

Milk Essay

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This is a publication of Milk SA. Milk SA was founded by the primary and secondary dairy industry sectors to promote a healthy South African dairy industry.

The flocculation headache

For long life drinking milk, raw milk is heated for a short period at high temperatures. Normally, the milk protein (casein) is very stable and will not form deposits as a result of the heat treatment. If the milk protein is destabilized, it can coagulate or form deposits in the heating equipment, which can cause burning and blockages in expensive equipment.

Factors which can have a detrimental influence on the heat stability of casein in milk include amongst others:

- **Acid development** in the milk as a result of bacterial growth (poor hygiene or inadequate cooling of the milk during storage)
- **Mastitis** or udder infection which causes the milk's pH to rise
- Bacterial **enzymes** and possibly natural enzymes in the milk which attack the protein
- Shortages or imbalances in the cow's feed can also destabilize the protein.

These include:

- i. Mineral imbalances as a result of too little or too much calcium, phosphate or citrate in the milk
- ii. Low milk urea nitrogen (MUN) in the milk.

The so-called **Alizarol test**, conducted at the factory to measure the protein instability of the milk, is a quick test where equal quantities of milk and Alizarol reagents are mixed in a test tube. **Curdling** or "**flocculation**" indicates protein instability and the milk is then declared unfit for further heat processing. The producers involved can suffer severe economic losses as a result. **Colostrum** in the milk, as well as late lactation milk can also lead to a positive Alizarol test.

The problem occurs mostly in the southern and eastern milk producing coastal regions, but has also been encountered elsewhere. At times there appears to be a seasonal trend, especially where cows are on pastures.



Prof Piet Jooste



Prof Celia Hugo



Prof Robin Meeske



Dr Koos Myburgh

From the Chairman of the Board of Milk SA...



At a workshop arranged by Milk SA involving several experts, a three-pronged approach to identify the factors which could be responsible for the problem was adopted and three groups of researchers were contracted in by Milk SA for this purpose:

- Prof Robin Meeske, animal nutrition scientist in the Western Cape, is examining the effect (on protein instability) of mineral imbalances and other nutritional aspects in the total diet of lactating cows on pasture.
- Prof Celia Hugo of the University of the Free State (UFS) is investigating the significance of proteolytic psychrotrophic bacteria occurring in raw milk. These organisms produce proteolytic enzymes which destabilize the casein complex in the milk.
- Dr Koos Myburgh, also of UFS, is examining the biochemistry of the problem. He is monitoring the activity of natural enzymes, as well as bacterial enzymes in the milk with the help of various tests. He aims to link the proteolytic activity in the milk with the protein instability and will be working closely with Prof Hugo to look at both the microbiological and biochemical aspects.

In his annual report to the Members of Milk SA on 2 June, the Chairman of the Board of Milk SA, Prof Chris Blignaut, highlighted certain aspects, changes and challenges during the course of 2015.

Recalling the devastating drought accompanied by unrelenting heat, Prof Blignaut said the total milk flow had nevertheless surpassed previous years, against the backdrop of the national economy struggling to gain a productive foothold amongst political uncertainties and a troubled international scenario.

During its four meetings in 2015, Milk SA's various disciplines received meticulous attention by the Board. Commercialisation of the black dairy entrepreneurs and enterprise development in all relevant aspects continued to play a prominent role. A set of Guidelines for Skills and Knowledge Development and Mentorship projects - developed by a task team - was approved, as well as an annual transformation business plan for the dairy industry, for submission to the NAMC.

Through its projects, Milk SA continued to make remarkable progress in unlocking and building capacity for the industry through interaction with governmental and other structures. Due to the increasing importance of the international dairy market, the Customs and Market Access functions of Milk SA were repositioned as a registered project of Milk SA.

