Milk quality maintaining standards

A cross-disciplinary team of Teagasc researchers are tackling the challenge of producing premium quality milk at increased quantities.

Ireland is currently well recognised internationally for the production of very good quality milk and this premium quality status will need to be maintained, and improved upon, for the long-term future of the export market and the interests of the consumer. The proposed removal of quotas in 2015 will likely lead to an increase in milk production, as forecasted by the Department of Agriculture, Food and the Marine's Food Harvest 2020 report. This will necessitate a focus on milk quality research to ensure the production of premium quality milk for an extended manufacturing season. Food Harvest 2020 predicts a 50% increase in milk production by 2020 (above the average 2007 to 2009 baseline). This equates to a 2.75 billion litre increase in milk production that would add value to primary output by about €700 million/year, with further benefits from increased dairy product values, export earnings and employment.

In parallel, milk processors are setting higher specifications for milk quality including improved bacterial quality, decreased somatic cell counts (SCC) and residue concentrations, required by export markets. The EU has set a legislative SCC limit of ≤400x10^3 cells/ml (which is generally met), but some markets are now requiring milks to meet a specification of ≤200x10^3 cells/ml, and it is generally accepted that a lower specification will be required in future. Also, in order to accommodate the increased milk processing volume, an extension of the duration of the product manufacturing season is required. So, a significant challenge exists to continue producing premium quality milk in light of tighter standards, expanding herd size on farms, reduced labour availability and recent changes in animal treatments and legislation.

How are these issues being addressed?

The issues mentioned above require a multi-disciplinary approach. Teagasc is ideally placed to deal with such issues as it is one of the few Agricultural Research and Development Agencies globally that has the capacity to deal with the complete "milk pipeline" from "farm to fork".

Teagasc has established:

- an internally co-ordinated approach to milk quality that involves researchers at the Animal and Grassland Research & Innovation Centre, Moorepark, the Food Research Centres (Moorepark and Ashtown) and the Farm Advisory Group.
- interaction with industry mainly through the establishment of the Milk and Product Quality Forum in 2009. This group represents key dairy industry stakeholders including quality managers and/or quality advisors from the dairy companies and members of other organisations (e.g., Irish Dairy Board) associated with the promotion of the Irish dairy industry. It provides a forum where new milk and product quality issues may be identified and existing issues addressed. It also assists in the dissemination of key research findings to the industry.
- international collaboration with, for example, (i) Professor Ruegg, University of Wisconsin-Madison, USA, who is recognised as a world leader in the field of food microbiology and milk quality; and (ii) a joint study with DairyNZ (Dr Jenny Jago) and Massey University, New Zealand, is evaluating labour efficiency in milking parlours with particular reference to influences on milk quality.

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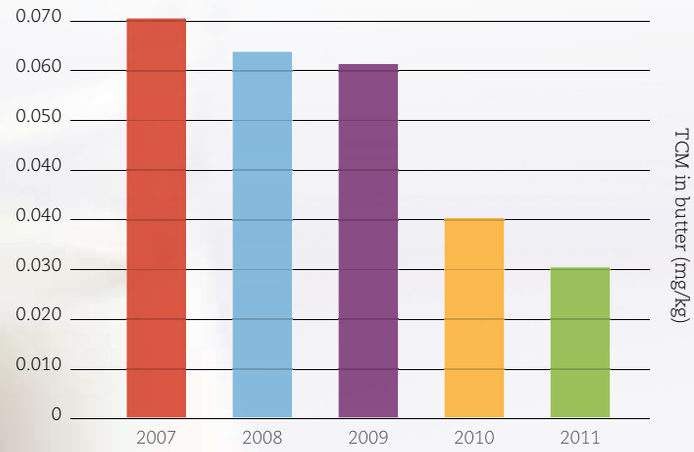

Figure 1. Profile of TCM reduction in Irish butter from an initial high of 0.07 mg/kg to the target level of 0.03 mg/kg.

As the dairy industry develops and expands over the coming decade it will be vital that the clean, green image of the Irish dairy industry is maintained. Image courtesy Bord Bia.

Current milk quality research highlights

Food Institutional Research Measure: a project has been funded and recently commenced under the Department of Agriculture, Food and the Marine's FIRM programme. Its aim is to collate all recent Irish and international research on a number of aspects of milk quality in order to identify the gaps in knowledge and those aspects requiring specific attention.

Bacterial transfer to milk: The effectiveness of a range of milking equipment cleaning products and procedures are currently being evaluated. A key output of this research is a detergent efficacy list which is available on the Teagasc website (http://www.agresearch.teagasc.ie/moorepark/Articles/Chemicalanalysisofdetergentsterilizerproducts.pdf). The increasing importance of infant formula manufacture has lead to a new focus within the programme, i.e., the occurrence and control of Bacillus cereus and sulphate-reducing clostridia (SRC) in farm bulk milk.

SCC Reduction: The impact of milk SCC on milk chemistry and cheese manufacture is currently being addressed. The reduction of milk SCC on-farm is the focus of CellCheck, a joint programme being run by Animal Health Ireland and Teagasc. SCC and its impact on farm profitability has been the subject of a recent article in TResearch (Winter 2011, p22-23).

Chemical residues: Trichloromethane (TCM) levels in butter are an important market-driven concern for the dairy industry at present. An industry-funded project at Teagasc has addressed this issue for the last four years and significant progress has been achieved. Figure 1 shows the gradual reduction of TCM in butter from 0.07 mg/kg in 2007 to 0.03 mg/kg in 2011. This was achieved through farm visits to identify incorrect practices, advice on the correct practices allied with a vigorous advisory campaign through Teagasc and the dairy companies and, most importantly, an intensive analysis programme. Routine screening for TCM in both tanker milks and individual suppliers' milk resulted in analysis of approximately 25,000 milk samples during 2011.

Liver fluke: Liver fluke continues to be an issue on many Irish farms; however, there are few flukicides available to assist farmers to control this problem in dairy cows. Research at Teagasc has followed the persistence and stability of various flukicide residues during pasteurisation, separation and manufacture of dairy products, including cheese and milk powder. Results show that residues are carried over into the dairy products and are stable therein. This poses a serious challenge for industry and further research is required.

Future

As the industry develops and expands over the coming decade it will be vital that the clean, green image of the Irish dairy industry is maintained. New markets and new products, along with the need to link quality milk production to our seasonal supply will continue to impose new challenges to the industry. A strong research base in quality milk production and processing with solid links to the dissemination capacity of the Teagasc Dairy Advisory group and the key industry stakeholders will be vital if these challenges are to be addressed in a positive and adequate manner.