



ADVANCED DairyNews

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ADVANCED ANALYSIS FOR THE DAIRY INDUSTRY

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Analyze milk, analyze cheese

Delta Instruments Lactoscope FT Advanced™ does both

With higher raw milk prices and soaring energy costs, cheesemakers are faced with daily decisions that can affect the profitability and efficiency of their process. Delta Instrument's new Lactoscope FT Advanced with Cheese Application allows the cheesemaker to quickly and accurately analyze all liquid dairy and solid cheese products.

In fact, Delta's Lactoscope is the only AOAC approved mid-infrared analyzer that will work with all liquid and solid cheese products!

Traditionally cheesemakers have had to rely on at least two different methods to quantify their raw and finished products. This led to the reliance on two different expensive instruments. Mid-infrared would be used to measure the components on the raw milk, and Near Infrared would be used to analyze the solids cheese. Both systems required extensive calibration work and maintenance by the operator. Other problems this method posed were: inconsistent results due to operator preparation, expensive calibration development and costly routine maintenance.

Delta has eliminated the need for using two instruments by combining the ability to analyze both liquid and solid on our new Lactoscope FT Advanced with Cheese Application. Our system uses our most accurate and robust FTIR analyzer to measure liquid samples and an automatic dilutor to prepare solid cheese products. All products and calibrations are included so the system is ready to analyze the day it is installed. You can immediately begin testing your raw milk, skim milk, pasteurized milk, heavy cream, cheese milk, whey, RO whey and

WPC. Our instrument will be configured to give results for whatever components you need, like: butterfat, protein, solids, solids non-fat, casein, FPD, NPN, lactose and many other components. The unit will also measure solid cheese (even cream cheese!) for fat, moisture, fat in dry matter, pH, salt, lactose, protein and other components as needed.

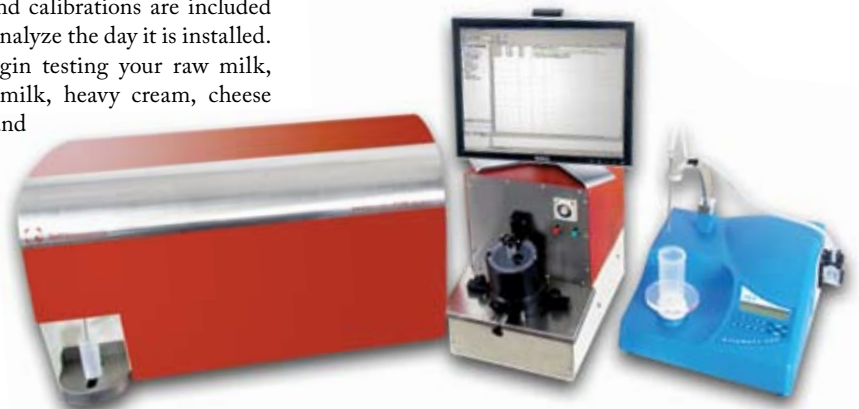
The biggest benefit of this system is that there is only one system to purchase and maintain. Other benefits will be quickly realized by increased production, yield and more standard product quality. The Lactoscope FTAdvanced with Cheese Application will enable you to have more control over every aspect of your process:

- Raw milk and cream can be analyzed and standardized to maximize butterfat usage and greatly reducing shrinkage
- Raw milk can be analyzed for casein to help predict and control yield of cheese batch
- In-process cheese milk can be quickly analyzed to allow for batch adjustment to eliminate butterfat waste
- Final cheese product can be analyzed to insure quality, as well as quantify for shipping weights.

As with all of our instruments, we offer onsite installation and extensive training. All of our instruments come with 24-hour phone support and free lifetime calibration support.

To learn how much money our system can help you save, please call a Delta Instruments Sales Specialist at (800) 225-4034.

Shown here:
The LactoScope FT Advanced with Cheese Application—the industry's fastest, safest and least expensive milk/cheese analyzer.



from the PRESIDENT



Welcome to our 2008 edition of *Advanced Dairy News*. Our goal is to keep you updated and educated about our products and their many and varied applications.

In this latest edition, you'll learn

how a new cheese application for the Delta Instruments LactoScope is saving dairy processors money. You'll also learn how our products have completely blown away the competition when it comes to pasteurization testing, so much so that the EU has given the Fluorophos® method unanimous approval as a new international reference standard for determining pasteurization.

