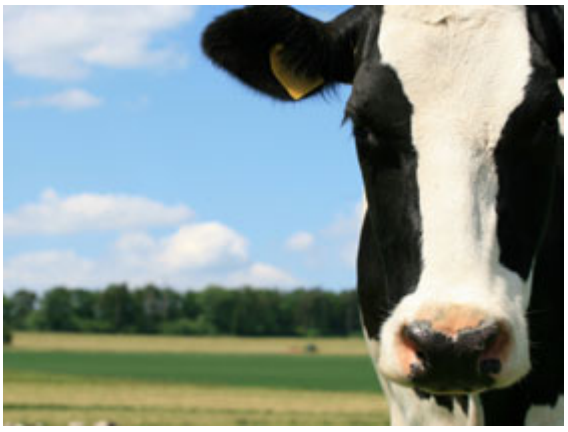
Annual report of the UK National Reference Laboratory for the testing of milk and milk products.



2014-2015

Contents:

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

The National Reference Laboratory (NRL) for the 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 this and all other 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.

Report Number:	AFBI/NRLREPORT/2014-2015
Authors:	L. Moran, C. Kelly, RH Madden.
Date:	29th April 2015
Sponsor:	Food Standards Agency Aviation house 125 Kingsway London WC2B 6NH
Project number:	PAU/222
NRL Auditor:	Dr Linda Farmer
Lead Scientist:	Dr RH Madden
Project Manager:	Mrs Lynn Moran
NRL Support:	Mrs Carmel Kelly
Distribution:	1. Mrs Chelvi Leonard (FSA) 2. Dr. Linda Farmer (AFBI).

Introduction

This report provides an outline of the work of the UK-NRL over the financial year 2014 to 2015. The UK-NRL acknowledges the support of the FSA and the help of AFBI in fulfilling its duties. On the top tier in the hierarchy of enforcement authorities within the European Union is the EU Reference Laboratory (EU-RL) for Milk and Milk Products 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 and within the UK the NRL is 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.

The core functions of the UK-NRL include:

- Secretariat Services.
- Advice and representation within the UK/EU.
- Production of standard operating procedures, codes of practice and guidance documents at the request of the FSA.
- Compliance assessment via audits and ring trials.
- Co-ordination within the UK of EURL initiatives.
- Communication of results and data use.
- Additional services and tasks as requested by the FSA.

The responsibilities of the UK-NRL therefore are:

- Dissemination of information coming from the EU-NRL.
- Provision of expert advice to the FSA or OCLs as required.
- Monitoring the performance of national OCLs. The majority of these labs within the UK are accredited to ISO17025 by United Kingdom Accreditation Service (UKAS) for the analyses they perform under the requisite EU legislation. This requires internal and external independent audit and satisfactory performance in internal and external quality assurance schemes to assure the laboratories proficiencies in the tests undertaken.
- Participation in workshops organised by the EU-RL on topics of concern.
- Dissemination of relevant changes to British Standard (BSI) and International Standard Organisation (ISO) standards to the OCLs.
- Participation in ring trials organised by the EU-RL to ensure the satisfactory performance of the member state NRLs.
- Participation in practical assessments to aid the formulation of EU legislation.

FSA UK

Provision of Reports to the UK-FSA

Reports on all UK-NRL activities have been provided to the FSA on a monthly and quarterly basis. Monthly reports usually took the form of a short email report while the quarterly ones were more comprehensive. They were sent electronically to the NRL project manager and any matters arising discussed at greater length.
Regular meetings were also held between FSA and NRL representatives throughout the year to discuss details on the study to establish a UK Bactoscan conversion factor.

Consultation on Information and Guidance on the Testing of Milk for Antibiotic Residues

The UK-NRL received an FSA guidance document that had undergone a detailed routine review and had been updated accordingly. We, along with other interested parties, were invited to comment on the document as part of an 8 week consultation.

