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For Efficient Dairy Plant Operation

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GREENHOUSE GAS EMISSIONS

This bulletin includes technical information based on latest developments on products, systems, techniques etc. reported in journals, companies' leaflets and books and based on studies and experience. The technical information in different issues is on different areas of dairy operations. It is hoped that the information contained herein will be useful to readers.

The theme of information in this issue is **Greenhouse Gas Emissions**. It may be understood that the information given here is by no means complete.

In this issue:

1. INTRODUCTION

Evidences have confirmed that the climate system is warming, and the years after 1994 have been the warmest years recorded of surface temperature since 1850. The Intergovernmental Panel on Climate Change (IPCC) has, in its 'Climate Change 2007: Synthesis Report – Summary for Policymakers'[(1)], summarized observations on global warming. Some of these are:

- Atmospheric CO_2 (a greenhouse gas) concentration up from 280 ppm (pre-industrial) to 379 ppm in 2005.
- The global surface temperature has risen linearly by 0.74 (0.56 to 0.92)°C during 1906-2005. The temperature increase is greater at higher northern latitudes. Also, land regions have warmed faster than the oceans.
- Sea level has risen at a rate of 1.8 (1.3 to 2.3) mm/yr since 1961 and 3.1 (2.4 to 3.8) mm/yr since 1993. This is consistent with warming.
- The Arctic sea ice extent has shrunk by an average of 2.7 (2.1 to 3.3)% per decade, with larger decreases in summer of 7.4 (5 to 9.8)% per decade. Mountain glaciers and snow cover have declined in both hemispheres. These decreases are also consistent with warming.
- During the last century, precipitation increased significantly in eastern parts of North and South America, northern Europe and northern and central Asia but decreased in parts of southern Asia, Southern Africa, the Mediterranean and the Sahel. Areas affected by drought globally have possibly increased since the 1970s.
- It is considered very likely that over the last 50 years, cold days and nights and frosts have become less frequent over most land areas; and hot days and nights have increased in number.
- Changes in snow, ice and frozen ground are strongly believed to be the cause of increased number and size of glacial lakes and increased ground instability in mountain.

During the period 1901-2000, surface air temperature in India increased by 0.4°C[(2)].

These changes are largely attributed to increase in the levels of greenhouse gases in the atmosphere due to human activities. Agriculture, including dairying, is one of the several sectors that cause emissions of GHGs. This issue of *Technews* presents a brief review of available published information on global warming and its relations with dairy sector.

2. GREENHOUSE GASES (GHGs) AND THEIR IMPACT ON CLIMATE

GHGs allow sunrays to enter the atmosphere freely. When sunrays strike the earth's surface, some of them are reflected back towards space as infrared radiation (heat rays). GHGs absorb this infrared radiation and trap the heat in the atmosphere. Many gases exhibit these 'greenhouse' properties in varying degree. Some of them occur in nature (water vapour, carbon dioxide, methane and nitrous oxide) and are also made by human activities, while others are exclusively man made.

Increases in GHGs tend to warm the surface while the net effect of increases in aerosols is to cool it. The net effect due to human activities since the pre-industrial era is one of warming. In comparison, changes in solar irradiation are estimated to have resulted in a smaller warming effect.

Global GHG emissions due to human activities have increased since pre-industrial times, with an increase of 70% between 1970 and 2004[(1)]. The rise in GHG concentrations is mainly due to CO_2 resulting from the use of fossil fuels, especially for power generation and transport in developed countries. Another major source of CO_2 emissions is deforestation. CO_2, together with emissions of methane and nitrous

oxide in the agricultural sector, accounts for nearly 99% of global GHG emissions [3]. Most of the observed increase in global average temperatures since the mid-twentieth century is very strongly considered to be due to the observed increase in anthropogenic GHG concentrations.

The impacts of GHGs on climate change are given in kg CO_2 equivalent. According to IPCC 2001, the equivalent values are: 1 kg of CO_2 equals 1 kg of CO_2 equivalent, 1 kg of CH_4 equals 21 kg of CO_2 equivalent, and 1 kg of N_2O equals 310 kg of CO_2equivalent.

