NMKL Newsletter 90

June 2015

NORDIC COMMITTEE ON FOOD ANALYSIS

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◊ NordVal 014 3M Petrifilm Coliforms/ *E.coli*

◊ NordVal 016 3M Petrifilm Yeast and Mould

◊ NordVal 020 RAPID' *E.Coli*2, Bio-Rad

◊ NordVal 023 **food**proof *Salmonella* detection kit, Biotecon Diagnostics

◊ NordVal 025 **food**proof *Listeria monocytogenes*, Biotecon Diagnostics

◊ NordVal 030 Dupont Bax system PCR Assay for *Salmonella*, OXOID Limited, Thermo Fisher

◊ NordVal 042 HyServe Compact Dry X-SA, HyServe GmbH & Co. K

◊ NordVal 043 HyServe Compact Dry YM, HyServe GmbH & Co. K

◊ NordVal 041 *Salmonella* detection method by real-time PCR, Danish Technological Institute

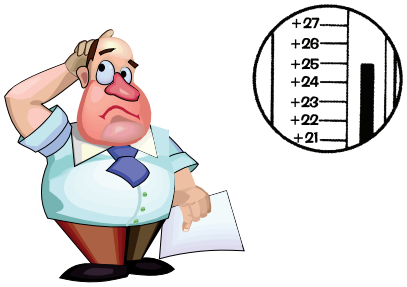
NMKL c/o Norwegian Veterinary Institute
PB 750, Sentrum, N-0106 Oslo, Norway
Tel. +47 23 21 62 50 / +47 46 8888 07
Org.no. 995 790 394
NMKL Secretary General: Hilde Skår Norli

E-mail: nmkl@vetinst.no
www.nmkl.org

Control and Internal Calibration of Thermometers and Temperature Control on Microbiological Laboratories

Coming soon

NMKL Procedure No. 26, 2nd version, 2015



THE AIM OF THE PROCEDURE

This NMKL Procedure for control and internal calibration of thermometers and temperature control in microbiological laboratories are based on national and international recommendations and the experience gained from control and calibration of thermometers in Nordic food laboratories. In addition, this procedure provides a practical guide for the daily temperature control to a microbiology laboratory.

The procedure:

- is intended for food laboratories of all sizes
- is a general procedure, which can be adapted to the specific needs of the individual laboratory
- clarifies the terminologies around the control and calibration of thermometers
- gives practical instructions on how to carry out relevant documentation on functional control, internal and traceable calibration, and
- provides practical guidance for temperature control in a microbiology laboratory.

The change in this 2nd version consists of inclusion of the chapter 6.5: Estimation of measurement uncertainty for working thermometers.

CONTENTS:

GUIDELINES FOR SENSORY EVALUATION OF FOOD PACKAGING

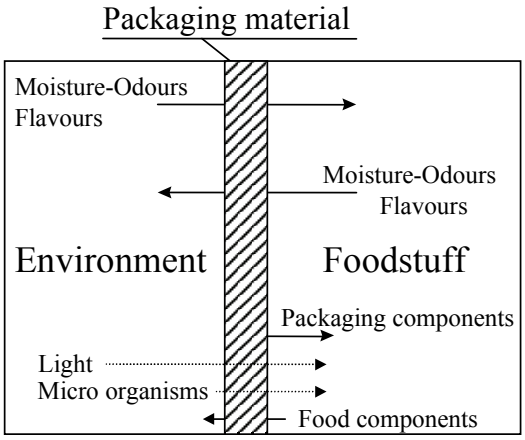
NMKL PROCEDURE NO. 19, 2ND VERSION, 2015

Coming soon

Food packaging is a wide concept and comprises a variety of different materials or combinations of materials, designs and functions. Furthermore, the nature and characteristics of the packaged food itself, which may be intrinsically different, are highly important factors to consider when aiming to achieve a well functioning packaging. The fundamental function of packaging is to protect the packaged food in many ways, such as mechanically, microbiologically, chemically and sensory. Two other important aspects of packaging are design and appearance, as the packaging constitutes the interface between consumer and product, and thus plays a significant part in how the packaged food is assessed by the consumers.

