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EURL MMP
European Union Reference Laboratory for Milk and Milk Products

Laboratory for food safety

Maisons-Alfort, France

2012 Annual Report of the European Union Reference Laboratory for Milk and Milk Products

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INTRODUCTION

The Laboratory for Food Safety of Anses (French agency for food, environmental and occupational health safety) has undertaken, as European Union Reference Laboratory for milk & milk products (EURL MMP), the following works in 2012 according in particular to the actions planned at the 14th Workshop of the National Reference Laboratories (NRLs) (2&3 May 2011), and as agreed with DG SANCO (see 2012 work programme of the EURL MMP, version 1, 18/08/2011).

These actions are part of the current mandate of the EURL MMP, restricted to the control of raw and heat-treated liquid milk (total flora, somatic cells count, phosphatase activity), as well as cheeses for phosphatase, in the frame of the Regulation 853/2004 *laying down specific hygiene rules for food of animal origin*.

The Annex III, Section IX of Regulation 853/2004 is dedicated to raw milk and dairy products:

- Microbiological criteria on total flora at 30°C and on somatic cells count are fixed:
    - At the level of raw milk production & collection: for raw cow's milk and raw milk from other species milk (Chapter I, clauses I & III);
    - At the level of preparing dairy products (Chapter II, clause III-criteria for the use of raw cow's milk for further processing).
- Phosphatase activity:
    - At the level of raw milk production (Chapter I, clause I.3): a reference is made to a negative phosphatase test to characterize the heat-treatment to be applied to raw cow's or buffalo's milk coming from animals not meeting certain requirements on brucellosis or tuberculosis.
    - At the level of heat treatment of raw milk or dairy products (Chapter II, clause II): the food business operators shall ensure that the heat-treatment satisfies the requirements of Regulation 852/2004, Annex II, Chapter XI.

The EURL has provided in particular a support to the NRLs for the implementation of:

- the Regulation 853/2004;
- the derived Regulation 2074/2005 (modified by Regulation 1664/2006) defining amongst other the testing methods for raw milk and heat-treated milk to be used by competent authorities and food business operators:
    - to check compliance with the limits for total flora and somatic cells count laid down in Regulation 853/2004, Annex III/Section IX/Chapter I/Part III,
    - to ensure appropriate application of a pasteurisation process to dairy products, as referred to in Regulation 853/2004, Annex III/Section IX/Chapter II/Part II.

NB: in brackets under each item, the scheduled duration of the action is indicated: either annual (limited to 2012), either multi-annual (on-going programme on several years).

0 GENERAL ASPECTS

0.1 GENERAL COORDINATION (EURL MANAGEMENT TEAM, PAFT DEPARTMENT) (MULTI-ANNUAL)

General coordination of the network of the NRLs (dispatch of circular letters and documents, coordination of the scientific and technical support to NRLs).

Relations with DG SANCO, coordination of the scientific and technical advice to DG SANCO, management of annual contract with DG SANCO (annual budgets and work programmes, annual technical and financial reports). In particular, meeting with DG SANCO at DG SANCO's office, 10 October (see 3.1).

In 2012, Adrien ASSERE, co-manager of the EURL CPS visited Nebih (HU-NRL) on 15/10/2012.

In-house follow-up of EURL activities, expenses, support to EURL units.

0.2 WORKSHOP OF THE NRLS (ANNUAL)

3 October afternoon-5 October morning 2012 at EURL MMP, Maisons-Alfort;

28 NRLs from 25 EU Members States (MSs), from Norway and Switzerland were represented.

Luisa PELLEGRINO (University of Milan, IT) was invited to give a presentation on pasteurization tracers in cheese.

Klaus KOSTENZER, contact officer at DG SANCO for the EURL MMP, attended the meeting on 4 October.

The EURL drafted the report which was dispatched first to DG DSANCO, then to NRLs by circular mail N°2012/16 dated 19/12/2012.