3. KYOTO PROTOCOL [4, 5]

The broad foundation for addressing climate change was laid by the United Nations Framework Convention on Climate Change (UNFCCC), which was adopted in 1992 and ratified by 193 countries by 26 August 2009.

The basic objective of the Convention is the 'stabilization of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'. Annex I of the treaty lists the countries (developed countries and countries with economies in transition) that agreed to take on GHG mitigation commitments.

The Kyoto Protocol to the UNFCCC was adopted in 1997 but came into force only in 2005. It lays down the principle of common but differential responsibility for countries to reduce GHGs. In its Annex A, the Protocol has listed six greenhouse gases (GHGs) for emission reduction: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6). The Annex also lists the sectors / source categories in which the emission reduction is to be carried out. The sectors included are: energy, industrial processes, solvent and other product use, agriculture and waste.

The Protocol established legally binding economy-wide GHG emission targets to the Annex I countries. The signatories of the protocol are split into three grades:

- Annex 1 (industrialized countries)
- Annex 2 (developed countries which pay for costs of developing countries)
- Developing countries

The Protocol has been ratified by 180 countries. However, the USA is the only country of Annex 1 which has not ratified the Protocol so far.

Under the Protocol, Annex I countries of the UNFCCC agreed to reduce their emissions to target levels below their 1990 emissions levels. For HFCs, PFCs and SF_6, countries have been given option to choose 1995 as the base year. Targets are country specific but on average Annex I Parties agreed to at least a 5% reduction of aggregate emission during the period 2008-2012 (the so called first commitment period) compared with the emission levels in 1990 (baseline year).

The Protocol has established three flexible mechanisms through which Annex I Parties can attain their emission targets. These include:

- Emissions trading among Annex I countries
- The Clean Development Mechanism (CDM)
- Joint Implementation

The international emissions trading mechanism allows Annex I countries to trade in carbon units. The CDM allows Annex I countries to undertake projects to reduce emissions in developing countries and receive carbon units (or certified emission reductions) in return. Joint implementation is similar to CDM but it is designed to allow Annex I countries to earn emission reduction units by investing in projects in another Annex I country.

Developing countries have no immediate restrictions under the protocol and are not expected to implement their commitments unless developed countries supply enough funds and technology, and this has lower priority than economic and social commitments and dealing with poverty.

So far the Protocol has had positive but limited impact. While the Annex 1 countries were required to reach to 1990 level by 2000, they (excluding the economies in transition) have actually increased GHG emissions by 10% during 1990-2004[(2)].

Negotiations on the second commitment period of the Kyoto Protocol are currently undergoing and are expected to be concluded at the forthcoming United Nations Climate Change Conference, the 15th Conference of the Parties (COP-15) in Copenhagen, Denmark, in December 2009.

The Conference of the Parties (COP) is the supreme body of the Convention i.e., which is the highest decision making authority. This is an association of all the countries that are Parties to the Convention. The COP reviews the implementation of the Convention and examines the commitments of the Parties in light of the Convention objectives, new scientific findings and experiences gained in implementing climate change policies. The key task for the COP is to review the national communications and emissions inventory submitted by Parties. The COP meets every year unless the authorities decide otherwise. The COP meets in Bonn, the seat of the Secretariat, unless a Party offers to host the session.

4. GLOBAL SCENARIO

4.1 GHG Emissions by countries / sectors

Contribution of GHG emissions through various activities by developed and developing world are shown in Table 1.

Table 1: Contribution of GHGs emissions [3]

Sector	Percentage contribution		
	Total	**Developed countries**	**Developing countries**
Energy	60	48	12
Industrial processes	4	3	1
Deforestation	17	-	17
Agriculture	15	4	11
Waste	4	2	2
	100	**57**	**43**

GHG emissions by different regions/countries as percent of global emissions in 1990 and 2000 are shown in Table 2.

