Milk South Africa
Melk Suid-Afrika

Milk Essay

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Contents

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.

TIA signs Memorandum of Understanding with Milk SA to drive innovation in the dairy sector

In its role as an industry builder, the Technology Innovation Agency (TIA), an entity of the Department of Science and Innovation (DSI), signed a strategic collaboration agreement with Milk SA as the umbrella industry body. Milk SA was established with the strategic intent to improve the competitiveness of the South African dairy industry, broaden the market for South African dairy products and empower existing black dairy entrepreneurs in the South African dairy industry to broaden the market.

The cluster model is TIA's approach for assessing value chains and stimulating the development of activities and interventions to facilitate sector or industry-level engagements through a cross-cutting approach. This approach is intended to address systemic weaknesses that hamper innovation and commercialisation beyond just the provision of funding to individual projects. In this collaboration, Milk SA will amongst others be the implementing partner for the current Dairy Genomics Programme / Cluster of TIA.

"We are delighted to have reached this milestone and we look forward to the contributions by TIA and Milk SA towards the prosperity of the South African dairy industry. The signing of this collaboration agreement is the culmination of years of negotiation and underscores the realisation that partnerships are central to the achievement of the developmental goals of South Africa.

Above: Nico Fouché (CEO: Milk SA), Dr Bonile Jack-Pama (Chairman: Milk SA), Mr Patrick Krappie (CEO: TIA) and Dr Heinz Meissner (R&D Programme Manager: Milk SA)

"This historic moment of the signature of a memorandum of understanding between TIA and Milk SA has also ensured a meeting of minds regarding further support to the transformation agenda of Milk SA. As we pursue diversity, equity, and inclusion, we envisage a dairy industry in which the participation of women is commonplace, and in which all opportunities within the value chain are opened up for participation," said Dr Vuyisile Phehane, Executive: Bioeconomy at TIA.

"Milk SA regards the relationship with TIA as of high importance in supporting the research and development (R&D) programme of the dairy sector. Technology development and innovation in a competitive environment where profit margins are small is crucial and therefore, we anticipate that this relationship should provide increased opportunities to achieve such innovation and at the same time maintain sustainability," said Dr Heinz Meissner, R&D Programme Manager at Milk SA.

This collaboration is a good example of a public-private partnership that would contribute to economic growth and a competitive industry, leading to improved quality of life for South Africans.

As a strategic high-impact programme, the model of cluster creation and management supports the DSI's Decadal Plan and the implementation of the 2019 White Paper on Science Technology and Innovation. The Decadal Plan guides on modalities for the state's intervention towards rescuing industries in decline, amongst others interventions defined in the Agricultural and Agro-processing Masterplan.

technology innovation
A G E N C Y
Taking technology innovation further

2023 in review, by the European Milk Board

As 2023 draws to a close, we look back on a year marked by challenges in the European dairy sector by presenting you articles from many countries that were published throughout the year. Reflecting on the diverse experiences across Europe, it becomes evident that our shared pursuit for a sustainable and fair dairy sector remains more relevant than ever.

This year, decreasing milk prices, high production costs and regulatory changes have continued to pose significant challenges. From Belgium to Lithuania and elsewhere, dairy farmers have struggled. Especially the situation in Lithuania, with its rapidly declining milk prices and shrinking dairy sector, serves as a strong reminder of the fragility of our profession.

Amidst these challenges, the push for sustainability and environmental responsibility has been a defining theme. The European Green Deal and the "Farm to Fork" strategy have set ambitious targets, but have not come with the necessary market regulation. So, we have been demanding the framework that is necessary to adapt to the Green Deal and to stabilise our agricultural system and will continue to do so.

This year also highlighted the importance of farmers' autonomy and fair brands. The concept of Fair Milk continues to show in Belgium, France, Germany, Luxemburg and Switzerland how empowering farmers can lead to more equitable and sustainable practices. It is a model that resonates with the ethos of many dairy producers across Europe.

We have also seen the impact of large retailers and the consolidation of the dairy processing industry, particularly in Switzerland. The increasing power of major retailers like Migros has raised concerns about market concentration and the survival of smaller processors, echoing the need for fair competition in the sector.

In Germany, discussions and actions surrounding agricultural policy, contracts, market transparency and price monitoring have been at the forefront. These efforts are crucial in ensuring that dairy farmers receive fair compensation for their products.

Sweden's dairy farmers have set a good example of resilience and a proactive approach, tackling issues like competitiveness and economic pressures head-on, while in Denmark, concerns over cattle exports and the use of organic milk by processors have sparked major discussions.