0.3 SCIENTIFIC MONITORING AND COMMUNICATION (MUTI-ANNUAL)

The EURL teams have conducted scientific monitoring in its area of competence, as well as communicate on the works conducted as EURL CPS, disseminate the outcome of works in the international scientific community (drafting of written publications, oral presentations and posters to international symposia). The list of publications can be found in Chapter 4.

1 HYGIENE OF RAW MILK

Frame : The Regulation 2074/2005 modified by Regulation 1664/2006 prescribes the reference method for total flora enumeration at 30°C, Standard EN ISO 4833, and the reference method for somatic cells count, Standard EN ISO 13366-1, as well as conditions for the use of alternative methods.

1.1 PROFICIENCY TESTING TRIAL

The inter-laboratory proficiency testing (PT) trials organised by the EURL MMP for the NRLs aim at evaluating the ability of the NRLs to apply satisfactorily the methods for the analyses performed in the frame of official controls, prescribed by Regulation 2074/2005 modified.

1.1.1 STUDY OF SAMPLE TYPES USED FOR INTER-LABORATORY TRIALS ON TOTAL FLORA IN RAW COW'S MILK (MULTI-ANNUAL)

In order to improve the organization of future proficiency testing (PT) trials dedicated to the enumeration of total flora (TF) in raw cow's milk, the EURL MMP (Unit EDB) has begun in 2012 an investigation study on the homogeneity and on the stability of samples to be used for such trials. Indeed, in 2009, the EURL MMP had conducted a similar investigation study (homogeneity and stability) to find a way, such as the addition of a chemical agent, to stabilize sufficiently TF contamination of raw cow's milk, in order to prepare and dispatch itself the samples used for TF enumeration.

The purpose of this study is to optimize the protocol currently used, initially defined in 2009. The study is ongoing and will be completed by December 2013.

1.1.2 STUDY OF SAMPLE TYPES USED FOR INTER-LABORATORY TRIALS ON SOMATIC CELLS IN RAW COW'S MILK (MULTI-ANNUAL)

In order to organize the 2012 PT trial dedicated to somatic cell counting (SCC) in raw cow's milk, the EURL MMP (Unit EDB) had begun in 2011 an investigation study on the homogeneity and on the stability of the samples to be used for this trial.

Four different sets of tests were performed in 2012 by using a chemical agent: Broad Spectrum Microtabs II. It is a tablet preservative containing a combination of Bronopol and Natamycin which prevents the growth of both bacteria and yeast and mold. Samples of raw cow's milk were stored at 4°C. Three levels of inoculation (*i.e.* low, medium and high levels) were tested. For the homogeneity study, SCC was performed in duplicate at 0 day, on 10 samples at each level. For the stability study, SCC was performed in duplicate each day during 15 days, on 3 samples at each level.

In conclusion, for the three levels of contamination at 4°C, homogeneity of the samples was satisfactory and the stability of the samples was satisfactory between day 0 and day 4 after preparation of samples.

So, for the next inter-laboratory PT trial, samples of raw cow's milk would be sent refrigerated and analyses should be conducted by the NRLs between day 0 and day 4 after preparation of samples.

The EURL is currently preparing the report of this study, to be sent to the NRLs.

1.1.3 ENUMERATION OF SOMATIC CELLS IN RAW COW'S MILK

The EURL MMP (EDB Unit) prepared and dispatched in October 2012 samples for a PT trial for the NRLs on SCC in raw cow's milk by the reference method, the Standard EN ISO 13366-1 (microscopic method). 25 NRLs participated to this trial.

The EURL MMP prepared and dispatched in advance (Week 38) the instructions and the test report for the trial. The EURL prepared samples (6 samples of raw cow's milk, with a different given level of somatic cells) and dispatched them in October 2012 (Week 42) to the participating laboratories.

The EURL has collected the results and is currently preparing the PT trial report which will be soon dispatched. In December 2012, a preliminary report (initial statistical analysis: calculation of k and z-scores) of the PT on somatic cell counting was sent to the participating NRLs.