Table 2: GHG emissions by some countries as percent of world emission [6]

Region	GHG emissions, percent of world emission	
	1990	**2000**
Enlarged EU	23	14
Canada + USA	21	21
Russia & CIS	17	8
East Asia & South East Asia	16	20
Latin America	7	7
Africa	4	7
Middle East	4	5
South Asia	3	7
Japan	4	4
Oceania	1	5

The South Asian region, including three-fourths emission share of India, contributed to only 3% of the total global GHG emissions in 1990

and the share of emissions from South Asia had grown merely by 4% in 2000.

A comparative trend of GHG emission for some countries in 1990 and 2000 is given in Table 3.

Table 3: Comparative trends of greenhouse gas emissions for some countries [6]

Country	CO_2 eq. emissions in million tonnes		CAGR (%)
	1990	2000	
Russian Federation	3208	1833	-3
Germany	1246	1019	-2
United Kingdom	738	640	-1
Japan	1103	1297	2
USA	5080	6209	2
India	988	1485	4
China	3837	4820	5
Brazil	1187	1477	6

For almost all the countries, the share of CO_2 emission actually increased continuously between the period 1990 and 2000 and it was the CH_4 and N_2O emissions which had decreased in this period. Though the compounded annual growth rate of CO_2 equivalent emissions from India was on a higher side, the absolute value of these emissions was one-sixth that of USA. Also the per capita emissions from India were one of the lowest. In the year 2006 the US per capita CO_2 emissions equivalent was 14 times more than that of India [3].

Use of energy is one of the main sources of CO_2 emissions. For a given unit of energy, coal combustion emits twice as much carbon dioxide as natural gas, and oil falls in between. It is reported that industrial countries use about 25 times energy per person as the emerging countries [8].

Agriculture was responsible for almost 35% of the world's GHG emissions in 1990, but its share decreased to 13.5% in 2004. Methane is by far the most important non-CO_2 greenhouse gas and animal agriculture is a major source world-wide as shown in Table 4. Enteric fermentation is only responsible for 3% of the global warming in the world [(7)].

Table 4: Sources of methane globally [(7)]

Sources	Percentage
Energy	26
Ruminants	24
Rice	19
Land fills	11
Biomass burning	11
Waste	5
Other	4

4.2 Overall scenario

At the global level, the share of GHGs emitted in CO_2 equivalent terms was[(4)]: CO_2 76.7%, CH_4 14.3%, N_2O 7.9% and refrigerant (fluorine based gases) gases 1.1% in 2004. Overall, the concentration of GHGs in the atmosphere has increased (for example CO_2 by 29%, CH_4 by 150% and N_2O by 15%) in the last 100 years[(6)].

It is predicted[(7)] that mean global temperatures will rise by 1.4^oC by 2030 and 2.1^oC by 2050. Global mean sea level will be 20 cm higher in 2030 and 31 cm higher in 2050. The extent to which the global warming will affect human life in future will depend on the success in limiting GHG emissions. According to the IPCC[(3)], a target that seems viable is to limit the temperature rise by 2-2.5^oC by 2050. If this target is reached, a large proportion of potential damages from climate change may be avoided. But even then significant adverse impacts are expected.

5. INDIAN SCENARIO [6]

The sources of GHG gas emissions from India are shown in Table 5. In 1994, of the total CO_2 equivalent emission in India, CO_2 was 63%, methane was 33% and the rest 4% was nitrous oxide. Methane emission due to enteric fermentation was 15.3% of the total CO_2eq emissions.

Table 5: Sources of GHG emissions from India

GHG source	CO_2 eq., million tonnes	
	1994	2000
All energy	743.8	959.5
Industrial processes	102.7	168.4
Agriculture	379.7	328.1
Waste	23.2	28.6
Land use, forestry	14.3	-
Total national	1228.5	1484.6
Per capita emission (tonnes/capita/year)	1.3	1.5

India has about 16% of world population, but its share is only 4.6% of the global GHG emissions [2]. In food sector, the specific GHG emissions from food production and processing are much lower in India than in developed countries (Table 6).