It is important to be aware of the fact that the sensory aspects that are dealt with in this procedure, are often a part of a larger whole, and this may mean that compromises have to be made in order to achieve a product that is as well-functioning as possible. Nevertheless, one should always strive to perform the sensory measurements with the appropriate degree of sensitivity. There will always be a certain degree of interaction between the surroundings, the packaging and the food. In many cases, manufacturers focus on minimising this interaction, and therefore seek packaging which interacts with the food to such a small extent, that it may be considered insignificant in sensory terms. On the other hand, some types of packaging try to utilise and encourage a form of interaction between packaging and food - this is called active packaging.

The document provides a number of different procedures which may be applied in the sensory evaluation of food packaging, and points out critical aspects and potential pitfalls of this work. It focuses mainly on the sensory aspects of packaged foods relating to odour and taste evaluation, and consequently does not deal with issues such as the design and practical usability of the packaging. The field of application is wide, and covers issues such as continuous production control of incoming materials, evaluation of storage conditions for packaged goods, and controls to ensure compliance with applicable rules and regulations.



Contents:

The main change in this new version of the Procedure is an update of the list of references. Only minor editorial corrections are made on the main content. This version was elaborated in a project group consisting of:

- **Leena Lilleberg, Finnish Food Safety Authority Evira (project leader)**
- Riitta Maija Osmonen, VTT Expert Services Ltd, Finland,
- Liv Bente Strandos, Elopak AS, Norway,
- Sara Jonsson, Iggesund Paperboard AB, Sweden.

69th NMKL Annual Meeting, 2015

28 - 31 August 2015, the Danish National Committee of NMKL welcomes the members of NMKL to hold the 69th NMKL Annual Meeting at Nyborg Strand Hotel and Conference Center, Denmark. It is a closed meeting for the NMKL members. The members are appointed experts from Denmark, Finland, Iceland, Norway and Sweden, representing food laboratories, food industry, research institutions and food control authorities. During the Annual Meeting the sub committees for microbiology, chemistry and sensory will discuss all the subjects on the working program. There will also be time for networking.

Would you like to become a member of NMKL, please contact the chairperson in your country:

Denmark: Arne Højgård Jensen (arho@fvst.dk)
Finland: Tuula Pirhonen (tuula.pirhonen@evira.fi)
Iceland: Franklin Georgsson (franklin@matis.no)
Norway: Dag Grønningen (dag.gronningen@vetinst.no)
Sweden: Ulla Edberg (uled@slv.se)

Do you need a new or improved analytical method?

Would you like to contribute in the elaboration and validation process?

Please do not hesitate to contact NMKL.

Nordic Reference Laboratories, NRLs

According to the Article 33 of the European control regulation, i.e. the Regulation (EC) No 882/2004 *of the European Parliament of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules*, the members states are to appoint national reference laboratories in different areas. The article describes the specific tasks of NRLs, such as:

According to article 33:	**Example in practice:**
Collaborate with the Community reference laboratory in their area of competence	Participate at EURL relevant workshops and meetings, and follow up decisions and recommendations
Coordinate, for their area of competence, the activities of official laboratories responsible for the analysis of samples for official control	Provide advice and guidance on which methods and/or provide criteria for methods used for analysis of official samples; develop and validate analytical methods; keep updated on the analytical-technical development and if necessary arrange courses and workshops for the laboratories analysing samples in the framework of the official control
Where appropriate, organise comparative tests between the official national laboratories and ensure an appropriate follow-up of such comparative testing;	Inform the official laboratories about appropriate national and international proficiency tests (PTs). If needed organising PTs and evaluate the performance of the laboratories.
Ensure the dissemination to the competent authority and official national laboratories of information that the Community reference laboratory supplies;	Regularly inform authorities and official laboratories of EURL decisions and recommendations, obtained by correspondence, workshops or meetings
Provide scientific and technical assistance to the competent authority for the implementation of coordinated control plans	Participate in the planning of government projects and assist official laboratories in analytical technical problems

For the list of contact persons at the NRLs in the Nordic countries and information on the EURLs, click here.

