



# CALF CHRONICLE

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# CALF

Centre for Analysis and Learning in Livestock and Food



[www.nddb.coop](http://www.nddb.coop)



Welcome to the first issue of CALF CHRONICLE.

We are delighted to introduce this newsletter which will provide you with an insight of our activities and the latest developments that make the analytical world amazing. The journal will include the original works being carried out for the quality evaluation and monitoring of dairy, cattle feed and other food and agricultural products. This will usher new ideas, techniques and skills developed for the betterment of the industry.

We request each one of you to share your valuable thoughts and feedback about this newsletter for continual improvement.

Come; let us carve a niche in this exciting journey of knowledge together.

## **CUSTOMER MEET**

CALF has started customer meets to interact with customers, update them about the testing services offered by CALF and also to understand new requirements of the customers. CALF has so far arranged three customer meets at Anand, Bangalore and

Chandigarh. The last Customer Meet was held at Chandigarh on 21st February 2018, which was attended by CEOs and QA/QC officers from the milk federations, unions, producer companies and farmers'

cooperatives situated in Punjab,



Haryana, Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Western UP and Northern Rajasthan.

There were five sessions on 'Overview of Laboratory Facility of CALF, NDDB', 'Quality & Safety: Dairy Industry', 'Packaging Material Role in Quality, Food Safety & Sustainability', 'Analytical Requirements for Dairy Industry as per FSS Act 2006' and 'Cattle feed Production & Quality Assurance'. The meeting saw active participation by all the delegates.

### **CALF PARTICIPATES AS AN EXHIBITOR IN IDA**



CALF, NDDB participated as an exhibitor in the 46<sup>th</sup> IDA Dairy Industry Conference held on 8-10 February, 2018 at Kochi

The visitors were briefed about the activities of CALF and they were impressed with the range of services being provided by CALF.

### **CALF FACILITATES TRAINING PROGRAMME ON LABORATORY QUALITY MANAGEMENT SYSTEMS (LQMS)**

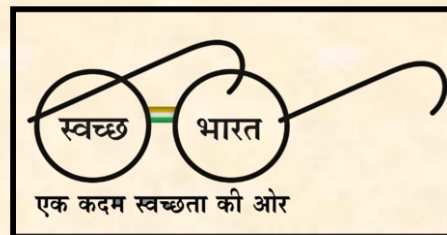
A one day training programme was conducted at CALF, NDDB, Anand on Thursday, 15th February, 2018 for the participants of 8th International Training Programme

on Laboratory Quality Management Systems (LQMS) for Developing Countries, organised by Bureau of Indian Standards (BIS). Participants from Tanzania, Ethiopia, Honduras,

Peru, Russia, Sri Lanka and Vietnam underwent this training programme.

### **SWACCHA BHARAT ABHIYAN**

As per the directive of Ministry of Food Processing Industries, CALF organized 3 Swachhta Pakhwada to promote Swachha Bharat Abhiyan. The last Pakhwada was



arranged in the last week of April 2017. A number of initiatives were undertaken to ensure cleanliness in and around the premises of the laboratory, as envisaged by Swachha Bharat Mission. All the employees of CALF participated in the event.

### **FSSAI FOOD ANALYST EXAM 2017**

The role of a Food Analyst is very important in the context of analysis of regulatory food samples. Food Analysts are certified after rigorous examination process involving theory and practical exams. These exams are conducted by the Food Safety and Standards Authority of India (FSSAI).

FSSAI conducted the theory exam followed by practical exam for certified Food Analysts at four

locations across the country including NDDB, Anand for Western Region. The other centres were CFTRI Mysore, NIFTEM, Sonapat and CFL Kolkata.



## **CALF GETS BIS RECOGNITION FOR TESTING MILK & MILK PRODUCTS**



CALF has received recognition from the Bureau of Indian Standards (BIS) for undertaking analysis of various milk and milk products viz., packaged pasteurized milk, flavoured milk, sterilized milk, condensed milk, milk powder, cheese, shrikhand, paneer, skimmed milk powder (Grade I and II), pasteurized butter, butter oil, ghee, dahi, yoghurt and ice-cream.

Out of the above products, currently, CALF is the only laboratory in the country having recognition from BIS for undertaking analysis of pasteurized milk, sterilized milk, flavoured milk, shrikhand, paneer, pasteurized butter, butter oil, ghee, dahi and yoghurt.

This recognition would go a long way in supporting the dairy industry's commitment to maintain standards and provide safe and good quality milk and milk products to consumers.