Table 6: CO_2 eq. emissions from the food sector - from production to processed food in different countries[9]

Country	Tonnes of CO_2 eq. emission per million kcal of food energy
India	0.1
China	0.1
UK	1.7
Germany	1.8
Netherlands	1.9
Australia	2.0
USA	2.2

The CO_2eq emissions from India are set to increase up to 3000 million tonnes by 2020 due to economic development. India has taken several measures to limit GHG emissions without hindering development. Over 700 CDM projects were approved, and about 300 of these were registered by October 2007. These projects have already resulted in over 27 million tonnes of certified CO_2eq emission reductions[9].

6. GLOBAL DAIRYING

The dairy industry contributes directly to emissions of greenhouse gases through a variety of processes. The most important greenhouse gases generated by the dairy industry are methane (CH_4), nitrous oxide (N_2O), carbon dioxide (CO_2), and some refrigerant emission (CFCs and HFCs).

6.1 GHG emissions on dairy farms

The largest emissions of GHGs are due to dairy farming, which represents around 80% of the GHG emissions of the total life cycle of milk [10]. At the dairy production level the following are the main sources of GHG emissions:

- Animals: primarily CH_4 emissions. Young animals below 3 months do not produce methane.
- The manure storage: CH_4 and N_2O emissions.
- Crop, pasture, direct emissions on the pasture and indirect emissions through leaching: N_2O emissions.
- Feed production: mainly N_2O emissions.

Methane emission: Global man made methane emissions are estimated to total about 320 million tonnes each year[7]. Agriculture is responsible for about 50% of total CH_4 emissions. A major source worldwide is animal agriculture, which produces more than one hundred million tonnes of methane a year. 85% of this is produced in the digestive processes of livestock and contributes about 24% in methane emission from all sources word-wide. It is reported that the methane emission per

cow is 100-150 kg per year[10]. In Europe, virtually all the CH_4 emissions come from livestock: 87% from enteric fermentation of ruminants and 11% from manure[7]. At a global level, the enteric fermentation of ruminants contributed around 13-15% of the total global emissions of CH_4 in 1990, with emissions from livestock manure contributing another 5%. In total, however, enteric fermentation of dairy cows is only responsible for 3% of the global warming in the world.

Methane is produced from the decomposition of organic components in animal waste. When cow dung is stored as a liquid the manure can produce an important amount of methane. When the manure is handled as solid it tends to decompose aerobically and little methane is produced.

Poor nutrition is one reason for excess methane production. Supplementing a cattle diet with urea has been found to lower methane production by 25-75%. An additional 15% of animal agricultural methane emissions are released from the large 'lagoons' used to store untreated farm animal waste[7].

N_2O emission: N_2O is the second largest contributor to the greenhouse effect at the dairy farms (varying from 9 to 53% with a mean of 30% in Europe)[10]. It comes mainly from manure management and from nitrogen fertilizers. Nitrous oxide emissions are low during manure storage, except for some solid manure handling systems.

CO_2 emission: CO_2 is less important in farm phase. Emissions of CO_2 on the farm arise from the consumption of fossil fuels, notably petroleum products used in tractors and other farm vehicles (transport of animals, feed and fodder).

The use of electricity at the farm may also have implications for CO_2 emissions, depending on the electricity generation sector of the country concerned. Intensive dairy farm systems tend to consume more fossil energy and produce more CO_2 than extensive ones.

Off-farm CO_2 emissions are related to non-renewable energy consumption, mainly for fertilizer production and transport.

Results from Europe showed the emission of GHGs in CO_2 equivalent per kg milk produced at farm to be mostly 0.9 to 1.1 (range 0.4 to 1.8) [10].

6.2 GHG emissions due to dairy manufacturing and related activities

The two main sources of emissions of GHGs at the manufacturing level are: process energy consumption and fossil fuel consumption for transport. CO_2 is emitted at the dairy manufacturing level due to energy consumption required by the process used. CO_2 is the main byproduct of the combustion of all fossil fuels.

Emissions of refrigerant gases from the refrigerating system in the factory may occur if the system leaks. Industrial refrigeration includes three applications:

- Process refrigeration which is an integrated part of the production process,
- Industry refrigeration for the freezing products,
- Storage refrigeration for the conservation of products.

All new installations are estimated to have only 5% leakage[7].