This review has taken into account the recommendations made following the European Commission Food and Veterinary Office audit of official controls related to the milk and dairy sector which took place in April 2013.
The guidance is intended for all interested parties along the milk production chain including farmers, milk purchasers and processors, and the enforcement authorities and provides advice which will help with compliance with the Regulations in regard to antibiotic residues in milk and dairy products.
The significant changes are summarised below;

- Updated references to the Regulations where these have changed or been updated

- Reporting of “adverse events” e.g. where antibiotic test failures have occurred after the withdrawal period

- Clarification of the need for testing of milk from road tankers prior to use of milk in processing establishments

- Clarification of what FBOs need to report to their Competent Authority e.g. where milk is tested and failures occur.

The document was reviewed and no additional comments were forwarded.

Brazilian Inspection of UK Dairy Controls

The UK-NRL was informed by the FSA of a Brazilian inspection of UK Dairy Controls which was originally due in March 2015 but has now been postponed to April/May 2015. The Brazilian auditors are coming to assess the UK official control laboratory network in relation to milk controls. They will audit the National Reference Laboratory and possibly the OCLs specialising in the microbiology of milk and the analysis of residues and contaminants in milk. This is in relation to UK exports to Brazil of dairy foods. Further details from the FSA of what is required with regards to the milk UK-NRL and OCLs are to follow.

Maintenance of UK-NRL Website

This website allows a mechanism for disseminating information to all interested parties and has been updated on an on-going basis as new information and reports become available.

Link to UK-NRL Website: www.**afbini**.gov.uk/index/services/services-diagnostic.../**milk**-**nrl**.htm

Official Control Laboratories

OCL's Status

The status of the Official Control Laboratories was monitored throughout the year and relevant information from the EU-RL sent as required. The UKAS schedules for all the OCLs were acquired from the

UKAS website and confirmed that all the schedules are within date. The updated list is attached in Appendix 1.

OCL and Other Requests for Advice

The UK-RL provided advice in response to various enquires from OCL's and other national NRL's throughout the year on such diverse topics as;

Goat, sheep and buffalo milks
Yeasts and moulds in infant milk powders
Legislation on total flora in milk samples
Alkaline phosphatase measurement in cream
The testing required for UHT milk and liquid tea whitener
The quality of milk samples for payment
Consideration of the Bactoscan for the automation of raw milk analyses
Alkaline phosphatase testing in regard to ice cream

The UK-NRL dealt with all these by directly responding to the specific query or by seeking advice from the EU-RL and passing this on to the enquirer in a timely fashion.

Food Examiners Register and OCL Training

At a meeting between the NRL Steering Group and the FSA, discussions were held on a Food Examiner Register as well as interactions with the Shellfish and Dairy NRLs.
As a result the UK –NRL for MMP received a request in June/July of 2014 from Jim McLaughlin (UK NRL for Microbiology) concerning the establishment of a Food Examiners Register in the UK. A list of OCLs sent by the group was checked against the UK-NRL for MMP list of OCLs and found to completely overlap. The purpose of confirming this register and completion of a survey was to highlight any gaps in training. The object was to aim future relevant training courses and information at the appropriate laboratories enabling the NRL to support the OCLs further.

17th Workshop of the NRLs for milk and milk products

The UK-NRL Lead Scientist Bob Madden and Carmel Kelly attended the 17th Workshop on 1st to 3rd October 2014 at the headquarters of the EU-RL at Maisons-Alfort in Paris. The main topic of the workshop was hygiene of raw milk and pasteurisation tracers. A full agenda and UK NRL report are attached in Appendix 2 and 3. To date the EU-RL has not published a full report of this meeting on it's website.

British Standard (BSI) and International Standard Organisation (ISO) Standards

As part of UK-NRL responsibilities to disseminate relevant changes to BSI and ISO standards to the OCLs, several reports were received during the year for comment.
The FSA requested comments on methods for chemical analysis of MMP which were being reviewed by the BSI ISO milk committee (AW005). No comments were received for any of the listed methods and a return of such was made to the FSA.
A report from EU-RL on CEN and ISO meetings held in Washington in June 2014was also received for information.
Dr Bob Madden in his capacity of Lead Scientist for the UK-NRL attended the BSI AW/9 Microbiology meeting on 21st October 2014. No matters of direct relevance to the UK-NRL were discussed however there were discussions on co-ordination between AW 005 (Chemical Analysis of MMP) and AW09 (Microbiology). The agenda is attached in Appendix 4.

