Annual report of the UK National Reference Laboratory for the microbiological testing of milk and milk products.

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The National Reference Laboratory (NRL) for the microbiological testing of milk and milk products for the UK is currently based at the Agri-Food and Biosciences Institute (AFBI) in Belfast, Northern Ireland.

The role of the NRL, as it is for all respective NRLs in other Member States, is to provide monitoring for the enforcement of EU Directive 882/2004 on official controls performed to ensure the verification of compliance with food and feed law, animal health and animal welfare rules. The ultimate aim is to promote fair trade both within and between Member States within the EU.

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Introduction

It is important to recognise the hierarchy of enforcement authorities within the European Union. On the top tier is the relevant EU Reference Laboratory (EU-RL) which is based in Maisons-Alfort, Paris, France and funded directly by the EU Commission. This Laboratory is responsible for monitoring the performance of the reference laboratories in Member States e.g. the UK National Reference Laboratory (UK-NRL) based in the Agri-Food and Biosciences Institute in Belfast, UK. Each of the NRLs is, in turn, responsible for the performance of Official Control Laboratories (OCLs) situated within their jurisdiction. Both the Member State NRLs and OCLs are funded by their respective Government departments for testing performed under the relevant legislation. An OCL is defined as a laboratory which generates results which can be used by the competent authority for enforcement purposes under the requisite EU directives. The object of the whole exercise is to facilitate fair trade both within and between member states of the EU and ultimately to ensure the safety of the public and protect them from fraudulent practices. It also acts as a contact point for those countries outside the EU who wish to export dairy products into the region.

In the proper pursuit of its function the UK-NRL has a number of responsibilities viz.

- Participate in ring trials organised by the EU-RL to ensure the satisfactory performance of the member state NRLs e.g. total viable counts.
- Participate in practical assessments to aid the formulation of EU legislation e.g. levels of alkaline phosphatase in pasteurised bovine milk cheeses.
- Monitor performance of national OCLs. Since the majority of these within the UK are accredited to ISO17025 for the analyses they perform under the requisite EU legislation, which requires internal and external independent audit and satisfactory performance in internal and external quality assurance schemes, this is currently regarded as adequate.
- Disseminate relevant changes to British Standard (BSI) and International Standard Organisation (ISO) standards to the OCLs. The participation of the Lead Scientist of the UK-NRL on BSI Technical Committees AW/9 and AW/5 facilitates this function.
- Provide expert advice to the FSA or OCLs as required.
- Disseminate information coming from the EU-NRL. The circulation of a questionnaire to the UK national OCLs about their activities ensures that only relevant information is circulated to them and reduces any unnecessary burden of administration.
- Participate in workshops organised by the EU-RL on topics of concern.

It is recognised that the ultimate responsibility for the operation of the UK-NRL resides with the FSA and they provide the necessary finance. In

pursuit of this responsibility the FSA can conduct an audit of the UK-NRL at any time.

It should be recognised that the current contract between AFBI and the FSA to fulfil the NRL function is due to end on 31st March 2013. This organisation (AFBI) has submitted a tender to the UK-FSA for continuance of this function and awaits a response from that organisation.

Alternative methods for total viable counts

The testing of raw milk for total viable count is for one or both of two principal reasons viz. enforcement purposes (EU Regulation 853/2004) or to enable the operation of quality payment schemes. In April 2011 a report was received from the EU Reference Laboratory (EU-RL) detailing an analysis of questionnaire responses concerning alternative methods, such as the use of Bactocount™, Bactoscan™ and Bently systems for measuring the total viable microflora of raw milk in Member States.
This report was sent to all Member State National Reference Laboratories (NRLs). The UK NRL responded to the original questionnaire and collated the data from relevant UK laboratories to enable the UK data to be taken into account in the overall analysis. This analysis was not restricted to bovine milk and milk from other animals was included e.g. buffaloes, mares and camels although this is considered of minor relevance to the UK.

The main reason for this exercise was because many of the alternative methods measure all the viable bacteria in the sample, even those within clumps. Traditional viable plate counting methods cannot discriminate between cells within clumps and those in a planktonic state. A single viable cell will give rise, under the right conditions, to one colony and a clump of cells, perhaps containing hundreds of cells, will also only give rise to one colony. This means that the value obtained with most currently available alternative methods will likely be consistently higher than the value obtained using a traditional plate count. This necessitates the use of a conversion factor to transform the value obtained with alternate methods to its plate count equivalent since the latter value is used for enforcement purposes. It was of concern to the EU-RL that different conversion factors may be being used even for the same machine models and this may adversely affect fair trade both within and amongst Member States.

In conclusion the EU-RL considered this questionnaire analysis represented a good initial step towards harmonisation of conversion factors with the overall objective of establishing a single conversion factor, at least per country, for all EU Member States.