### **NEW TEST FACILITY TO DETERMINE MILK FAT PURITY BY GC-COC INJECTION TECHNIQUE**

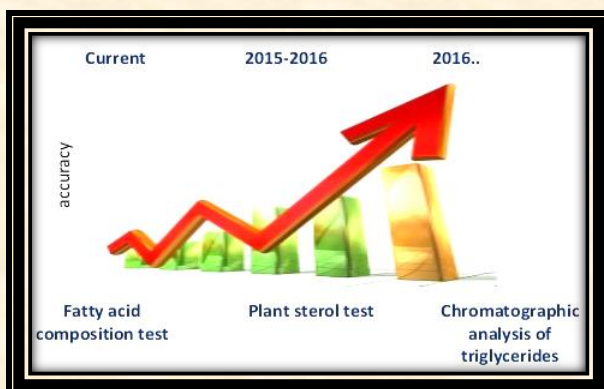
Adulteration of milk fat with less expensive foreign fats such as lard, cotton seed oil, palm kernel fat, rape seed, fish oil or beef tallow etc., is posing a huge problem to the dairy industry. As no single chemical method can detect these all adulterants in single shot with

reliable accuracy and sensitivity, ISO came up with ISO 17678:2010 (E) method which is an efficient analytical methodology to ensure the authenticity of milk fat in a single run for 14 different adulterants.

CALF, NDDB has standardized the method prescribed by ISO 17678:2010 (E) for detection of foreign fat in cow milk fat. It is an efficient analytical methodology over traditional methods to ensure the authenticity of milk fat or finding out foreign fat adulteration in Cow Milk fat. It can analyze Cow Milk Butter and Cow Milk Ghee for its purity.



This is being carried out using Gas chromatograph equipped with cool on column injection technique. The technique can detect vegetable fats as well as animal fats such as beef tallow and lard using defined triglyceride equations. This method is based on the separation and quantification of its triglycerides by means of gas chromatography (GC) with flame ionisation detection (FID).



### **DETECTION OF MALTODEXTRIN IN MILK POWDER**

Maltodextrin is a hydrolysed product of starch having glucose units of variable length. Dextrose Equivalent (DE) value for maltodextrin is less than 20. It is usually used as a food additive for its important properties such as a bulking agent, fat replacer, crystallization prevention etc.

Recently, maltodextrin is being used as an adulterant in manufacturing of milk powder. CALF has verified the method for quantitative estimation of Maltodextrin in milk powder. The method is based upon the extraction of maltodextrin and its hydrolysis to glucose units by Amyloglucosidase, followed by

glucose estimation using a glucose assay kit. Final glucose content in the sample is calculated after removing the native glucose present in the particular sample. Native glucose can be estimated by treating the sample without enzyme. Excess

glucose content, if obtained can be converted to Maltodextrin by multiplying the factor of 0.91. Method was found satisfactory to quantify added Maltodextrin at 0.5 % level of milk powder

### **CALF STANDARDIZED & VALIDATED A METHOD TO DETERMINE AND QUANTIFY PESTICIDE AND VETERINARY DRUG RESIDUES IN MILK, MILK PRODUCTS, FRUITS & VEGETABLES**

A rapid and simple multiclass, multi-residue method based on Liquid Chromatography coupled with tandem Mass Spectrometry (LC-MS/MS) and Atmospheric Pressure Gas Chromatography coupled with Mass Spectrometry (APGC-MS/MS) detection has been developed at CALF for determination and quantification of pesticide residues and veterinary drug residues in Milk.



The developed method has been validated according to the criteria set in Commission Decision 2002/657/EC and SANTE/11945/2015.

The methodology represents a fast and cost-effective alternative for simultaneous analysis of veterinary drug and pesticide residues which can be easily extended to other compounds and matrices.