1.2 ANALYTICAL DEVELOPMENT (MULTI-ANNUAL)

1.2.1 DETERMINATION OF TOTAL FLORA AT 30°C AND SOMATIC CELLS IN RAW MILK BY AN INSTRUMENTAL METHOD

1.2.1.1 DETERMINATION OF TOTAL FLORA AT 30°C IN RAW COW'S MILK

The EURL MMP (Unit EDB) had launched an experimental study in 2007 using a flow cytometer (Bactocount, Bentley) as an alternative method for the enumeration of bacterial TF and SC in raw cow's milk, in order to investigate the correlation relationship between this method and the respective reference methods, especially the influence of production factors of raw milk (mainly variation in breeds, period of lactation, type of feeding) on this conversion relationship.

In 2012, the EURL, in collaboration with ENVA (Veterinary School in Maisons Alfort) and Institut de l'Elevage, has developed an experimental design for studying the influence of additionnal factors (such as environment of animals, storage of milk) on the conversion equation for cow's milk and identified farms which could provide samples of raw milk at regular intervals of time, together with information of the additional factors mentioned above. This 2nd phase of the study is continuing in 2013.

In addition, once a month, 9 samples were analysed for SCC by the reference method, the Standard EN ISO 13366-1, and by the alternative method based on flow cytometry (Somacount).

The EURL (Pascal BOUCHEZ) has participated to a technical meeting on the implementation of Bactocount by different laboratories (Kirchheim, Germany 20-22/06/2012).

1.2.1.2 DETERMINATION OF TOTAL FLORA AT 30°C IN RAW GOAT'S MILK

The EURL MMP (Unit EDB) has launched an experimental study in 2012 using a flow cytometer (Bactocount, Bentley) as an alternative method for the enumeration of bacterial TF in raw goat's milk, in order to investigate the correlation relationship between this method and the respective reference methods, especially the influence of production factors of raw milk (mainly variation in breeds, environment of animals, storage of milk) on this conversion relationship. Samples are received from different producers. This experimental study will continue until 2014.

1.2.2 DEVELOPMENT OF A MOLECULAR BIOLOGY TOOL FOR THE IDENTIFICATION OF THE BACTERIAL FLORA OF MILK AND MILK PRODUCTS

The EURL MMP (Unit EDB) envisaged to adapt an innovative molecular biology tool (real-time PCR, LightCycler 1536 ® of Roche) for the identification and quantification of the bacterial flora of milk and milk products. However, the idea to develop a new molecular biology tool was given up. Indeed, to verify that the microbial flora has an impact on the conversion relationship between the reference method and alternative method based on flow cytometry (Bactocount, see 1.2.1), the microbial flora of raw milk samples needs to be identified by PCR-TTGE/DGGE (PCR-Temporal Temperature Gradient Gel Electrophoresis/ Denaturing Gradient Gel Electrophoresis) available in the EURL laboratory.

1.2.3 ENQUIRY ON MICROBIOLOGICAL LEVELS IN COLOSTRUMS AND BIBLIOGRAPHIC REVIEW

> **Frame**: In the frame of Regulation 853/2004 modified, national hygienic requirements are referred to for colostrums.

The EURL MMP (EDB Unit) had undertaken in 2010 an enquiry to the NRLs to collect existing national hygienic requirements/microbiological criteria on cows' colostrums.

The EURL has presented at the 2011 workshop a synthesis of the outcome of this enquiry and a written report on this survey was dispatched to DG SANCO and NRLs by Circular Letter 2012/03, dated 14/02/2012.

At the workshop of October 2012, the EURL has presented a draft for a new enquiry on total flora, somatic cells count levels and other hygienic/pathogenic bacteria, as well as antibiotic residues found in raw colostrums for direct human consumption, in parallel with a review of the literature. The new enquiry was dispatched to NRLs by Circular Letter 2012/15 dated 13/12/2012 and a written report of this enquiry will be prepared soon.