The UK NRL is required to establish an equitable conversion factor in the UK. Currently there are no OCLs within the region that use the automated method for enforcement purposes by the relevant competent authority but the conversion factor is needed to support the FSA's earned recognition policy in relation to official inspection within the dairy sector by facilitating comparison of automated test results carried out by members of Dairy UK's Farm Assurance Scheme with the legislative limit based on the reference (plate count) method.

There are currently only a few such machines in the UK and they are chiefly used by commercial dairy organisations in support of quality payment schemes, rather than enforcement purposes. It was previously general practice that the relevant competent authority would occasionally have parallel samples checked by their own laboratories, but due to the current climate of financial stringency, this practice has largely been discontinued.

Alkaline phosphatase activity in UK produced bovine milk cheeses

This was at the behest of the EU-RL and funded by the UK-FSA after approval of a business case. This exercise was designed to provide an evidence base as to whether an alkaline phosphatase value of ≤ 10mUg^{-1} would discriminate between cheese made from properly and improperly pasteurised milk. This, it was intended, would inform EU legislation in respect of this matter. The exercise was considered important to ensure that exports of UK produced cheeses were not disadvantaged within the EU. The outcome of the investigation showed that UK pasteurised bovine cheese was within the limit of ≤ 10mUg^{-1}.

After consultation with the Biometrics Department in AFBI a suitable experimental design was devised. This exercise is now complete and results forwarded to the EU-RL. The results generated by the UK-NRL are regarded as sufficiently novel and substantive enough to warrant submission to a peer reviewed journal, after approval by the UK-FSA. The report (Appendix 1) was therefore written in the format of a scientific paper.

EU-RL training session on the reference method for somatic cell counting.

Miss Sharon Cassidy (UK-NRL Project Manager) participated in a workshop on the reference method for somatic cell counts in milk organised by the EU-RL and took place on 14-15th June 2012. It should be recognised that the reference method (ISO 13366-1) is considered laborious and is rarely used in the UK for routine testing of somatic cells as it has been largely superseded by more automated methods. These automated methods must however be calibrated against the manual reference method and hence it is axiomatic that, at least the NRLs, are competent in the reference method. The UK-NRL therefore participated in a ring trial organised by the EU-RL to verify competence in the reference method. Reports are attached regarding the training sessions for the Project Manager (Appendix 2) and subsequent

proficiency trials with the UK NRL identification number being 14 (Appendix 3).

15th Workshop of the NRLs for milk and milk products.

This took place on 3rd to 5th October 2012 at the headquarters of the EU-RL at Maisons-Alfort in Paris. It was attended by the Project Manager and the topics discussed were the development of certified reference materials for somatic cell counts, proposals for the 2013 work programme, legal limits of alkaline phosphatase activity in goat's milk among other topics. A full report is attached in Appendix 4.

Working group meeting on harmonisation of conversion factors between instrumental and reference method for total viable count in raw milk.

This took place on the 3 October 2013 at the EU-RL headquarters and was attended by the Project Manager. A description of such alternative methods is given earlier in this report but a more detailed report of the workshop is given in Appendix 5.

Up-date of accreditation status of Official Control Laboratories

This was performed using a questionnaire circulated to the OCLs seeking relevant information and was a follow-up to a similar exercise performed at the initiation of the UK-NRL operation. In addition, at the behest of the UK-FSA, a request will also be circulated requesting the OCLs to forward the results of relevant external QA schemes they participate in which is a pre-requisite for ISO 17025 accreditation (Appendix 6).

EU-RL interest in colostrum.

Colostrum is the first milk of a cow after giving birth to her calf. It is rich in antibodies and inhibits colonisation of the calf's rumen and gastrointestinal tract with pathogenic organisms. There are problems with so-called pooled colostrum, where colostrum from more than one cow is bulked together before being fed One such problem is the possible transmission of Johne's disease to otherwise unaffected calves. There is increasing interest in the consumption of colostrum products by humans because of apparent health benefits. In response to this there is now an import trade of colostrum products into the EU for this purpose and as a consequence has prompted the EU-RL to consider hygiene regulations for such products and as a first step circulated a questionnaire to all NRLs. The UK-RL responded to the queries raised on this topic by the deadline of 14 January 2012. A presentation on the analysis of outcome of this scoping exercise was delivered by Rabeb Miled and is attached to this report (Appendix 7).

Comparison study of Plate Count Agar (PCA) and Milk Plate Count Agar (mPCA) for total viable counts of milk and milk products.

Following a workshop (3-5 October 2012 at Maisons-Alfort) the EU-RL considered that it would be beneficial to undertake an investigation amongst NRLs to compare PCA and mPCA for total viable counts in milk and milk products, in the framework of EN ISO4833. After approval from the UK-FSA the NRL will participate fully and the study is due to commence in the near future. Detail of correspondence on this matter is given in Appendix 8.