Courses in Sampling

Scope

Inadequate and improper sampling may lead to unreliable results, wasted time and resources. The objective of the course in sampling is to address how to sample (sampling techniques / equipment / seal / transport) and how many samples that should be withdrawn (sampling plans). The course will discuss considerations to be taken into account in the sampling and in the pre-treatment of samples. Available sampling plans, and the possibility of using these in practise? The courses will be practical, and include sampling for food processing, food laboratories and for research purposes.

The participants will also get the pdf-version of the NMKL Procedure No. 12, 2nd ed., 2014: Guide on sampling for analysis of foods.
The course is sponsored by the Nordic Working Group for Food Safety & Consumer Information (NMF).

Who should attend

The target group of the courses are sampling officers, designers of sampling procedures/plan, laboratory personnel and stakeholders, i.e. everyone involved in sampling and analysis of food and those who make decisions based on the results.

Time and place

Finland: 19 - 20 November 20, 2015 at the Finnish Food Safety Authority Evira, Mustialagatan 3, Helsinki.
Norway / Iceland: 2 - 3 December 2015 at the Norwegian Veterinary Institute, Ullevålsveien 68, Oslo with video conference to Matis, Vinlandsleið 12, Reykjavik.
The course will not be held in Sweden.
Time and place for any course in Denmark is not settled.
Anyway, everyone is welcome to participate in Finland or in Norway (depending on preferred language).

Language

Finland: Finnish
Norway / Iceland: Mainly Norwegian

Program

Finland: for the preliminary program, click here
Norway / Iceland: for the preliminary program, click here

Fee

Participating on site: NOK 2000 / EUR 230
Participating via videoconference (Iceland): NOK 1000 / ISK 17000

Click here for registration

Registration:

Deadline: 1st November 2015.
The registration is binding.

A glimps from the AOAC Europe - NMKL - NordVal International Symposium: Food Labs in a Crystal Ball– Future Challenges in Food Analysis, Stockholm 21—22 May 2015.

Stig Orustfjord, Director-General of National Food Agency, Sweden, **Dr Ulla Edberg**, Chair of NMKL and **Dr Klaus Reif**, President of AOAC Europe welcomed the 165 participants from 25 countries.

Photo: Klaus Reif

Dr Franz Ulberth, JRC

Dr Franz Ulberth, European Commission, Joint Research Centre, Belgium, started the first of the 20 technical presentations with introducing the complexity in the food and feed sector due to globalisation and new technologies. When deciding whether a tested item conforms to certain specifications, the uncertainty associated with the test result has to be taken into account. Because of the wide-ranging consequences of such decisions, analytical data have to be comparable and reliable. Whatever mechanism for choosing a method for official food control, evidence has to be provided that the method delivers valid results, and that the performance of the method is fit-for-purpose.

Dr Jan Alexander

Dr Jan Alexander, Deputy Director-General, Norwegian Institute of Public Health, Professor at Norwegian University of Life Sciences, Chair of the Norwegian Scientific Committee for Food Safety and the Vice Chair of EFSA Scientific Committee stated that food analysis is an essential part in ensuring food safety and nutritious foods. Access to safe and nutritious food is the basic requirement for human health, and the risks of unsafe food are substantial. The risks are related to harmful parasites, bacteria, viruses, prions, allergens, chemical compounds and radioactive substances, which may cause numerous health problems ranging from infectious to non-communicable diseases such a cancer and impaired development. The link from food to human health risk is related the extent of exposure to hazardous microbiological agents and chemicals. In this area there are new opportunities in the field of human biomonitoring using human biomaterial such as blood, urine, hair and biomarkers of exposure.

Dr Bernd Renger

Dr. Bernd Renger, Bernd Renger Consulting, Germany talked about "lean lab" - proposed strategies to reduce cost while improving quality and efficiency. He showed examples on laboratory efficiency; only about 40% of all laboratory activities are directed directly to work orders, so what are we doing 60% of our time? Amongst others, he showed how much improvement "lean thinking" could be in organizing the lab more adequate, avoiding excessive walking and excessive searching for missing items and materials.

Dr Eric Konings

Dr. Erik J.M. Konings, President of AOAC INTERNATIONAL, Nestlé Research Center, Lausanne, Switzerland**,** gave the perspective of from an industry point of view and from a standardisation point of view on the future challenges in food analysis. Konings concluded that there is a need for alternative methods in quality and safety testing, and that the authorities accept these methods. Due to globalisation there is a need for harmonized international guidelines, and harmonized standards to meet demands of international trade, ensuring safety, quality and fair trade.

