can be compromised at any point along the market chain, but poor hygiene practices by farmers have been perceived as the main contributor to the low milk quality in the market.

A study of milk quality sampled from milk traders and consumer households (Omore et al. 2005) found the bacteriological quality of informally traded milk is low.

This was attributed to poor unhygienic handling by farmers and traders, delays during transit and lack of cooling facilities. It has not been clear to what extent each node in the chain contributes to the low bacteriological quality of marketed milk. To overcome this, the Kenya Dairy Board has implemented measures in different parts of the country targeted at different value chain actors to improve the quality of milk in the market and guarantee quality to consumers of dairy products. One of those measures is a training and certification program that requires value chain actors to first acquire basic skills in milk quality control before licensing. This brief presents results of a survey on milk quality in smallholder farms in Limuru and Eldoret and relates this to quality of milk along the market chain from the earlier market study by Omore and others (2005).

Box 1: Bacterial count
Bacterial counts in milk rise if milk is not chilled or if hygienic standards are not maintained.

Total bacterial count is a direct bacteriological test and is a reflection of temperature and time since milking while coliform count reflect levels of hygiene or sanitation, as they are mainly fecal in origin. Both are measured in colony-forming units per millilitre (cfu/ml).
**Box 2: Data source and methodology**

A study was carried out in 2012 in milk collection centres (CCs) supplying the Limuru Dairy Cooperative (LDC) in Limuru District and Metkei Multipurpose Dairy Limited (MMDL), one of the East Africa Dairy Development (EADD) project sites in Eldoret.

The CCs were selected based on the number of farmers bulking milk there and accessibility. A total of 297 milk samples were collected from farmers delivering milk to CCs in the two study sites.

The milk was aseptically sampled using an aluminium ladle that was first flamed and cooled before being used to thoroughly mix the milk. Approximately 100ml of milk was sampled and then distributed into two sample bottles. Milk in one of the sample bottles was designated for microbiological analysis while the other was for compositional analysis. All the sample bottles were properly labelled, stoppered and transported to the laboratory in an ice-packed cooler box.

Laboratory tests were carried out at the University of Nairobi’s department of Public Health, Pharmacology and Toxicology, the central veterinary laboratories in Kabete, the regional veterinary laboratories in Eldoret and the MMDL laboratory. Assessment of bacterial quality was based on the milk hygiene standards of KEBS. The benchmarks are >50,000 cfu/ml and >2,000,000 cfu/ml for coliform and total counts, respectively.

A questionnaire on dairy farmer practices was randomly administered to 252 farmers whose milk had been sampled.

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Milk from a healthy cow contains very few microorganisms, usually less than 1000 total bacteria per ml of milk (Omore et al., 2005). However, soon after milking depending on the environment, bacterial contamination, delays in transit and lack of cooling facilities lead to a rapid bacterial growth phase within two hours and reaching several millions within six hours. Contamination may occur at any point along the market chain.

**Results**

Figure 1 shows the bacteriological results measured against the KEBS benchmarks. Generally, about 22% of milk samples from the two sites (Limuru and Eldoret) had exceeded KEBS standards for bacteriological counts (<2,000,000 cfu/ml total counts and <50,000 cfu/ml coliforms counts).

Figure 1: Comparison of total bacterial and coliform counts at farm level in Limuru and Eldoret
These findings are consistent with results from a previous Smallholder Dairy Project (SDP) study where milk from farmer groups had lower total bacterial and coliform counts compared to other milk handlers in the informal channel (Figure 2). Elsewhere in his research, Oduor (n.d.) observed that 80% of milk delivered by farmers to processing plants met the minimum quality standards.

Figure 2: Comparison of bacterial counts in milk among cadres of milk traders.

These results challenge the perception that poor hygiene practices by dairy farmers is the main source of poor milk quality. On the contrary, a general inference made from this study is that milk is of good bacterial quality at the time of collection at the farm. This could be attributed to the good hygienic practices by farmers (Table 1). Cleanliness was observed in most farms and farmers mostly used clean sources of portable water. Farmers have also increasingly adopted use of aluminium cans which enhances the quality of milk delivered. Chilling of milk is rare among milk producers (due to lack of electricity) and is non existent during transportation by small-scale traders and farmers.

Table 1: Proportion of farmers observing hygienic practices at the farm

<table>
<thead>
<tr>
<th>Farmer practices</th>
<th>Limuru</th>
<th>Eldoret</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand washing</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>Udder washing</td>
<td>99%</td>
<td>97%</td>
</tr>
<tr>
<td>Teat dipping</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Milk containers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td>100%</td>
<td>95%</td>
</tr>
<tr>
<td>Plastic</td>
<td>0%</td>
<td>5%</td>
</tr>
<tr>
<td>Water source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piped</td>
<td>80%</td>
<td>6%</td>
</tr>
<tr>
<td>Community/private pump</td>
<td>7%</td>
<td>57%</td>
</tr>
<tr>
<td>Rain catchment/rivers/streams</td>
<td>1%</td>
<td>17%</td>
</tr>
<tr>
<td>More than one source</td>
<td>12%</td>
<td>20%</td>
</tr>
<tr>
<td>Housing cows</td>
<td>98%</td>
<td>16%</td>
</tr>
<tr>
<td>Awareness on drug withdrawal</td>
<td>90%</td>
<td>94%</td>
</tr>
</tbody>
</table>

Source: Omore et al., 2002
Conclusions

• Though producer awareness and practices are generally good, these can further be improved because milk quality management starts at the farm.
• Milk quality mostly deteriorates in the hands of milk traders.
• Incentives to improve milk handling practices as opposed to rules and regulations (which seldom work) should be encouraged. For example, training and certification and regular monitoring of milk handlers and milk quality that has previously been shown to contribute to milk quality improvement should be encouraged.
• Ultimately, a cold chain is needed to maintain milk quality along the market chain.

References


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