1.2.4 USEFULNESS TO USE PCA+MILK AGAR FOR TOTAL FLORA

As agreed at the 2011 workshop, the EURL MMP (Unit EDB) has investigated in 2012, through a bibliographic review and an enquiry to IDF/ISO, the usefulness to add skimmed milk powder to Plate Count Agar (mPCA) for the enumeration of the total flora in milk and dairy products. In the case such addition to PCA would not show any added value compared to PCA, the purpose would be to use "normal" PCA, as for other food products than milk & milk products.

Experimental results of a study conducted by the EURL as well as those of BE and D NRLs were presented at the workshop in October 2012. After discussion, it was decided to launch a second phase of the study in 2013 with participation of voluntary NRLs. The incubation time of dishes (48 or 72 hours) as well as manufacturers of PCA and mPCA chosen for the study will also be investigated. An enquiry to launch the 2nd phase of the study was dispatched to NRLs by Circular Letter 2012/17 dated 21/12/2012.

1.2.5 DEVELOPMENT OF CERTIFIED REFERENCE MATERIALS ON SCC

Given the deficiencies of the reference microscopic method for SCC in raw milk (lack of reproducibility) and the limited number of laboratories using it, it is of utmost importance to develop Certified Reference Materials (CRMs), which are not currently available. CRMs are needed to calibrate instrumental methods, mostly used for routine analyses of SCC in raw milk, as to have comparable SCC analyses conducted within each European country and between different European countries.

In 2011, the EURL MMP had reiterated its request to DG SANCO for supporting the need that JRC/IRMM (Geel, Belgium) develops, in cooperation with the EURL, CRMs for somatic cells in milk.

On 11 May 2012, a meeting has been organised in Bruxelles (Belgium) with DG SANCO, JRC/IRMM and EURL MMP (Véronique DEPERROIS) to discuss the need and the feasibility to produce CRMs on SCC in milk. Another meeting has been held on 24 September 2012 at IRMM (Geel, Belgium) with IDF/ISO representatives and EURL MMP (Véronique DEPERROIS)to further investigate the needs and feasibility of these CRMs.

Further to the last meeting, an enquiry to quantify the needs for CRMs is being drafted by EURL and IDF/ISO, and will be dispatched to NRLs and members of adequate IDF/ISO groups. In case of sufficient need according to JRC/IRMM, the EURL would conduct an experimental feasibility study.

1.3 COORDINATION ACTIVITIES ON TOTAL FLORA DETERMINATION

1.3.1 CRITERIA FOR THE VALIDATION OF INSTRUMENTAL (EPIFLUORESCENT) METHODS FOR THE DETERMINATION OF TOTAL FLORA IN RAW MILK

According to the EC Regulation 2074/2005 modified by Regulation 1664/2006, the use of alternative methods to the reference method EN ISO 4833 for TF determination is possible if

they are validated against the reference method in accordance with the protocol of the Standard EN ISO 16140 or other similar internationally accepted protocols.

The EURL prepared in 2011 a document on validation criteria of instrumental (epifluorescent) methods for the TF determination in raw milk. It was sent to the validation/ certification bodies (AFNOR Certification, MicroVal and NordVal), which were to base their validation studies on it.
In 2012, the validation of instrumental flow cytometers (Bactoscan and Bactocount) began.

1.3.2 HARMONIZATION OF CONVERSION FACTORS BETWEEN INSTRUMENTAL METHODS AND REFERENCE METHOD FOR TOTAL FLORA IN RAW MILK

According to the NRL workshop in Kiel 11&12 September 2006, one conversion factor was to be established per apparatus, per animal species and per country, under the responsibility of NRLs and EURL coordination. The necessity of keeping several factors per country had to be justified.

At the 2011 workshop, it had been agreed that the EURL would launch a working group with interested NRLs to investigate the possible harmonization of conversion factors at European level. The invitation to participate to the working group and its first meeting was sent by the circular letter of 12th July 2012.