Prof Blignaut

Animal scientists meet at Spier



Dr Heinz Meissner

"The 49th Annual Congress of the SA Society for Animal Science (SASAS) was held from 3 to 7 July at the Spier Estate near Stellenbosch. The congress was unique in the sense that animal and ratite science took hands to stage a memorable meeting. Although the ratite symposium dealt mainly with ostriches, it is noteworthy to mention that emus, poultry and some other farmed birds also received attention. For animals, as usual, the livestock divisions of dairy cattle, beef cattle, sheep and goats, pigs, game and aquaculture were used.

Invited speakers gave their perspectives on various topics on the morning of 4 July. As usual, the perspectives of Prof Mohammed Karaan on the interplay between agriculture, land redistribution, job creation and the effect of the

drought and food security, were food for thought. Dr Chris van Dijk, CEO of the MPO, and Mr Gerhard Schutte, CEO of the RPO, gave overviews of the structure and operating procedures of the dairy and red meat R & D programmes respectively. In the dairy cattle session, Dr Carel Muller outlined the effects of heat stress, whereas most other papers dealt with nutritional and reproduction issues. Although not specifically related to dairy, much emphasis was placed on the genetics of parasite resistance and animal welfare which is relevant, given the genomics R & D programme of the Dairy Industry and our own concern with lameness and other welfare-associated issues".

Functional dairy farming

The following functional farming tactics - necessary to execute the main strategies - are key activities in a dairy business: Human resources; production; finance; marketing; and research and development.

Within the functional structure of the organised South African dairy industry, Milk South Africa (MSA) has strategic objectives which are defined in the statutory regulations of the Marketing of Agricultural Products Act

(Act 47 of 1996). The strategic objective of MSA is to broaden the market for milk and other dairy products, improve the international competitiveness of the dairy industry and empower previously disadvantaged individuals.

The following are vital to ensuring a profitable and competitive dairy industry:

- A strategic and focused approach to R&D to ensure innovative technologies

Functional Dairy Farming – Structural changes in the SA dairy industry



Dr Chris van Dijk

(Based on an extract from a paper presented by Dr Chris van Dijk, MPO CEO, at the SASAS Conference)

Many structural changes have occurred in the South African dairy industry in the past decade or two. Although the number of producers decreased from 7 600 in 1998 to fewer than 1 700 in 2016, herd sizes increased substantially during the same period. There was also a migration from the typical total mixed ration in the central parts of South Africa to a more pasture-based approach in the coastal regions. Dairy farming evolved into a technology-driven industry, but this transition was not fully supported by relevant research.

Historically research was practised largely via competitive science by researchers associated with universities and organisations

such as the ARC. The focus of research was not always demand-driven and did not focus on strong business drivers to ensure a sustainable and competitive dairy industry.

Periodically unpredictable market and environmental forces - such as drought - exert pressure on milk production in South Africa. This usually leads to short term financial issues such as a drop in the milk price and a possible increase in input costs, which might have a long term effect on the population dynamics of the national herd. Producers start exiting the industry and animals are culled. A stable industry is a prerequisite to prevent the South African consumer from being at the mercy of international price trends.

and solutions supported by strong business drivers

- Exploration of new avenues for research and innovation to meet increasingly stringent environmental outcomes
- Co-ordination between research investment from government, commercial companies and industry within South Africa
- An industry approach placing the primary industry (Producers) and secondary industry (Processors) at the core of research and development.

- New partnerships and nurturing of old ones between the Primary and Secondary Industry, Academic institutions, Government and industry organisations (RPO)
- Alignment of ability and investment, building the best teams to move the dairy industry forward to withdraw from the historical 'competitive science' model that was in place for many decades.



INTERNATIONAL DAIRY FEDERATION (IDF) NEWS

New biochemical markers of (heat) stress in milk

A recent scientific publication contained reports on biochemical markers of heat stress (HS) in cow's milk. Results identify potential biomarkers that could be used to monitor HS in lactating dairy cows and merit further investigation to elucidate the physiological mechanisms underlying the HS-induced changes in metabolic pathways. This could lead to better management practices, thereby improving animal welfare and reducing economic losses.

The full article can be downloaded at www.nature.com/articles/srep24208 or a copy can be obtained from the SANCIDF office.