Alkaline Phosphatase Activity in Cheese

Proficiency Trials (PT) on the determination of the Alkaline Phosphatase activity in cheese

In December 2013 the UK-NRL participated in a trial to determine alkaline phosphatase activity in 8 samples of cheese sent by EU-RL (6 portions of hard cheese and 2 portions of semi-hard cheese). In August 2014 the EU-RL issued a final report with recalculated results from the 15 participating laboratories in relation to repeatability and z-scores (Appendix 5). The results for the UK-NRL (Lab Code 8) had mixed results indicating that sample preparation is problematic depending on the type of cheese.

A questionnaire was completed and submitted in October 2014 at the request of the EU-RL in respect of the report on the trial detailed above.

Participation in a further proficiency trial was undertaken in March 2014 this time on soft cheese (n=4) and semi-hard cheese (n=2). The preliminary report issued by EU-RL in August 2014 is attached in Appendix 6. In summary, a questionable z-score was achieved for one of the soft cheeses by UK-NRL (Lab 2). This again highlighted that further clarity in the instructions for the sample preparation of the different types of cheeses is required in the final ISO method. As a result therefore the EURL issued a training video demonstrating the correct preparation of cheese samples and circulated to all NRL's.

Inter-laboratory Validation Studies on the Determination of Alkaline Phosphatase (AP) activity in cheese

The UK-NRL participated in validation studies for AP activity in cheese in December 2013 and March 2014. These studies coincided with the Proficiency Trials above and allowed time to be saved by only requiring one calibration of the channels on the Fluorophos machine for the cheeses being tested.
The types of cheese submitted for the validation study were the same as for the proficiency trial i.e. 6 portions of hard and 2 portions of semi-hard cheese from pasteurised cow's milk in 2013. The 2014 validation study was completed on 6 portions of soft cheese and 2 portions of semi-hard cheese. (UK NRL is Lab no. N in the report).

A summary report for these studies was issued in February 2015 entitled 'Interlaboratory Validation Study for the determination of Alkaline Phosphatase (ALP) activity in Cheese Fluorimetric method'(Appendix 7)
The study will be published by EU-RL in full form in an international journal and all participants will be cited in the published paper as collaborators to the validation study. Two trials were held and this report summarises the raw data submitted from 15 laboratories from a total of 13 countries. Full analysis of the study has yet to be published.

Somatic Cell Counts

Inter-laboratory Proficiency Testing Trial

The EU-RL published the final report for the proficiency testing trial for the NRLs for Milk and Milk Products on the counting of somatic cells by the reference method in October 2014. (Appendix 8)
In summary, 6 samples of raw cow's milk were processed in October 2013 and the results indicate that the UK-NRL (Laboratory number 14) results achieved satisfactory z-scores.

Methodologies

In June 2014 the UK-NRL responded to an enquiry from the EU-RL concerning analytical methods used by the NRL for somatic cell counts (SCC). The UK-NRL nor any of the UK OCL's are accredited under ISO 17025 for any methodology for SCC but the response accounted for non-accredited methodologies applied in some of the laboratories.

Certified Reference Materials (CRM) for Somatic Cell Counts (SCC)

The Institute for Reference Materials and Measurements of the EC Joint Research Centre (JRC/IRMM, Geel) has previously envisaged developing CRMs for SCC in milk in collaboration with the EU-RL MMP and ISO/IDF/ICAR.
In an effort towards making these available, a questionnaire was sent to all NRL's from EU-RL in order to canvass interest in becoming a qualified supplier for SCC measurements.
The UK-NRL reported that it does not undertake SCC in milk by either the reference or alternative methods on a routine basis and hence it is not accredited under ISO 17025. Only two of the current OCLs provide this test, and again not under ISO 17025 accreditation, and therefore the UK network of laboratories are not interested in becoming a qualified supplier for SSC measurements.