The first WG meeting took place on 3 October morning 2012 in Maisons-Alfort. Twelve participants from 9 NRLs from EU Members States (MSs) and from Switzerland were present. Manufacturers of instrumental methods' equipments (FOSS, DK and Bentley, FR), had been invited.

The first item on the agenda was the state of progress on harmonization of conversion factors in European countries. Nine NRLs presented the state of progress. The second item on the agenda was the harmonization of conversion factors at European level and more particularly to assess the possibility to have one conversion factor per apparatus and per animal species.

The possibility to harmonize conversion factors at European level requires further work, in particular to collect data from different MSs through NRLs and to process them in a common way. This data collection will be undertaken in 2013.

1.3.3 REVISION OF IDF 161A STANDARD (ISO/DIS 16297)

The EURL MMP followed the revision of IDF 161A Standard (development of ISO 16297) concerning the guidance on evaluation of routine methods for the determination of bacteriological quality for milk, and reported on it to the NRLs at the annual workshop.

1.4 COORDINATION ACTIVITIES ON SOMATIC CELLS DETERMINATION

Criteria for the validation of instrumental (epifluorescent) methods for the enumeration of somatic cells in raw cow's milk

As for TF, the EURL MMP drafted in 2012 a document on validation criteria of instrumental (epifluorescent) methods for SCC in raw cow's milk, in collaboration with the NRLs.

The first draft was sent to NRLs for comments by circular mail Nr 2012/12 dated 24/09/2012. A modified draft, further to the discussions at the annual workshop, was then sent for consultation to the IDF/ISO Project Group S09, in charge of developing a reference system for SCC, as well as to the NRLs by circular mail Nr 2012/14 dated 20/11/2012.

EURL will finalize the document and dispatch it to the NRLs in 2013.

1.5 TRAINING SESSION FOR THE NRLS

The EURL MMP (EDB Unit) organized in June 2012 a training session on how to count somatic cells in raw cow's milk by the reference method EN ISO 13366-1.

This 2-day session included both a presentation of the reference method EN ISO 13366-1 and practical session: smear preparation, smear staining, slide counting, calculation and expression of results.

Five persons were trained from four NRLs of Lithuania, Ireland, United Kingdom and Netherlands.

2 DETERMINATION OF ALKALINE PHOSPHATASE ACTIVITY

Frame: The Regulation 1664/2006 defines the reference method for official controls in pasteurised cow milk, Standard EN ISO 11816-1, the legal limit for negativity of the test for alkaline phosphatase (AP) activity in correctly pasteurised cow's milk (350 mU/l) and conditions to use alternative methods.

2.1 INTER-LABORATORY TRIALS (ANNUAL)

Items 2.1.1 and 2.1.2 had to be postponed due to a long sick-leave of the analyst upon EURL contract (from February until October 2012, with a return at therapeutic half-time).

It has been agreed to partially replace these actions by a PT trial on AP determination in cow's milk (2.1.3) (see e-mail of Klaus KOSTENZER dated 13/07/2012).

2.1.1 PRELIMINARY STUDY

See above.

2.1.2 INTERLABORATORY STUDY

See above.

2.1.3 PROFICIENCY TESTING TRIAL ON COW'S MILK

In 2012, the EURL (Team CAT-AP) organized a PT trial dedicated to AP determination in cow's milk. Samples prepared and dispatched by EURL to the participants on Week 48 consisted of whole, semi-skimmed and skimmed cow's milk at 3 different AP levels, all in blind duplicates.

EURL conducted a preliminary study on homogeneity and stability, before the trial. Stability tests were unsatisfactory for 3 out of the 9 samples under study, consequently EURL decided to render mandatory the date of analysis by participants.

21 NRLs participated to the PT trial, 2 NRLs failed in submitting results and 4 were rejected from the results' evaluation because of non-respect of the organizer's instructions (one laboratory did not apply the prescribed method, another one derogated to the deadline of analysis, and two laboratories did not comply with the method's specifications).