IDF Member Countries (2016)

Australia	Belgium	Brazil	Bulgaria	Canada
Chile	China	Croatia	Cyprus	Czech Republic
Denmark	Egypt	Finland	France	Germany
Greece	Iceland	India	Iran	Ireland
Israel	Italy	Japan	Korea (Republic of)	Kuwait
Latvia	Lithuania	Luxembourg	Mexico	Mongolia
Netherlands	New Zealand	Norway	Philippines	Poland
Russian Federation	South Africa	Sweden	Switzerland	Turkey
Ukraine	United Kingdom	United States of America	Uruguay	Zimbabwe

New publications from IDF

The following Standards were recently received from IDF Head Office in Brussels.

- **Standards:**

IDF 216 - ISO 27105 (2016): Milk and Cheese - Determination of hen's egg white lysozyme content by high performance liquid chromatography

- **IDF 20-4 - ISO 8968-4 (2016):**

Milk and milk products - Determination of nitrogen content - Part 4: Determination of protein and non-protein nitrogen content and true protein content calculation (Reference method)

These documents are available from the SANCIDF office (see contact details) at differing prices, but thanks to a subsidy from Milk SA, levy payers in the dairy industry qualify for a 50% subsidy.

IDF: What does it really mean?

The International Dairy Federation (IDF) was founded in 1904 at the first International Dairy Congress held in Brussels, Belgium. It is a consensus-based, globally representative, respected and long established federation with a membership of 45 countries in 2016. Member countries produce more than seventy-five percent of the total world milk production. The IDF's work is science-based and has four key focus areas, Sustainability, Nutrition, Food Safety and Standards. Nine Work Areas with seventeen Standing Committees consisting of hundreds of experts, are addressing the four key focus areas.

Because the issues attended to by the IDF demand expert scientific knowledge, the top expertise of member countries - including South Africa - is used. Because of the science-based approach and reputation of the IDF, it is regarded as authoritative by international organizations whose work strongly influences the actions of countries in respect of standards regarding food safety,

composition of dairy products, integrity of dairy products, the role of dairy products in nutrition and health, as well as other issues which influence the well-being of the dairy industry.

The South African dairy industry is linked to the IDF through the South African National Committee of the International Dairy Federation (SANCIDF) of which the MPO, SAMPRO and the Department of Agriculture, Forestry and Fisheries are members. The work of SANCIDF is financed by these members and Milk SA. The activities of the South African National Committee have been harmonized and largely integrated with the projects of Milk SA and its members, the MPO and SAMPRO.



For further information

on any of these items or any other IDF related item, please contact Edu Roux at the SANCIDF office on **012 843 5701** or **082 338 7820** or send an email to edu.roux@agriconnect.co.za

DSA GUIDE TO DAIRY PRODUCT LABELLING – A FIRST OF ITS KIND

*The review of the existing document into a new, interactive, dynamic guide is considered to be a **first of its kind** in the agro processing sector, as the design allows it to be used by industry, the authorities and other stakeholders in the dairy industry, as a label assessment tool for measuring compliance with current product composition, food safety and metrology labelling standards and during design and changes of labels.*



The DSA's primary objective is the promotion of the compliance of milk and other dairy products with product composition, food safety and metrology standards. This objective is supported by the DSA's mandate, namely to:

- Conduct monitoring of milk and other dairy products;
- Communicate with industry and other stakeholders;
- Render support services to the dairy industry and other stakeholders (Government and other private institutions).

One of the statutorily funded activities of the DSA is the development of supportive dairy-technical guideline documentation (in conjunction with the organised industry) which is user-friendly and serves as a

valuable tool throughout the dairy value chain - ensuring compliance with legal standards.

Following the latest publication of the Regulations relating to the classification, packing and marking of dairy products and imitation dairy products intended for sale in RSA (R260 of 15 March 2015) and dispensations under the Agricultural Product Standards Act of 1990, the DSA decided on a new approach to the design and functionality of its current Guide to Dairy Product Labelling in South Africa - **by making it electronically available in a downloadable format** - which will be updated regularly as legislation is amended.