The other important phases are the waste management (packaging is incinerated and the plastics that the packaging contains emit GHGs) and the production of packaging (corresponding to the extraction of raw materials, as well as to the transporting and manufacturing of the milk containers).

Additional indirect emissions outside the dairy plant site occur due to:

- transport: milk truck to collect the milk, and truck to deliver products to shops
- transport of dairy staff

In the retail and use phases, the GHGs emitted are mostly CO_2 but also CFCs and hydrochlorofluorocarbons (HCFC's) which are refrigerant gases.

For different milk products, the share of different operations in GHGs emissions could be different, and may vary from one system to another. From the life cycle analysis conducted in the French dairy industry for yoghurt production in 2000 the following results were obtained [7]:

- 53% of the GHG emission occurred at the production level,
- Yoghurt production accounted for only 6% of the total emissions,
- 26% was during selling and buying,
- 9% of the GHG emissions occurred due to packaging,
- The share of the different gases emitted during the entire production chain was CO_2 (31%), CH_4 (28%), N_2O (22%) and refrigerant gases (18%).

6.3 Dairy sector emissions in various countries

GHG emissions of some countries in 2003 are shown in Table 7.

Table 7: Greenhouse gas emissions (all sectors and dairy production) of some countries (year 2003)[7] (emissions expressed as '000 tonnes equivalent of carbon dioxide)

Country		Carbon dioxide (CO_2)	Methane (CH_4)	Nitrous oxide (N_2O)	CO_2eq Total	kg CO_2eq per litre of milk
USA	All sectors	5841504	544955	376749	5935132	
	Dairy production	**NA**	43021	**NA**	43021	0.6*
Germany	All sectors	865367	75220	63693	968589	
	Dairy production	**NA**	17274	**NA**	17274	0.6*
France	All sectors	408155	60590	74608	490280	
	Dairy production	9887	10633	56203	76723	3.0
New Zealand	All sectors	11834	26545	13501	51979	
	Dairy production	2196	8681	3553	14430	1.0

Country		Carbon dioxide (CO_2)	Methane (CH_4)	Nitrous oxide (N_2O)	CO_2eq Total	kg CO_2eq per litre of milk
Australia	All sectors	402282	110295	31198	543775	
	Dairy production	**NA**	7964	**NA**	7964	0.7*
United Kingdom	All sectors	555927	40583	40424	636934	
	Dairy production	**NA**	5951	**NA**	5951	0.4*
Italy	All sectors	487282	34637	42352	482371	
	Dairy production	**NA**	4786	**NA**	4786	0.4*
Canada	All sectors	586066	94047	50180	730292	
	Dairy production	**NA**	3529	**NA**	3529	0.4*
Ireland	All sectors	45808	12795	9740	67366	
	Dairy production	**NA**	2936	**NA**	2936	0.6*
Belgium	All sectors	126204	8487	11253	142451	
	Dairy production	**NA**	2098	**NA**	2098	0.6*
Denmark	All sectors	60754	5894	8091	73534	
	Dairy production	**NA**	1700	**NA**	1700	0.4*
Finland	All sectors	73185	4965	6718	67066	
	Dairy production	290	881	976	2428	1.0
	Dairy processing	196	73	12		

NA: Information not available
* Excludes nitrous oxide

Notes:
1. Methane data (dairy production) includes emissions due to enteric fermentation and manure management
2. Nitrous oxide data (dairy production) includes emissions due to manure, direct from soil, pasture and indirect losses
3. Methane data (dairy processing) for Finland includes emissions due to transport and waste treatment.

7. INDIAN DAIRYING

Bovines and small ruminants are the most dominant feature of the Indian livestock scene and are also the major source of GHG emission. Table 8 provides data on relevant animal population in India. A majority of the cattle (87%) was non-descript, low producing, indigenous breed in 2003. In the case of buffaloes also, high-producing animals are less (10-20%).