## LIST OF PESTICIDE RESIDUES TESTED AT CALF

1	2, 4 DDE	39	Chlormequat chloride	77	Etofenprox
2	2, 4 DDT	40	Chlorothalonil	78	Fenamidone
3	2,4 DDD	41	Chlorpropham	79	Fenamiphos
4	3-hydroxy carbofuran	42	Chlorpyrifos	80	Fenarimol
5	4, 4, DDE	43	Chlorpyrifos	81	Fenazaquin
6	Acetamiprid	44	Chlorpyrifos-methyl	82	Fenbucarb
7	Alachlor	45	Chlothianidin	83	Fenithrothion
8	Aldrin	46	Clothianidin	84	Fenitrothion
9	Alpha-Cypermethrin	47	Cymoxanil	85	Fenoxaprop-p-ethyl
10	Alpha-Endosulfan	48	Cypermethrin	86	Fenpropathrin
11	Alpha-HCH	49	DDD	87	Fenproprathrin
12	Aminopyrilid	50	DDE	88	Fenpyroximate
13	Anilofos	51	DDT 4,4'	89	Fenthion
14	Atrazine	52	DDT,	90	Fenvalerate
15	Azoxystrobin	53	Delta-HCH	91	Fipronil
16	Bendiocarb	54	Deltamethrin	92	Flufenacet
17	Benfuracarb	55	Diazinon	93	Flufenoxuron
18	Beta-cyfluthrin	56	Dichlorvos	94	Flupicolide
19	Beta-endosulfan	57	Dicofol	95	Flusilazol
20	Beta-HCH	58	Dieldrin	96	Flusilazole
21	Bifenthrin	59	Difenoconazol	97	Heptachlor
22	Bitertanol	60	Difenoconazole	98	Heptachlor epoxide B
23	Buprofezin	61	Diflubenzuron	99	Hexaconzol
24	Butachlor	62	Dimethoate	100	Hexyazox
25	Carbaryl	63	Dimethomorph	101	Imidacloprid
26	Carbendazim	64	Dimethyl-s- sulfoxide	102	Indoxacarb
27	Carbendazim s	65	Diniconazole	103	Iprodione
28	Carbofuran	66	Dinotefuran	104	Iproralicarb
29	Carbofuran	67	Diuron	105	Isoproturon
30	Carbofuran-3-keto	68	Edifenphos	106	Kresoxim methyl
31	Carbosulfan	69	Edifenphos	107	Kresoxim-methyl
32	Carboxin	70	Emamectin Benzoate	108	Lambda-cyhalothrin
33	Chlorantraniliprole	71	Endosulfan	109	Lindane
34	Chlordane	72	Endosulfan-beta	110	Linuron
35	Chlordane-cis	73	Endosulfan-sulfate	111	Malathion
36	Chlordane-Trans	74	Endrin	112	Malaxon
37	Chlorfenpyre	75	Ethion	113	Metalaxyl
38	Chlorfenvinphos	76	Ethion	114	Methomyl



115	Methoxychlor	131	Phorat-sulfone	147	Thiamethoxam
116	Metolachlor	132	Phorat-sulfoxide	148	Thiodicarb
117	Metribuzin	133	Phosalone	149	Thiophanate-methyl
118	Metsulfuron-methyl	134	Phosphamidon	150	Thiophenate methyl
119	Monochrotophos	135	Pirimiphos-methyl	151	Triademefon
120	Monocrotophos	136	Pretilachlor	152	Triadimefon
121	Myclobutanil	137	Propaquizafop	153	Trichlorfon
122	Oxydemeton-Methyl	138	Propiconazole	154	Tridemorph
123	Oxyflurfen	139	Propoxur	155	Trifluralin
124	Paclobutrazol	140	Pyraclostrobin	156	$\alpha$ -Hexachlorocyclohexane ( $\alpha$ -HCH)
125	Parathion Methyl	141	Pyrazosulfuron ethyl	157	$\beta$ -Hexachlorocyclohexane ( $\beta$ -HCH)
126	Parathion-methyl	142	Pyriproxifen	158	$\gamma$ -Hexachlorocyclohexane ( $\gamma$ -HCH)
127	Penconazole	143	Quinolpos	159	$\delta$ -Hexachlorocyclohexane ( $\delta$ -HCH)
128	Permethrin	144	Quizalofop-ethyl		
129	Phenthoate	145	Tebuconazole		
130	Phorate	146	Thiacloprid		

LOQ (Limit of Quantification) Range - 1  $\mu\text{g}/\text{Kg}$  for Liquid Milk, fruits & vegetables, 2 to 10  $\mu\text{g}/\text{Kg}$  for milk products (LC-MS/MS and GC-MS/MS)

#### **LIST OF ANTIBIOTIC DRUG RESIDUE TESTED AT CALF**

1	3-amino-5-morpholinomethyl-2-oxazolidinone (AMOZ)	17	Fenbendazole	35	Sulfadimidine
		18	Furazolidone	36	Sulfadizine
		19	Gentamicin C1a	37	Sulfadoxine
2	4-epichlortetracycline	20	Gentamicin C2	38	Sulfamerazine
3	4-epioxytetracycline	21	Gentamycin C1	39	Sulfamethazine
4	4-epitetracycline	22	Ivermectin	40	Sulfamethizole
5	Albendazole	23	Kanamycin A	41	Sulfamethoxy pyridazine
6	Albendazole 2-amino sulfone	24	Metronidazole	42	Sulfanilamide
		25	Morantel	43	Sulfathiazole
7	Albendazole sulfone	26	Neomycin B	44	Sulfonamides
8	Albendazole sulfoxide	27	Oxytetracycline	45	Tetracycline
9	Amino oxazolidinone	28	Phenyl Butazone	46	Thiamphenicol
10	Aminohydantoin (AHD)	29	Ronidazole	47	Tilmicosin
11	Chloramphenicol	30	Semicarbazide (SEM)	48	Trimethoprim
12	Chlortetracycline	31	Spectinomycin	49	Tylosin A
13	Dehydrostreptomycin	32	Spiramycin and Neospiramycin		
14	Doxycycline				
15	Enrofloxacin and Ciprofloxacin	33	Streptomycin		
		34	Sulfadimethoxine		
16	Erythromycin A				

LOQ (Limit of Quantification) Range - 0.5 to 10  $\mu\text{g}/\text{Kg}$  for Milk and milk products

## QUALITY MANAGEMENT AT CALF

CALF has implemented laboratory quality management system based upon ISO 17025: 2005. Since its inception in the year 2009, the lab has implemented various quality assurance measures to ensure accuracy in testing.



