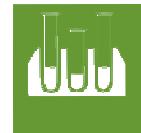


# CERTIFICATE OF COMPLIANCE

## MICROVAL



HEREBY DECLARES THAT THE CERTIFICATION ASSESSMENT BY  
**LLOYD'S REGISTER QUALITY ASSURANCE**  
HAS DEMONSTRATED THAT THE PRODUCT

## COMPACT DRY CF

Manufactured by:  
Nissui Pharmaceutical Co.Ltd.  
3-23-9 Ueno,  
Taito-Ku, Tokyo, 110-8736  
JAPAN

Supplied by:  
HyServe GmbH & Co. KG  
Hechenrainer Strasse 24  
82449 Uffing  
GERMANY

### COMPLIES WITH

The MicroVal Rules and Certification Scheme version 5  
The validation has been performed in accordance with EN ISO 16140:  
2003

As demonstrated by Report number MB/REP/101096/SE00644

Certificate no.: MV0806-003LR

Validation date: 2 June

2008

Surveillance date: 2 June  
2008

Expiry date: 1 June 2012

ISSUED BY: Lloyd's Register Nederland  
B.V.  
Rotterdam, The Netherlands

## PRINCIPLE OF THE METHOD

Compact Dry (Nissui Pharmaceutical Co. Ltd., supplied by Hyserve GmbH & Co. KG) are ready-to-use dry media sheets comprising culture medium and a cold-soluble gelling agent, rehydrated by inoculating 1 ml diluted sample into the centre of the self-diffusible medium. The Compact Dry CF (total coliforms) method contains a chromogenic medium and selective agents for the detection and enumeration of coliform bacteria. This method is an alternative method to the standard pour plate method, enabling determination of total coliform counts in foods after 24-48h incubation.

## SCOPE

All human food products

## RESTRICTION OF USE

None

## REFERENCE METHOD

ISO 4832 (2006) "Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of coliforms – Colony count technique".

## LINEARITY and RELATIVE ACCURACY

Comparison of performances of the alternative method and the reference method.

### LINEARITY STUDY

The tests were performed in 2007 on five food products/strains. In total 35 samples were naturally contaminated, 15 contained organisms at levels below the limit of detection of the test (<10 CFU/g), and 75 samples were artificially contaminated. The principle food product categories tested were meat products, poultry products, fish and seafood products, dairy products and fruit and vegetable based products.

The samples were analyzed in duplicate with each of the two methods, at the five naturally contaminated levels within the ranges: 10 to 100, 100 to 1000, 1000 to 10,000, 10,000 to 100,000, 100,000 to 1,000,000 and 1,000,000 to 10,000,000 and artificially contaminated levels: 100 to 1000, 1000 to 10,000 and 10,000 to 100,000 CFU/g.

### Table of results:

Food category	Food product/strain pair	Regression line
Meat products	Raw ground beef	$y = 0.211 + 0.943 x$
Poultry products	Cooked chicken	$y = 0.213 + 0.962 x$
Fish and seafood products	Frozen fish	$y = -0.412 + 1.089 x$
Fruit and vegetable based products	Lettuce	$y = -0.0465 + 1.142 x$
Dairy products	Milk powder	$y = -0.235 + 1.041 x$

## ACCURACY STUDY:

The tests were performed in 2007 on five food categories. In total 35 samples were naturally contaminated, 15 contained organisms at levels below the limit of detection of the test (<10 CFU/g), and 75 samples were artificially contaminated. The principle food product categories tested were meat products, poultry products, fish and seafood products, dairy products and fruit and vegetable based products.

The samples were analyzed in duplicate with each of the two methods, at the five naturally contaminated levels within the ranges: 10 to 100, 100 to 1000, 1000 to 10,000, 10,000 to 100,000, 100,000 to 1000,000 and 1000,000 to 10,000,000 and artificially contaminated levels: 100 to 1000, 1000 to 10,000 and 10,000 to 100,000 CFU/g.

Food category	Contamination range (in log CFU/g)
Meat products	3.4 to 7.9
Poultry products	LOD (<1) to 6.2
Fish and seafood products	2.9 to 7.0
Fruit and vegetable based products	2.5 to 7.5
Dairy products	LOD (<1) to 5.7

LOD (limit of detection)

The equation of the regression line between the alternative method and the reference method, for all categories combined, is as follows:

$$y = -0.074 + 1.013 x$$

$$R^2 = 0.967$$

y = log (N alternative method)

x = log (N reference method)

Conclusion: for the linearity and relative accuracy: The results of the method comparison study clearly showed the Compact Dry CF method to be equivalent to the reference method ISO 4832 (2006) for a range of foods.

## Selectivity (INCLUSIVITY/EXCLUSIVITY)

Both methods were challenged with 2-3  $\log_{10}$  (100 times limit of detection) CFU/ml of each culture twice, as required by EN ISO 16140. The inclusivity results revealed all 33 coliform strains produced typical colonies in VRBA (ISO 4832), and with Compact Dry CF medium.

The results from the 20 strains of non-target organisms used to determine the exclusivity of the CF method showed that 10 strains did not grow on the CF medium and 8 were

atypical in appearance. Two strains of *Shigella sonnei* appeared typical owing to the presence of galactosidase activity. By comparison, 9 stains failed to grow in VRBA, 5 strains were atypical and 6 were typical in appearance.

### **PRACTICABILITY (Alternative Method only)**

The Compact Dry CF method provides a convenient alternative to the conventional culture method for the enumeration of coliform bacteria in foods.

The ready-to-use format means that there is no prior preparation required except for dilution of the sample and inoculation of plates which stack easily and require less space than conventional Petri dishes.

The Compact Dry CF method employs a selective chromogenic medium which enables recognition of presumptive coliform colonies which appear blue/blue green after 24h incubation at 37°C.

Overall the comments from the laboratories during the inter-laboratory study were positive.

Evidence of spreading colonies was noted by one laboratory during the Inter-laboratory trial but this was only observed with some samples at the lowest dilution and it did not appear to affect the accuracy of the counts obtained. This observation was not reported by the Expert Laboratory.

### **INTERLABORATORY STUDY**

The inter-laboratory study was conducted in November 2007 with 13 laboratories.

Samples of pasteurised milk were artificially contaminated with defined numbers of *E. coli* and *E. aerogenes* to provide samples with the following contamination levels; low ( $10^2$  CFU/ml), medium ( $10^3$  CFU/ml) and high ( $10^4$  CFU/ml). Uninoculated samples were used to provide the forth contamination level (0 CFU/ml). Each laboratory received duplicate blind-coded samples for each contamination level which were tested by both methods.

Obtained results

Contamination level	Number of samples taken into account	Reference method		Alternative method		
		Repeatability r	Reproducibility R	Repeatability r	Reproducibility R	Bias
Low ( $10^2$ )	22	0.202	0.437	0.204	0.401	-0.011
Medium ( $10^3$ )	22	0.246	0.293	0.325	0.432	-0.031
High ( $10^4$ )	22	0.210	0.773	0.161	0.434	0.130

The data provided by 2 laboratories was omitted from the statistical analysis because samples were not analysed on the agreed date

## **Conclusion**

The results from the method comparison study and interlaboratory study revealed that there was no substantial differences between the Compact Dry CF method and the reference method ISO 4832 (2006) for the enumeration of Coliforms (plate count method).

**Please send any queries concerning the performance of the validated method to Lloyd's Register Quality Assurance.**