The final report of the PT trial is in the process of drafting and will be circulated to NRLs.

2.2 ANALYTICAL DEVELOPMENT (MULTI-ANNUAL)

2.2.1 DETERMINATION OF ALKALINE PHOSPHATASE IN CHEESE

The Project Leader, Marina NICOLAS, prepared a compiled template including IDF and ISO comments on the draft IDF/ISO Standard method for AP determination in cheese. Upon agreement of the IDF/ISO Project Group, the draft was brought into ISO layout, circulated for voting and accepted to the CD stage.

2.2.2 COORDINATION AND PROVISION OF ASSISTANCE ON THE SURVEYS CONDUCTED BY NRLS ON CHEESES MADE FROM PASTEURIZED COW MILK

Results were received from NRLs of Finland, Hungary, the Netherlands, United Kingdom, Italy and Slovenia.

EURL has established bilateral contacts with the UK, Finnish and Italian NRLs to investigate some specific points needing to be explored in depth. In particular the EURL (Hanène GHEZZAL) has visited the Finnish NRL to provide scientific and technical assistance to implement the method to determine AP in cheese (Evira, Helsinki 8-10/11/2012).

EURL informed NRLs that the study on cheese would be finally concluded at the end of 2013. It was decided that those NRLs who were not able to apply the method themselves were authorised to sub-contract analyses of their national types of cheese to another NRL.

2.2.3 STUDY ON THE EQUIVALENCE OF CHEMILUMINESCENT METHOD VERSUS FLUORIMETRIC METHOD

EURL had implemented the approach of accuracy profile (acceptability limits) to assess the equivalence of the chemiluminescent method *vs.* the official reference fluorimetric method.

EURL had conducted comparison with cow's whole milk.

The statistical evaluation of the results showed that the 2 methods under study were not equivalent and that results obtained with each method were not correlated by a linear regression.

Consequently, the chemiluminescent method cannot be declared as an alternative to the fluorimetric method, in the frame of EC Regulation 2074/2005 modified. In addition, after discussion with DG SANCO, it was concluded that it cannot even be used as a screening method, since the regulation mentioned above has not defined any screening controls for AP.

2.2.4 HEAT-TREATMENT TRACERS OTHER THAN AP, DEVELOPMENT OF ANALYTICAL TOOLS

George ZIOBRO, FDA expert, introduced to IDF/ISO a New Work Item Proposal (NWIP) for the development of a method on the determination of active gamma-glutamyl transpeptidase (GGT) in milks and dairy products. This proposal introduces GGT as an indicator of appropriate pasteurization, in alternative to AP.

EURL opposed this position arguing that GGT had a higher inactivation temperature than AP and thus could not be considered as an alternative option to the latter. But GGT could provide an interesting alternative thermal enzyme marker for dairy products where AP had not shown to be a pertinent indicator: for example, GGT has been demonstrated to be a useful thermal enzyme marker for heat treatment of camel milk.

After extensive discussions, FDA agreed to the EURL position and the NWIP was circulated for voting of IDF & ISO member bodies. A positive vote was casted.

EURL has acquired the appropriate material to implement analytical work on the basis of the proposed method.

2.2.5 REACTIVATED AND MICROBIAL PHOSPHATASE

No progress on this topic during 2012.

3 TECHNICAL AND SCIENTIFIC ASSISTANCE TO THE EUROPEAN COMMISSION (MULTI-ANNUAL)

3.1 DG SANCO ACTIVITIES

Adrien ASSERE and Bertrand LOMBARD (EURL management) have been invited by DG SANCO on Wednesday 10th October, at DG SANCO's office for a meeting with Koen van DYCK, Rosa PERAN, Klaus KOSTENZER, Kris de SMET and Sylvie GERVIS to discuss the following items:

- Development of a European molecular database on 3 main food-borne pathogenic bacteria, including *Lm*;
- The 2013 planning of the EURLs Milk, *Lm*, CPS, in particular the priorities in work programmes and associated budgets.