And for those who missed it, we'll give you a slice of what happened at this year's International Cheese Trade Expo, and the NALMA/ICAR exhibit.

Advanced Instruments, Inc. has been in the business of providing automated systems that help our global customers improve productivity and product quality, meet regulatory requirements, and reduce unnecessary operating expense, for over fifty years.

We hope this latest newsletter informs and entertains you and we welcome your comments, criticisms and suggestions.

John L. Coughlin, President and CEO
Advanced Instruments, Inc.

Featured at this year's NALMA meeting, the SomaScope Smart (shown here with monitor) will give dairy farmers the most cost-effective way to quantify somatic cells in unpasteurized milk.



Delta Instruments introduces SomaScope Smart™ at NALMA/ICAR 2008 meeting

The National Dairy Herd Information Association (NDHIA) hosted the 2008 International Committee for Animal Recording (ICAR) Meeting on June 16-20, in Niagara Falls, NY. At this meeting Delta Instruments introduced the SomaScope Smart to the meeting's attendees.

The new SomaScope Smart somatic cell counter is the latest addition to the Delta family of milk analysis products. The "Smart" is designed to quantify the number of somatic cells in milk using proven and IDF recognized fluorescence flow cytometry technology. High cell counts are an indication of infection in the cow udder. Farmers are paid a premium for milk with low cell counts since this milk will have a longer shelf life and provides a better cheese yield.

The SomaScope Smart incorporates the latest in technology including, a long-life LED source in the flow cytometer. This helps provide better repeatability and more linear counts up to five million cells. The instrument housing encloses the reagent containers, giving it a sleek look and reducing overall bench space. The technology employed allows the use of the non-mutagenic DAPI stain and the Delta Instruments brand Somatic Cell Counter (SCC) pilot/calibration kits. The

The SomaScope is a SMART choice for any dairy lab. The software is intuitive and user friendly, and the design allows for low cost maintenance and easy service.

software in the new SomaScope Smart is intuitive and user friendly, and the design allows for low cost maintenance and easy service. For more information contact info@aicompanies.com.

Also on display at the Niagara Falls meeting was the CombiScope-AutoLab™ automation video. The CombiScope-AutoLab is the only completely automated, sample handling and component analysis system specifically designed for the dairy laboratory. Advanced Instruments developed the CombiScope-AutoLab jointly with a robotic systems developer. The system provides consistent results due to more uniform sample handling, lower workers compensation exposure for the lab by elimination of repetitive stress injury activities, and significant opportunity for labor cost savings. A video of the system can be viewed at aicompanies.com/AutoLab/autolabvideo.htm.

International Cheese Technology Exposition

Delta Instruments displayed its LactoScope FT Advanced™ dairy analyzer with Cheese Application at the 2008 International Cheese Technology Exposition (ICTE). The expo was held in Madison, WI, on April 22-24.

The LactoScope FT Advanced allows customers to use one instrument to analyze both raw milk and solid cheese on one analyzer, a first in this industry. (See article on Page 1.) The Cheese Application eliminates the wet chemistry analysis methods typically used by cheese manufacturers.

The Wisconsin Cheese Makers Association

is the sponsor of the ICTE, and hosts cheese manufacturers and industry suppliers from around the world. Over 200 manufacturers from 19 countries attended the meeting.

The highlight of the meeting was the International Cheese Contest where cheese-makers and buttermakers from around the world are invited to compete for gold, silver and bronze awards. There are 59 cow's milk cheeses classes alone, ranging from "mild Cheddar" to "Muenster" to "Smear ripened semi-soft cheese". A panel of 22 judges rate the products on flavor, body and texture.

The winner of this years contest was a 77-



pound block of Gruyere cheese, submitted by a cheese maker in the Swiss Alps. The block will be auctioned (for about \$10,000) with the proceeds going to charity. A complete list of the winners can be found at www.wischeesemakersassn.org. More information about the LactoScope FT Advanced Dairy Analyzer with Cheese Application can be found at www.aicompanies.com/deltainstruments, or by calling (800) 225-4034.

Sample Pre-freeze Error Messages 4C3, 4250 & 4D3 Cryoscopes

A "Sample Pre-Freeze" error message is displayed during sample testing if the instrument detects a reversal in temperature of the sample prior to the freeze buzz.

A "Sample Pre-Freeze" error message is intended to inform the operator that the instrument detected crystallization prematurely or a reversal in the temperature of the sample prior to the freeze buzz.