Table 8: Population of cattle, buffalo, sheep and goat in India[11, 12]

Category	Population (millions)	
	1997	**2003**
Dairy cattle	58.23	102.70
Indigenous	49.87	82.96
Crossbred/exotic	8.36	19.74
Dairy buffalo	42.73	80.03
Non-dairy cattle	140.65	82.44
Non-dairy buffalo	47.19	17.88
Sheep & goat	180.22	185.75

GHG emissions from different sources in animal sector (only cattle, buffalo, sheep and goat) for 2003 are shown in Table 9.

The top three GHG emitting states in 1997 were [11] Uttar Pradesh (~15%), Madhya Pradesh (~12%) and Bihar (~ 10%). In 2003, this changed to[12]: Uttar Pradesh (~ 15%), Rajasthan (~ 9%) and Madhya Pradesh (8.5%).

Table 9: GHG emission from different sources – 2003 [12]

Animal category	Methane emission ('000 tonnes/yr)			
	Enteric ferment-ation	Manure manage-ment	Total	% contribution
Dairy animals	6400	764	7164	71.3
Cattle	2740	363	3103	30.9
Indigenous	1910	289	2199	21.9
Cross-bred	830	74	904	9.0
Buffalo	3090	371	3461	34.4
Sheep & goat	570	30	600	6.0
Non-dairy animals	2450	431	2881	28.7
Cattle	2060	218	2278	22.7
Indigenous	1760	208	1968	19.6
Cross-bred	300	10	310	3.1
Buffalo	330	55	385	3.8
Others	60	158	218	2.2
Total	**8850**	**1195**	**10045**	**100**

These emissions in CO_2 eq ('000 tonnes/yr) are shown below:

Animal category	Total methane emission (2003)
Dairy animal	150444
Non-dairy animal	60501
Total	**210945**

Among the anthropogenic GHG emission from the animal sector, methane is the highest, with N_2O accounting for only a very small fraction, which is negligible. Methane emission in 2003 was from: dairy animals, ~ 71% and non-dairy animals, ~ 29%. Also, operation-wise methane emission from animal source was: 88% from enteric fermentation and 12% from manure management.

Average methane production from dairy animals in 1997 was [11]: indigenous cattle, 41 g/kg milk; crossbred cattle, 21 g/kg milk and buffalo, 31 g/kg milk. Methane emission per kg milk was always lower in high milk-yielding animals.

8. EPILOGUE

Since pre-industrial times, increasing global GHG emissions due to human activities have led to a marked increase in atmospheric GHG concentrations. This has impacted the global climate system: increased global temperatures, rising mean sea levels, melting ice caps, receding glaciers and an increased intensity and frequency of extreme weather events. Climate change will also result in declining water resources, loss of biodiversity and increased transmission of vector-borne diseases (e.g., malaria). It is predicted that by the end of this century accumulated GHG emissions could cause a rise in the average global temperature of up to 6°C from the mean temperature of 1980-1999, if the current upward trend in GHG emissions is not reversed in the coming decades[3].

A certain degree of global warming and its associated impacts are unavoidable and will require adequate adaptation measures. An important issue, however, is that of mitigating further climate change by shifting global production and consumption patterns towards the use of climate-friendly primary commodities, production equipment and consumer goods than the current GHG intensive ones. The developed countries have to make a major effort in this regard, as they are mainly responsible for the current levels of GHG concentrations, and they have greater financial and technological capabilities to take the mitigation actions. At the same time, developing countries, which are predicted to be more vulnerable to climate change, are also required to take appropriate actions to reduce GHG emissions. Kyoto Protocol includes provisions for mechanisms for developed countries to provide

assistance to developing countries to mitigate GHG emissions, without hampering their development goals.

Dairying activities also contribute to GHG emissions. Appropriate actions can result in reduced GHG emissions even with maintaining the required growth of the sector.