Assessment is a critical aspect of laboratory quality management, and it can be conducted in several ways. One of the commonly employed assessment methods is proficiency testing wherein external provider sends unknown samples for testing to a set of laboratories, and the results of all laboratories are analyzed, compared, and reported to

the laboratories. Participation in an external quality assessment program provides valuable data and information which:

- Allows comparison of performance and results among different test sites;
- Provides early warning for systematic problems associated with kits or operations;
- Provides objective evidence of testing quality;
- Indicates areas that need improvement;
- Identifies training needs.

CALF has a predefined schedule for PT participation to assure customers that the laboratory can produce reliable results. Accordingly CALF has been participating in PT program regularly with satisfactory results.

### RESULT OF EQAS/ PT/ ILC PARTICIPATION

Product/ Material	Details of Test(s)	Date of Testing	Nodal Laboratory/PT Provider	Performanc e in terms of Z score	Acceptance Criteria (Z score)
Corn meal	Aflatoxin B1	APTECA 10-10- 2016	APTECA-FAO (Texas, US)	0.72	-2 to 2 (Satisfactory)

Cornmeal	Aflatoxin B1	APTECA Jan 2016	APTECA-FAO (Texas, US)	0.65	
*Milk Powder	pp'-DDT	July- Sep 2016(Test Report 05114)	FAPAS (UK)	1.0	
	alpha-HCH			-0.1	
Milk Powder	Melamine	Oct-Nov 2016 (Test Report 3068)	FAPAS (UK)	-1.0	
Water	Copper, mg/l	23-08-2016 (PTW/WATER /03/14-15)	Global PT provider Pvt. Ltd.(India)	0	
	Chromium, mg/l			0.27	
	Iron mg/l			0.48	
	Zinc, mg/l			-0.43	
	Boron, mg/l			0.24	
	Lead, mg/l			-0.32	
	Sodium, mg/l			0.05	
Bovine Milk	Chloramphenicol	Sep-Oct 2016(02302)	FAPAS (UK)	-1.3	
	Thiamphenicol			-0.5	
Milk Powder	Aflatoxin M1	Oct-Dec 2016	FAPAS (UK)	-1.2	
Oat Meal	Salmonella spp.	Dec 2016-Jan 17	UKAS (UK)	Satisfactory	(Satisfactory)
	Detection of Clostridium perfringens			Satisfactory	(Satisfactory)
	Enumeration of Clostridium perfringens			-1.18	
Ghee	Moisture	A-PT-03-2017	Aashvi proficiency & Analytical services (India)	0	-2 to 2 (satisfactory)
	Free Fatty Acid as oleic acid			0	
	Butyro-Refractometer reading at 40°C			-0.31	
Cornmeal	Total Aflatoxin	APTECA Feb-2017	APTECA- FAO (Texas, US)	-1.13	
	Aflatoxin B1			-0.99	
Tomato paste	Cadmium	Feb-March 2017 PT round-7280	FAPAS (UK)	0.1	
	Iron			1	
	Lead			0.4	
	Tin			0.9	
Food Matrix	Detection of Salmonella	A-PT-07-2017	Aashvi proficiency & Analytical services (India)	Satisfactory	Salmonella Absent (Satisfactory)
	Yeast and Mould			0.39	-2 to 2 (satisfactory)

## PROCEDURE TO SUBMIT BLOOD SAMPLES FOR KARYOTYPING



Here are a few guidelines which need to be followed while submitting samples to the laboratory for Karyotyping testing which will help your samples reach the laboratory intact and be processed efficiently.

- As fresh blood without hemolysis is required for testing, samples need to be sent immediately after collection (they should reach the laboratory within 30 hrs) to avoid test failure.
- Samples should be properly labeled to avoid mis-identification of the sample.

- Individual heparinized vacutainer tube is to be wrapped with the cotton.
- Tie all the wrapped samples with a rubber band to keep the samples together.
- Seal all the samples in the polythene bag.
- Wrap sealed polythene bag with cotton.
- Keep it in thermocol box with cooled gel pack to maintain low temperature during transport. Avoid direct contact of the blood samples with ice.
- Fill all the remaining space with filling material (cotton, thermocol or papers).
- Dispatch to laboratory for testing.

For feedback and comments: Contact us at [calf@nddb.coop](mailto:calf@nddb.coop)