(continued on page 6)

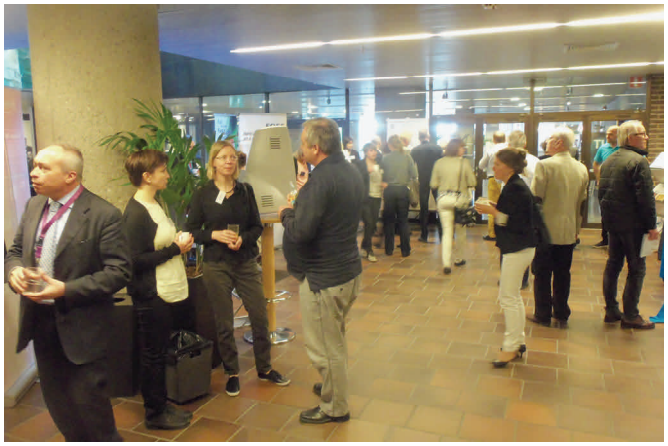
AOAC Europe - NMKL - NordVal International Symposium

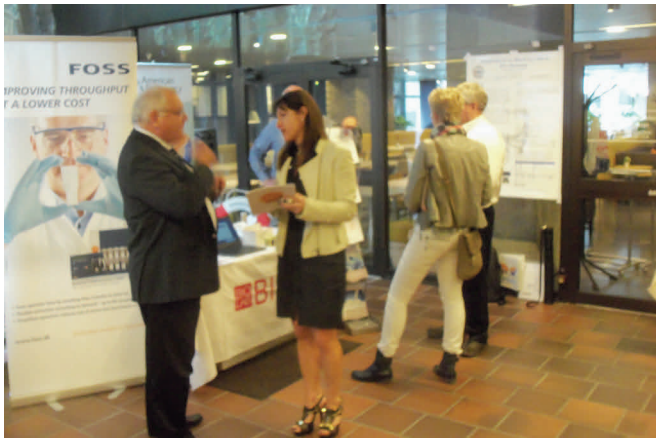
There were many interesting presentations.

The presentations are available as pdf-files under "course &seminar" at www.nmkl.org (see link here).

In the chemistry session there were talks about food fraud / adulteration, analysis of non-target samples in connection with preparedness, mycotoxins, pesticides, micro-plastic and allergens.

In the session for microbiology we were informed about the importance of sampling and analysing early in the process for ensuring food safety in the final product, the listeria outbreak in Denmark in 2014, new generation sequencing techniques, use of MALDI-TOF, microbiota and its importance to our health, and about validation and verification of microbiological methods.





Joe Whitworth, FoodQualityNews.com, has taken the photos, rightfully reproduced on this page. See also Whitworth article from the event on this link **here**.

Renewal of NordVal International Certificates

3M Petrifilm *E. coli* / Coliform Count Plate, 3M Health Care USA, NordVal 014

The 3M Petrifilm *E. coli* / Coliform Count Plate identifies both *E.coli* and other coliform bacteria with a confirmed result in 24– 48 hours. The kit is a sample-ready-culture-medium system which contains the needed ingredients for the enumeration of *E.coli* and other coliform bacteria in foods. For the enumeration of coliforms, red colonies with gas and all blue colonies with or without gas are counted after 24 hours of incubation at 37°C. *E. coli* appear as blue colonies with and without gas, after 48 hours of incubation at 37°C.

The method has been compared against the reference method: ISO 16649-2. The results document no statistical difference in the performances between the methods. The 3M™Petrifilm™ E.coli / Coliform Count Plate has also been fully collaboratively validated, and corresponds to AOAC 991.14: Coliform and *Escherichia coli* Counts in Foods Dry Rehydratable Film. This 3M method was previously referred to as NMKL Method No. 147. This NMKL Method was withdrawn, not because it did not work well but due to the NMKL policy of not including proprietary method in its collection. Such methods should be certified by NordVal International.

For the NordVal International Certificate click here .