Sample Pre-Freeze error messages can occur due to one of these three scenarios:

- The temperature reading of the sample reversed direction during cooling by 11mOsm or warmer and the sample is partially frozen.
- The temperature reading of the sample reversed direction during cooling by 11mOsm or warmer and the sample is actually in a liquid state – not frozen
- The rate of sample cooling is too slow to meet cooling requirements of 20mOsm in 7 seconds.

If the sample is partially frozen and you are getting "Sample Pre-Freeze" errors, then you will need to inspect the position of the stir wire in relation to the sample probe. An alignment tool is the best method for ensuring this alignment.

The stir wire amplitude should be set at approximately 40. If it is set too high or too low, you will see a partially frozen sample.

If the sample is actually in a liquid state and you are getting "Sample Pre-Freeze" errors, then particles in the sample is likely to be the reason for the error or the sample probe may be faulty. Try different samples of milk.

If the cooling rate is too slow, as seen on the display and you are getting "Sample Pre-Freeze" errors, then the cooling well may not have sufficient heat transfer fluid or the cooling well is not effective enough to cool the sample in the time allowed.

Monitor the display and look for a reversal in direction of the numbers displayed prior to reaching the freeze buzz.

Changes to ALP testing within the EU

In May 2007 the EU approved the fluorimetric method (ISO 11816-1: IDF 155-1) as the "Official reference" method for alkaline phosphatase for applications related to EU sanitary regulations. The EU now requires that any other method being considered for use be validated against the fluorimetric method and lowered the statutory level for ALP in pasteurised milk from 500 to 350mU/L.

This change means that ALP in milk is now defined as the result obtained when ISO 11816-1: IDF 155-1, the fluorimetric method, is applied.

A more sensitive test for pasteurisation of milk

It was recognised in the 1930's, that alkaline phosphatase (ALP), an enzyme naturally present in all milks, is inactivated at the time temperature conditions used to kill *Mycobacterium tuberculosis* and most other pathogens in milk (71.7°C/15seconds). These conditions are used commercially to pasteurise milk and test methods based on ALP measurement were developed in order to demonstrate that milk has been correctly pasteurised.

Tests developed for ALP measurement in the 1930's and used for many years were based on colorimetric methods of analysis. Such tests are only semi-quantitative and relatively insensitive, with a limit of detection of about 0.1% raw milk.

In 1990, Rocco¹ published the results of a collaborative trial of a fluorimetric method, which was linear over a wide range of ALP values, quantitative, precise and sensitive to raw milk levels below 0.01%. The method, named Fluorophos[®] Test System, was developed and is marketed by Advanced Instruments, Inc., USA.

In a number of studies the Fluorophos has been compared with existing, less sensitive colorimetric reference methods and a relationship was established around the 0.1% raw milk cut off point.

Table 1. Determination of ALP by AOAC and Fluorophos collaborative study (Rocco¹) using cow's milk in the USA

Milk Type	% of Raw Milk	Fluorophos Mean Value mU/L	AOAC Mean Value µg phenol/ml
Whole	0.05	256.2	0.83
	0.10	494.6	1.46
	0.20	960.2	2.70
Skim	0.05	262.3	0.60
	0.10	507.6	1.02
	0.20	994.6	2.14
Chocolate	0.05	262.8	0.38
	0.10	521.3	0.78
	0.20	1020.2	1.40

Lechner² studied the Fluorophos method using cow's milk in Germany.

Table 2. Study by Lechner

% Raw Milk in Pasteurized Milk	Fluorophos mU/l
0.1	540
0.2	1026
0.3	1455

Langridge³ summarised the results of a study involving 22 laboratories testing milk by Fluorophos, Aschaffenburg Mullen and the colourimetric EU reference method in use at that time. A comparison of the Fluorophos and EU colourimetric method based on results of blind duplicate samples is given below.

Table 3. Comparison of EU (reference) method and Fluorophos (Langridge) using cow's milk sourced in the UK

Raw Milk in Pasteurised Milk	Fluorophos Method mU/L	EU Method µg phenol/ml
Sample A 0.05%	257.4	1.26
Sample B	257.4	0.94
Sample A 0.10%	458.8	2.14
Sample B 0.20%	498.3	1.49
Sample A 0.15%	693.7	1.80
Sample B	713.5	2.08
Sample A 0.20%	911.6	2.29
Sample B	851.8	2.44

Comparison of the mean values obtained on the same samples tested under the Quality Management "Proficiency Testing Scheme".