The guideline will be available on the DSA website as from September 2016.

Learning materials and assessment tools for Milk Reception Operator received



On 21 July, Gerhard Venter, Training Manager: SAMPRO, reported: "I am proud to announce that the full complement of learning materials and assessment tools for the new intended qualification - Liquid Dairy Raw Materials Reception Operator (LDRMRO) (affectionately known as Milk Reception Operator) has been completed. As in the past the materials are in our usual style of user-friendly, complete and well-rounded text and logical layout."

Briefly, the learning materials consist of:

- 1. Four theory subjects:**
 - Quality and Food Safety (5 modules)
 - Applied Dairy Science & Product Knowledge (3 modules)
 - Equipment and System Knowledge (2 modules)
 - Product Quality (2 modules)
- 2. Two Practical Modules:**
 - Sampling and Analysis.
 - Intake of liquid raw materials.
- 3.** A log book in which the **workplace experience** component needs to be recorded.
- 4. Internal assessment** tools for the **theory subjects** and a **practical assessment observation checklist** for the internal practical assessment.
- 5.** Two finishing modules for preparation for the Final, external assessment.
- 6.** Three **external assessment Knowledge Questionnaires** with answer sets, and an external (final, summative) **Practical Assessment** tool (based on acceptance analyses and intake skills).

Whereas the Dairyman qualification is pitched at the Process Controller level of learning (NQF4, same as the academic senior certificate/Grade 12), this new qualification is pitched one level lower at the level of Process Machine Operator on the learning pathway. Similar to Dairyman (and supposedly all Occupational qualifications) the full qualification will also consist of subordinate Skills Programmes which make up the full qualification, but can be used over a longer period (one-by-one) to also achieve the full qualification. Apart from the above dairy-specific components, generic components that also feature in other Process Machine Operator qualifications, have been inserted into the total design of this course (qualification developers are obliged to do this to comply with the design and development rules), which add further value to the total intervention. Amongst others, these additions include business type studies (obviously at the appropriate low level).

Be an ambassador for dairy: Seminars presented by the Consumer Education Project of Milk SA

The Consumer Education Project (CEP) of Milk SA presented seminars to members of the dairy industry in Gauteng, KwaZulu-Natal, the Western Cape and the Eastern Cape in August 2016.

During the seminars, delegates learnt about the Project's approach to educating consumers on the important role of dairy products in the diets of South Africans. As this message often does not reach the wider consumer base effectively through commercial advertising by individual members of the dairy industry, the CEP's communication campaign is specifically shaped to promote the goodness of dairy to benefit the industry as a whole.

Several communication elements and products have already been developed, which the project coordinator shared with delegates during the seminars. The dietitian of the Project informed the delegates of the health and nutritional advantages of dairy products.

Two recently developed leaflets were introduced at the seminars. The leaflets were developed under the theme 'Know your product and present

Know Your Product
and present it with pride

STRONGER BONES, STRONGER YOU

Be an Ambassador for Dairy

A whole family needs dairy every day

Dairy is an essential mineral that helps to build strong bones and teeth. Your bones are important in all stages of life. You are never too old to make sure your bones stay healthy. A reliable source of calcium is the diet. Calcium from dairy is easily absorbed and that your body can use most of the calcium effectively to maintain strong bones. Calcium obtained from food also enhances the effect of physical activity on bone mass during growth.

Calcium: building partner throughout life

Calcium continues to build and grow from birth. Most growth occurs in the age of 9 and 19 years. During this period you should consume enough calcium to maximise bone density and to reduce the risk of osteoporosis later on in life. Osteoporosis refers to bones that are weak and brittle. Osteoporosis refers to bones and a higher risk of fractures.

BONE-BUILDING STAGES

Age Group	Percentage
0-3 YEARS	26%
4-8 YEARS	27%
9-19 YEARS	46%
20-30 YEARS	5%

STOCKING UP ON CALCIUM IS MOST IMPORTANT BETWEEN 9 AND 19 YEARS!