3M Petrifilm Yeast and Mould Count Plate, 3M Health Care USA, NordVal 016

The 3M Petrifilm Yeast and Mould Count Plate is a sample-ready-culture-medium system with ingredients that can differentiate and determine yeast and mould in foods on 3-5 days. Yeast appear as small blue-green colonies with defined edges, while mould forms big colonies in variable colour with a dark centre and diffuse edges.

The 3M™ Petrifilm™ Yeast and Mould Count Plate performance has been compared to the FDA Bacteriological Analytical Manual (BAM), 8th Ed: Yeast and Mold Method. The results document no statistical difference in the performances between the methods.

The 3M™ Petrifilm™ Yeast and Mould Count Plate has been fully collaboratively validated and corresponds to AOAC 997.02: Yeast and Mold Counts in Foods Dry Rehydratable Film Method (Petrifilm™ Method).

For the NordVal International Certificate click here .

Validation steps

The steering group approves application for validation and the expert laboratory (the lab has to be independent and accredited)

↓

A technical committee (TC) (3-4 independent experts) are appointed

↓

The expert laboratory, in consultation with the TC and the applicant, drafts the study plan

↓

The steering group approves the study plan

↓

The expert lab carries out the comparison study and write the report

↓

The TC reviews the results of the comparison study. If the comparison study is not OK, the process is terminated.

↓

The expert laboratory organises the collab study

↓

The TC reviews the results and forwards recommendations to the NordVal steering group

↓

The steering group approves the method

↓

Methods are reviewed every 2nd year

RAPID' *E.COLI* 2, BIO-RAD LABORATORIES, NORDVAL 020

RAPID' *E.coli* 2 is based on simultaneous detection of two enzyme activities; β-D-Glucoronidase (GLUC) and β-D-Galactosidase (GAL), and is applicable for the determination of *E.coli* and total coliform bacteria in foods.

The medium contains 2 chromogenic substrates:

- one substrate specific to GLU, causing pink coloration of colonies positive for this enzyme,
- one substrate specific to GAL, causing blue coloration of colonies positive for this enzyme.

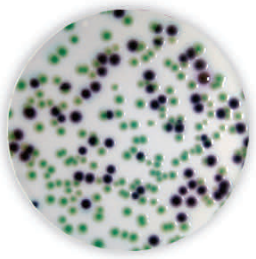


Photo: www.bio-rad.com

Coliforms other than *E. coli* (GAL+/GLUC-) form blue to green colonies, *E. coli* (GLU+/GAL+) forms violet to pink colonies.

The reference methods were ISO 4832:2006 for the enumeration of coliforms in foods at 37 °C, and ISO 16649-2:2001 for the enumeration of *E.coli* in foods at 37 °C and 44 °C. The results document no statistical difference in the performances between the RAPID' *E.coli* 2 Agar and the reference methods.

For the NordVal International Certificate click here.

FOODPROOF® *SALMONELLA* DETECTION KIT, HYBRIDIZATION PROBES AND FOODPROOF® *SALMONELLA* DETECTION KIT, 5' NUCLEASE, IN COMBINATION WITH FOODPROOF® SHORTPREP I KIT OR FOODPROOF® STARPREP ONE KIT

BIOTECON Diagnostics GmbH, NordVal 023

The principle is real-time PCR and detection with specific, fluorescence labelled probes.
After DNA isolation using the **food**proof® ShortPrep I Kit (Art. No. S 400 01), or the bulk version of this kit, the **food**proof® StarPrep One Kit (Art. No. S 400 07) both designed for the rapid preparation of bacterial DNA for direct use in PCR, the real-time detection of *Salmonella* DNA is carried out either by using the **food**proof® *Salmonella* Detection Kit, Hybridization Probes (Art. No. 300 27) or the **food**proof® *Salmonella* Detection Kit, 5'Nuclease (Art. No. R 302 27).

Photo: www.bc-diagnostics.com

The methods are tested on foods, feeds and environmental samples. For food and feed samples inoculate 25 g. For environmental samples inoculate an area of 100 cm^2. Perform the pre-enrichment according to EN ISO 6579. The detection kit provides all the reagents required for the PCR.

The results document no statistical differences in the performances between the alternative method and the reference method (EN ISO 6579:2002) for detection of *Salmonella* spp. in food, animal feed and environmental samples. NordVal International has concluded that it has been satisfactorily demonstrated that the requirements for the sensitivity and the agreement between the methods are fulfilled, further that confirmation of obtained positives are not necessary.