Inter-laboratory PT Trial on Enumeration of Microorganisms at 30°C in Sheep's Milk

An invitation from the EU-RL was received in August to participate in an inter-laboratory proficiency testing trial on the enumeration of microorganisms at 30°C in raw sheep's milk.
Instructions for the completion and methodology to be used in this trial (reference method: EN ISO 4833-1) was forwarded to UK-NRL in December 2014 (Appendix 9). The five sheep milk samples were received, tested and reported to EU-RL as instructed, by the applied deadlines. The EU-RL has yet to publish a report on the full results from this trial however a copy of UK-NRL's results are attached (Appendix 10).

Establishment of Conversion Factors between alternative methods and reference methods for total viable count in raw milk

Establishment of a Conversion Factor for the UK

Alternative methods such as the Bactoscan™ (Foss) and Bactocount™ (Bentley) systems are used for measuring the total viable microflora of raw milk in many Member States. The alternative methods measure all the viable bacteria in the sample, even those within clumps while traditional viable plate counting methods cannot discriminate between cells within clumps and single cells. This means that the value obtained with 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.

The conversion factor is needed to facilitate 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. None of the OCLs within the region use an automated method for enforcement purposes by the relevant competent authority.

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.

A meeting was held in April at National Milk Laboratory (NML) at Wolverhampton headquarters with UK-NRL, FSA and NML staff to discuss the proposal submitted to FSA by UK-NRL on the scope of work for the conversion factor.
Discussions on progression of the conversion factor contract, between all interested parties, continued in July and a further meeting held in August at the NML Glasgow site finalised details for the conversion factor study. Follow up discussions between the legal representatives of each interested party were then continued to complete the contracts. The scoping study for the work described above was approved by the FSA in 2014.

Work commenced in September at both NML sites as agreed in the contracts and results have been received monthly from NML.

Bactoscan™ and Bactocount™ Comparison

NML own six Bactoscan machines and therefore they will be the used in the conversion factor study. However another company (Bentley) produce a machine that also measures total viable microflora and they expressed an interest in taking part in the UK conversion factor study. In order to discuss the possibility of this further study the lead scientist for the UK-NRL and the European Bentley representative attended a demonstration of the Bactocount at Techno-path headquarters in Limerick. Discussions were undertaken on how to facilitate a comparison study between the Bactocount and Bactoscan in relation to the establishment of a UK conversion factor.
As a result of these discussions NML was approached and agreed to the locating of a Bactocount at their Glasgow site. It was therefore agreed that NML would test an agreed number of samples of milk using both machines.
NML Glasgow completed these samples in November and December 2014 and reported the Bactoscan /Bactocount results in January 2015.
A meeting was then held in with NML and UK-NRL representatives to discuss the comparison.

Validation of Bactocount for Measuring the Total Viable Microflora

A study was undertaken by EU-RL to validate the use of the BactoCount for measuring total viable. This is a (fully) automated flow cytometer for the rapid enumeration of individual bacteria in raw milk.
The method comparison study and the interlaboratory study show that the alternative method results obtained with BactoCount IBC/IBCm (Bentley Instruments) comply with the criteria of the EURL MMP document. A validation report and certificate was received from the EU-RL outlining the results and conclusions from the study. (Appendix 11 and 12).

Involvement of United Dairy Farmers

Discussions were held in April 2014 with United Dairy Farmers (UDF) concerning their participation in establishing a UK conversion factor. It was stressed that their involvement was required to contribute to a single UK wide conversion factor. UDF felt that due to limited resources they would be unable to participate until later in the year and suggested September 2014 as a possible start date.
Further discussions were had with UDF in October to clarify requirements for the study and a follow up conference call was had between FSA, UDF and UK-NRL in November. Another meeting was held at UDF between FSA NI, UK-NRL and UDF in February 2015 to further clarify UDF's involvement in establishing a conversion factor.
As a result of these discussions UDF submitted costs for the proposed study to the UK-NRL which have been forwarded to FSA for approval.

Harmonisation of conversion factors between alternative methods and reference method for total viable count in raw milk.

The UK-NRL received an invitation to attend a Working Group on Harmonisation of conversion factors in milk on the first day of the 17th Workshop held in October 2014. The lead scientist from the UK-NRL reported that such data from the UK could only be collected at additional cost by purchasing the information from relevant private

companies, should they be willing, or even able, to do so. An account of other discussions from this meeting are summarised in Appendix 3.