Date	Test Material	Fluorophos Mean Value	Number of Samples Tested	Charm Mean Value	Number of Samples Tested	Difference Charm — Fluorophos
Jan 05	31B105	173.91	189	306	40	187
July 05	31A111	242.61	157	261.3	52	19
July 05	31B111	80.62	155	95.04	52	15
Oct 05	31A144	472.89	258	768.29	52	296
Oct 05	31B144	447.35	256	997.65	52	550
Jan 06	31A177	80.41	161	123.36	35	43
Jan 06	31B117	134.82	161	234.47	34	100

Mean of the means for all samples **222.94** **398.0** 175 (44%) higher than Fluorophos

REFERENCES: ¹Rocco; J.ASSOC. OFF. ANAL. CHEM. Vol. 73 No 6. 1990; ²Lechner & Ostertag Deutsche Milchwirtschaft 23 (1146 – 1149) 1993.; ³Langridge International Food Hygiene 10 (3) 31-33 1999); ⁴Scintu et al (J Food Protection, V163. No 9, 2000 Pages 1258-1261)

upcoming EVENTS

DAIRY EXHIBITS 2008

International Cheese Technology Expo (ICTE) — April 22-24,
Madison, WI
NALMA/ICAR — June 17-19, Niagara Falls, NY
Dairy Producers of New Mexico — June 20-21, Ruidoso, NM
IFT 2008 Annual Meeting and Expo — June 20-July 1,
New Orleans, LA
IAFP 2008 — August 3-5, Columbus, OH

TRADE SHOWS 2008 Advanced Instruments and Advanced Instruments' subsidiaries: Delta Instruments and Spiral Biotech are participating in a number of Trade Shows and Exhibitions all over the United States and in Canada. To see which shows we'll be at this year, go to www.aicompanies.com/expos2008.

SCHEDULE A DEMO When you visit our trade show exhibits page, you will find links to products that will be featured at each of these shows. Because Advanced Instruments has product lines in the Dairy and Food, Healthcare and Life Sciences, and Microbiology markets, a sidebar on the same page has links to expositions specific to your industry. Make the most of your time at these conferences, by contacting us directly for a meeting or demo.

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Changes to ALP testing within the EU Continued from page 3

In the above studies, a Fluorophos value of 500mU/l was demonstrated to accurately assess the presence of unpasteurized milk at the statutory cut off point (about 0.1% raw milk).

A study using French milk however gave different values for 0.1% raw milk:

Table 4. October 2005 Study by EU reference laboratory (afssa)

% Raw Milk	IDF 63: 1970 Colorimetric determination µg phenol/ml	IDF 155-1: 2001 (Fluorimetric method) mU/l
0.05	1.5	—
0.1	3.0	939

Where comparisons were made with colourimetric methods the variability of the colourimetric methods has been cited as the reason for poor agreement.

Reprinted from dairy.foodbev.com/articleDetail.aspx?contentId=263

Comparison of Fluorophos® with other test methods

The EU having approved the fluorimetric method as the reference method for ALP, require that any other method being considered for use be validated against it.

Proficiency studies by an independent company in the UK have shown a significant bias between the Fluorophos and Charm methods of assessing ALP activity.

The EU reference laboratory (afssa, Paris, France) compared Charm (NovaLum) and Fluorophos and also showed that Charm is positively biased when compared with Fluorophos.

Scintu et al.⁴ has compared the EU method with the Fluorophos for Ewes milk and showed that the R and r values were close to those quoted for cow's milk.

Sample Pre-freeze Error Messages: 4C3, 4250 & 4D3 Cryoscopes Continued from page 3

If "Sample Pre-Freeze" errors occur with milk, then re-test with other samples of milk.

If "Sample Pre-Freeze" errors occur with Advanced Instruments standards and reference solutions, then focus on the setup of the stir wire to sample probe. Reference your User Guide for details on the correct set up and position of the stir wire and sample probe.

4D3700 Sample probe for a 4D3 that requires the sample probe leads to be soldered. This sample probe is for 4D3 instruments built prior to 1995.

3D3700 Sample probe for 4D3 cryoscopes built after 1995 and for all 4250 cryoscopes. This sample probe has a plug in connection. No soldering required.

4C3700 Sample probe for all 4C3 cryoscopes.

3LA700 Sample Probe and Stir Wire Alignment Tool for all cryoscopes.

technical SUPPORT

24-Hour Support, 7 Days a Week



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