Remember that the bone mass built during childhood and the teenage years determines your bone health later on in life. Consuming three servings of dairy every day since early childhood will help to build strong bones, so that you can lead an active life.

Are you getting enough calcium?
Your daily recommendation for calcium

1000-1300 mg per day FOR CHILDREN AND YOUNG PEOPLE AGED 10 TO 18	1000 mg per day FOR ADULTS	1200 mg per day FOR WOMEN OVER 50 AND MEN OVER 70
BUILD maximum peak bone mass	MAINTAIN healthy bones	SUSTAIN avoid premature bone loss and sustain mobility and independence

1 serving of dairy provides 300 mg of calcium

Compare the different amounts of food or products that provide 300 mg calcium

Milk 250 ml	Spirits, cooked 2 cups
Yoghurt/milk 200 ml	Broccoli, cooked 7 cups
Cheese 40 g	Cabbage, cooked 9 cups
Sardines with bones 130 g	Baked beans 3 cups



Milk SA Stars

it with pride' to help industry members to promote their products with confidence. 'Dairy essentials', the first leaflet in this series, describes the nutrient richness of dairy and offers suggestions for adding dairy to our everyday diet in an easy way. In the second leaflet, 'Stronger bones, stronger you', highlights the importance of calcium for bone health and focusses consumers' attention on the high calcium content of dairy.

Copies of the leaflets were handed out to delegates to distribute at their workplaces.

We encourage industry members to request more copies for distribution at individual dairy production and processing plants. Copies can be requested from the Consumer Education Project.

Contact Christine Leighton or Maretha Vermaak at 012 991 4164.

For more information please go to www.rediscoverdairy.co.za and www.dairygivesyogo.co.za.



Lucua Cohn graduated with a MBA on 7 April 2017 from Regensys Business School.



Matilda Wistebaar obtained a certificate in Office Administration for South African Business from SACOB on 9 June 2016.

The History of the EU / South African and now EU / EPA Cheese Agreement



After ten years of preparations and negotiations, the Economic Partnership Agreement (EPA) between the SADC EPA Group and the EU was successfully concluded and signed on 10 June 2016, with the SADC EPA Group consisting of Botswana, Lesotho, Mozambique, Namibia, South Africa and Swaziland. Angola has an option to join the agreement in future.

According to Sidwell Medupe, Departmental Spokesperson for the Department of Trade and Industry (DTI) *“South Africa had two central objectives in the EPA negotiations, namely:*

- First, we sought an outcome that would preserve coherence in the Southern African Customs Union (SACU) in terms of maintaining the common external tariff that is at the core of the Union and
- Second, we sought to improve our access to the EU market over and above what currently obtains under the bilateral Trade, Development and Cooperation Agreement (TDCA). More specifically, we sought improved access for South Africa’s agricultural products”.

From the onset of the first negotiations in the mid-nineties, the South African dairy industry focused on improved market access for cheese products entering the EU market. The original EU/SA Agreement on cheese was

implemented in 2000 and an initial quota of 5000 metric tons of cheese was allocated to each party, with preferential rates of duty that varied from 50 percent of the normal duty to a zero rate of duty.

Both parties started renegotiating during 2004 to remove certain difficulties posed by the agreement, resulting in South African being able to export all types of cheese classifiable under tariff heading 04.06 to EU member countries at a zero rate of duty.

In 2013, South Africa’s negotiating team had several discussions with Milk SA to discuss market access concessions within the spectrum of EPA. According to an announcement by the EU and SADC partners, the EPA agreement will be implemented on 1 October 2016. This will allow imports of types of cheese 04.06 (cheese and curd) from the EU under the quota to be at a zero rate of duty and South Africa will be able to export an unlimited quantity of cheese at a zero rate of duty to the EU market.

De Wet Jonker
Milk SA Project Manager:
Customs & Market Access