3.2 PARTICIPATION TO ISO/IDF STANDARDIZATION WORKS

On behalf of DG SANCO, and as EC representatives to CEN/ISO meetings, participation to:

1. The IDF/ISO works on the analytical methods specific to the analysis of milk & milk products:
   - somatic cells count in raw milk: reference and alternative methods,
   - total flora in raw milk: alternative methods,
   - pasteurisation tracers: methods for AP determination, and methods for other pasteurisation tracers.
2. The 2012 IDF/ISO Analytical Week (Tel-Aviv, Israel, 4-8 June 2012): participation of Marina NICOLAS and Véronique DEPERROIS to the meetings of the different groups dealing with the topics mentioned above.

4 PUBLICATIONS

4.1 REPORTS

Deperrois V. (2012) Criteria for the validation of instrumental (epifluorescent) methods for the enumeration of somatic cells in raw cow's milk. EURL for Milk and Milk Products.

Cauquil A., Guillier L., Baudouin N., Soudrie N., Bouchez P., Maladen V., Pierru S., Asséré A., Lombard B., Deperrois V. (2012). Factors influencing the conversion relationship between the reference method for enumeration of total flora at 30°C in raw cow's milk and an alternative method based on flow cytometry. EURL MMP report

Deperrois V. (2012) Working Group "Harmonization of conversion factors between instrumental methods and reference method for total flora in raw milk", Report of 1st meeting, 3 October

Miled R., Deperrois V. and Lombard B. (2012) National hygienic requirements criteria on cow's colostrums: outcome of an enquiry to the National Reference Laboratories for Milk & Milk Products. EURL MMP report.

Miled R., Deperrois V. and Lombard B. (2012) Proficiency testing trial dedicated to total flora. Enumeration in goat's raw milk by EN ISO 4833 Standard method, EURL MMP report

Bouaouaja I. (2012) rapport Master 1 « Dénombrement et identification de la flore totale des laits crus de chèvre », Master 1 ingénierie pour la santé et le médicament, Université Claude Bernard Lyon 1 et Institut de pharmacie industrielle de Lyon

GHEZZAL Hanene and NICOLAS Marina (2012) Interlaboratory Proficiency Test on the determination of Phosphatase Activity in goat milk, EURL MMP final report.

4.2 ORAL PRESENTATIONS

Deperrois V., Participation to IDF/ISO Analytical Week, oral communications to Group S09, "Reference system for somatic cell counting", on « Certified reference materials for somatic cells. Outcome of the meeting with JRC/IRMM-Geel and DG-SANCO", Tel-Aviv, 4 to 8 June 2012.

M NICOLAS : A note on the interpretation of combined precision data of
ISO 11816-1/IDF 155-1 5 (AP in milk), IDF/ISO Analytical Week Tel Aviv, 4-5 June 2012

M NICOLAS: Experimental design of a study to assess the impact of the cheese sample preparation to the overall results' variability (ISO11816-2/IDF 155-2 : AP in cheese), IDF/ISO Analytical Week Tel Aviv, 4-5 June 2012

M. NICOLAS: A critical review of the FDA proposal for the development of different enzyme indicators for pasteurization in other species (Gamma Glutamyl Transpeptidase), IDF/ISO Analytical Week Tel Aviv, 4-5 June 2012

4.3 SCIENTIFIC PUBLICATIONS

Deperrois V. and Lombard B. (2012) Bactocount and Bactoscan to be validated. *Raw milk connect*, 5 July.

DEPERROIS-LAFARGE V. and MEHEUT T. (2012) Use of the rpoB gene as an alternative to the V3 gene for the identification of spoilage and pathogenic bacteria species in milk and milk products. *Letters in applied microbiology*, doi:10.1111/j.1472-765X.2012.03261.x

Deperrois V. (2012) Performance of the network of NRLs Milk & milk products for the counting of somatic cells in raw cow's milk. *IDF/ICAR Newsletter RefSystSomCells*