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NEWS SECTION

Indian Food Laws

- **Notification No. 1-54/08-MMPO/FSSAI ADVT-III/4187-O/Exty. (E) of 24 September 2009 of the Ministry of Health and Family Welfare:** The notification provides the draft *'Food Safety and Standards Authority of India (Milk and Milk Products) Amendment*

Regulations, 2009'. The important proposals in the draft regulations are as follows:

- The 'Milk and Milk Products Order' to be called 'Food Safety and Standards Authority of India (Milk and Milk Products) Regulations';
- The fee for registration for new plant or expansion / modification of the existing plant to be Rs.5000/- (Rupees Five Thousand Only); and,
- The Chief Executive Officer of the Food Safety and Standards Authority of India to be the Controller under the 'Food Safety and Standards Authority of India (Milk and Milk Products) Regulations'.

- **Notification GSR 761 (E) of 20 October 2009 of the Ministry of Health and Family Welfare:** The notification provides draft rules to amend the PFA rules. The important proposed revisions relate to Rules 42 (Form of labels), 47 (Restriction on use and sale of artificial sweeteners) and 61 F (Use of hydroxypropyl methyl cellulose), and proposes a new draft rule 47A (Restriction on use of polyols in foods and are as follows:

  - The foods permitted to contain a mixture of acesulfame potassium and sucralose shall carry the prescribed label declaration including name of the sweetener, 'Not recommended for children' declaration and quantity of sugar in the product;
  - Package of food containing polyols to have a prescribed label declaration 'Polyols may have laxative effect';
  - Use of maltitol to be allowed at GMP level in ice-creams and frozen desserts; and,
  - Use of hydroxypropyl methyl cellulose to be allowed in gulab jamun mix, ice creams and frozen desserts.

Codex Alimentarius Commission

Meeting of the Codex Committee on Milk and Milk Products is scheduled to take place on 01-05 February 2010 at Auckland, New Zealand. The important Agenda Items to be discussed in the meeting are as follows:

- Draft Amendment to the Codex *Standard for Fermented Milks* (CODEX STAN 243-2003) pertaining to Drinks based on Fermented Milk
- Proposed draft Standard for Processed Cheese
- Maximum levels for annatto extracts in Codex Standards for milk and milk products
- Consistency of the *Model Export Certificate for Milk and Milk Products* (CAC/GL 67-2008) with the *Generic Model Official Certificate* (*Annex to the Guidelines for Design, Production, Issuance and Use of Generic Official Certificates* (CAC/GL 38-2001))

International Dairy Federation (IDF)

IDF has published the following Bulletin/Standards recently:

Bulletins

- IDF Bulletin No.438/2009: The World Dairy Situation 2009.
- IDF Bulletin No.439/2009: Interlaboratory Collaborative Studies on Reference Method ISO 1211 / IDF 1 for the Determination of the Fat Content in Cow Milk, Sheep Milk and Goat Milk.

Standards

- IDF 075-1 - ISO 3890-1: Milk and milk products - Determination of residues of organochlorine compounds (pesticides) - Part 1: General considerations and extraction methods.

- IDF 075-2 - ISO 3890-2: Milk and milk products - Determination of residues of organochlorine compounds (pesticides) - Part 2: Test methods for crude extract purification and confirmation.

- IDF 128-1 - ISO 8196-1: Milk - Definition and evaluation of the overall accuracy of alternative methods of milk analysis - Part 1: Analytical attributes of alternative methods.

- IDF 128-2 - ISO 8196-2: Milk - Definition and evaluation of the overall accuracy of alternative methods of milk analysis - Part 2: Calibration and quality control in the dairy laboratory.

- IDF 128-3 - ISO 8196-3: Milk - Definition and evaluation of the overall accuracy of alternative methods of milk analysis - Part 3: Protocol for the evaluation and validation of alternative quantitative methods of milk analysis.

- IDF 142-1 - ISO 12080-1: Dried skimmed milk - Determination of vitamin A content - Part 1: Colorimetric method.

- IDF 142-2 - ISO 12080-2: Dried skimmed milk - Determination of vitamin A content - Part 2: Method using high-performance liquid chromatography.

- IDF 152 - ISO 11870: Milk and milk products - Determination of fat content - General guidance on the use of butyrometric methods.

- IDF 167 - ISO 14378: Milk and dried milk - Determination of iodide content - Method using high-performance liquid chromatography.

- IDF 174 - ISO 11865: Instant whole milk powder - Determination of white flecks number.

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