For the NordVal International Certificate click here.

FOODPROOF® *LISTERIA MONOCYTOGENES* DETECTION KIT, HYBRIDIZATION PROBES AND FOODPROOF® *LISTERIA MONOCYTOGENES* DETECTION KIT, 5' NUCLEASE, IN COMBINATION WITH FOODPROOF® SHORTPREP II KIT OR FOODPROOF® STARPREP TWO KIT,

BIOTECON Diagnostics GmbH, NordVal 025

The principle is real-time PCR and detection with specific, fluorescence labelled probes.
After DNA isolation using the **food**proof® ShortPrep II Kit (Art. No. S 400 02) or the bulk version of this kit, the **food**proof® StarPrep Two Kit (Art. No. S 400 08), designed for the rapid preparation of bacterial DNA for direct use in PCR, the real-time detection of *Listeria monocytogenes* DNA is carried out either by using the **food**proof® *Listeria monocytogenes* Detection Kit, Hybridization Probes or by using the **food**proof® *Listeria monocytogenes* Detection Kit, 5'Nuclease.

The methods are tested on foods and environmental samples. For food samples inoculate 25 g. For environmental samples inoculate an area of 100 cm^2. Perform the pre-enrichment according to EN ISO 11290. The detection kit provides all the reagents required for the PCR.

The results document no statistical differences in the performances between the alternative methods and the reference method (EN ISO 11290:1996/Amd 1:2004) for the detection of *Listeria monocytogenes*. NordVal International has concluded that it has been satisfactorily demonstrated that the requirements for the sensitivity and the agreement between the methods are fulfilled, further that confirmation of obtained positives are not necessary.

For the NordVal International Certificate click here.

DUPONT™ BAX® SYSTEM PCR ASSAY FOR *SALMONELLA* (CLASSIC + Q7 INSTRUMENTS)

OXOID LIMITED, THERMO FISHER SCIENTIFIC, NORDVAL 030

The DuPont™ BAX® System for detection of *Salmonella* is a detection kit using PCR. The method procedure consists of enrichment, preparation of DNA, amplification and detection.
The DuPont™ Bax® System for detection of *Salmonella* is targeting a specific bacterial DNA fragment, which is specific for *Salmonella* and is not present in any other bacteria, and hence is an indicator of *Salmonella* presence.

Photo: www.dupont.com

The PCR allows the BAX® System to realize a specific and rapid amplification of the DNA.
After the lysis step, the Bax® System cycler/detector is doing both amplification and automated detection.

The method has been tested on foods, feeds and environmental samples.
The DuPont™ BAX® System PCR Assay for *Salmonella* can be used without further confirmation.

The performance of the BAX® System PCR Assay for *Salmonella*, has been compared against EN ISO 6579:2002. The results document no statistical difference in the performances between the methods.

For the NordVal International Certificate click here.

HyServe Compact Dry X-SA Method for the Enumeration of *Staphylococcus aureus* in Foods HyServe GmbH & Co. KG, NordVal 042

Compact Dry X-SA method contains a ready-to-use dry chromogenic medium, and selective agents making it suitable for the detection and enumeration of *Staphylococcus aureus* in foods. An aliquot of 1 ml of an appropriate dilution is plated onto Compact Dry X-SA plate. The incubation conditions tested in the study were 37 ± 1°C for 24 ± 2h. *Staphylococcus aureus* form blue colonies

Photo: www.hyserve.com

NordVal International has reviewed the method and the validation studies conducted by CCFRA Technology Limited, Chipping Campden, UK. The studies have been conducted according to ISO 16140:2003. The results document no statistical difference in the performances between Compact Dry X-SA and the reference method, ISO 6888-1: 1999.

For the NordVal International Certificate click here.

HyServe Compact Dry YM Method for the Enumeration of Yeasts and Moulds in foods HyServe GmbH & Co. KG, NordVal 043

Compact Dry YM contains a ready-to-use dry chromogenic medium and selective agents making the method suitable for the detection and enumeration of yeast and mould in foods. The method has been tested in extensive studies where it has been compared with ISO 21527-1. Both the reference method and the alternative method give the user the opportunity to record results at two time points. Compact Dry YM enables reading after 3 and 7 days. For slower growing fungi, the reading should be carried out after 7 days, for other fungi 3 days might be sufficient. The methods (the alternative method and the reference method) are applicable for levels above 100 cfu/g.


Photo: www.hyserve.com

NordVal International has reviewed the method and the validation studies conducted by CCFRA Technology Limited, Chipping Campden, UK. The studies have been conducted according to ISO 16140:2003. The results document no statistical difference in the performances between Compact Dry YM and the ISO 21527-1:2008.

For the NordVal International Certificate click here.

Salmonella detection method by real-time PCR, NordVal 041

Laboratories have requested to use newer and faster thermocyclers in the *Salmonella* 12-hour method with real-time PCR. Therefore, two laboratories in Denmark have carried out comparison tests between the Stratagene MX3005p (Agilent) and the StepOnePlus (Applied Biosystems), and between Stratagene MX3005p (Agilent) and Aria MX (Agilent). 150 and 135 samples were analysed in duplicates. The results showed that the three tested thermocyclers give equivalent results, and may be regarded as equal. Therefore, the three PCR systems are included in the certificate. The testing is performed on behalf of the Danish Technological Institute, DMRI, Denmark.

The method is validated and found fit for analyses of raw meat and swabs from cattle and pork carcases.
The method describes a shortened pre-enrichment in buffered peptone water followed by DNA extraction and subsequent real-time PCR analysis. For raw meat, the samples are pre-enriched for 12 h ± 2 h and for the swabs 14 h ± 1.5 h at 37 °C. DNA extraction can be carried out by either boiling, or by automated extraction such as KingFisher.

The method has been extensively validated, including a collaborative study. The results showed that the alternative method provide equivalent results to the reference method. Relative accuracy, relative sensitivity and relative specificity were satisfactory.

For the NordVal Certificate, click here.

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- For education purposes, 25% discount.

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Available NMKL Procedures

- No 1, 2. Ed. 2005 Calibration and performance checking of laboratory balances
- No 3, 1996 Control charts and control materials in internal quality control in food chemical laboratories
- No 4, 3. Ed., 2009 Validation of chemical analytical methods
- No 5, 2. Ed. 2003 Estimation and expression of measurement uncertainty in chemical analysis
- No 6, 1998, (Adm 2002, Adm 2006) Generelle retningslinier for kvalitetssikring af sensoriske laboratorier. (only available in Danish and Finnish)
- No 7, 1998 Checking of UV/VIS spectrophotometers
- No 8, 4. Ed. 2008 Measurement of uncertainty in quantitative microbiological examination of foods
- No 9, 2. Ed., 2007 Evaluation of method bias using certified reference materials.
- No 10, 2001 Control of Microbiological Media
- No 11, 2. Ed. 2010 Procedure for sensory analysis of drinking water
- No 12, 2. Ed., 2014 Guide on sampling for analysis of foods
- No 13, 2003 Volumetric control
- No 14, 2004 SENSVAL: Guidelines for internal control in sensory analysis laboratories
- No 16, 2005 (2007) Sensory quality control.
- No 17, 2006 Guidelines for requirement specifications for food analyses.
- No 18, 2006 The use of reference materials, reference strains and control charts in a food microbiological laboratory
- No 19, 2007 Guideline for sensorial Analysis of Food containers/packages
- No 20, 2007 Evaluation of results from qualitative methods
- No 21, 2008 Guide for sensory analysis of fish and shellfish
- No 22, 2008 Considerations regarding evaluation of immunochemical test kits for food analysis
- No 23, 2008 Guide on quality assurance in microbiological laboratories
- No 24, 2010 Guidelines for quality assurance for food chemical laboratories
- No 25, 2014 Recovery information in analytical measurement
- No 26, 2012 Control and internal calibration of thermometers and temperature control on microbiological laboratories
- No 27, 2013 Measurement uncertainty in sensory analysis
- No 28, 2014 Guidelines for reporting sensory data
- No 29, 2014 Guidelines for sensory analysis of meat and meat products
- No 30, 2014 Statistical Evaluation of Results from Quantitative Microbiological Methods