As we approach the new year, it is becoming clear that the path ahead is fraught with challenges but also ripe with opportunities. Europe will elect a new Parliament in 2024. The EMB will use this as an opportunity to push for a better system by cooperating with like-minded partners, to meet EU politicians and promote good concepts, such as EU legislation that makes cost-covering prices mandatory.

The need for collective action, innovative solutions and strong advocacy has never been greater. Let us continue to strive for a dairy sector that is fair, sustainable and resilient, ensuring a future for dairy farmers across Europe.

EMB
European Milk Board

European Milk Board
Newsletter of
18 December 2023

DSA LAB SERVICES: PROMOTING FAIR TRADE AND COMPETITION

Because the entire dairy value chain plays an extremely important role regarding the protection of the integrity of South Africa's dairy industry, the Dairy Standard Agency NPC - as a non-profit organization - focuses on:

- **Monitoring milk and other dairy products.**
- **Communicating with the industry and other stakeholders.**
- **Providing support services to the industry and stakeholders.**

A well-equipped laboratory

With financial support from Milk SA, the Dairy Standard Agency (DSA) has established a well-equipped, independent dairy specific laboratory in 2019. The primary function of the laboratory ("DSA Lab Services") is to produce and import reference standards that apply to the analysis of raw milk parameters for fat, protein, lactose, freezing point, milk urea nitrogen (MUN), somatic cell count (SCC) as well as skim milk (fat and protein), goat milk (fat and protein) and cream (fat and protein). The laboratory is also geared to conduct microbiological testing and is maintaining standard operating procedures aligned with the ISO/SANS 17025.

Aligned with international standards

The laboratory's standard operating procedures are in line with the International Organisation for Standardisation (ISO) and the South African Bureau of Standards' specifications set out as a National Standard in ISO/SANS 17025.

The Dutch quality assurance company, Qlip, supplies calibration standards as their standards are considered to be the most suitable for South Africa and are well aligned with the Gold Standard of the International Dairy Federation (IDF). It is important to comply with Qlip standards to ensure that a single system is used in the process of harmonising standards. This mitigates the risk of disputes and possible litigation.

Covering an array of products

Any milk and dairy products can be tested at the DSA Lab Services for compliance with legal and voluntary quality standards. Fresh milk is tested throughout the year, but also test various dairy products such as:

- Fermented products such as maas, sour cream and yoghurt
- Butter and cream
- All cheeses – hard, soft and everything inbetween
- UHT and sterilised products

Remedial action and law enforcement

One of the most important functions of the laboratory is the testing of product samples collected by environmental health officials at national level in collaboration with the Dairy Standard Agency. These samples are submitted to the laboratory in accordance with a very strict protocol. Results are then sent to the respective authorities for remedial work, which includes law enforcement, as well as to processors, packers and/or sellers involved. This system is aimed at swiftly rectifying potential non-compliance. In addition, the technical staff of the Dairy Standard Agency supports processors and other players in the value chain with advice and remedial facility assessment programmes, aimed at quality and food safety improvement.

Specific needs of the producer of unprocessed milk

As the quality of unprocessed milk directly affects the producer's profitability, the DSA Lab Services offers the following services to the producers of unprocessed milk:

- Testing for somatic cell counts (bulk tank and individual cows)
- The identification and confirmation of certain pathogens
- Fat, protein, lactose and urea measurement
- Microbiological testing
- Determining the antibiotic resistance of mastitis organisms
- Aflatoxin M1 testing
- Added water

Special investigations

Special investigations by the laboratory are addressing areas within the dairy value chain that pose high risks for food safety and quality. A value-added objective of the laboratory's is also to stimulate research and development as well as to cooperate with the research and development projects of Milk SA and academic institutions.

Further aspirations

The laboratory staff is currently working hard at obtaining South African National Accreditation System (SANAS) accreditation as well as recognition from the Department of Agriculture, Land Reform and Rural Development. This includes the implementation of milk-ring tests for milk producers.

Conclusion

It will therefore be reasonable to conclude, saying that the Dairy Standard Agency, through its laboratory and other services, adds tremendously towards achieving fair trade and competition in the South African dairy industry.

European Milk Board Press Release, 25 September 2023

Crisis warning on the European dairy market:

The EMB calls on policy-makers to wake up from their slumber and take action at EU level at last

Given the dire situation on the dairy market when it comes to milk prices, Kjartan Poulsen, President of the European Milk Board (EMB), has sounded the alarm. "We are in the middle of a crisis. It is high time to take action!"

The EMB calls on the EU to wake up at last and activate some emergency measures in order to keep the European milk market from going under. Poulsen adds: "We cannot accept that even though EU policy-makers see that the situation is hairy, they remain impassive and pass on the responsibility to the individual Member States." He says that it is time for the European Commission to take up its responsibility at EU level and finally bring some relief to the milk market by activating voluntary production reduction.

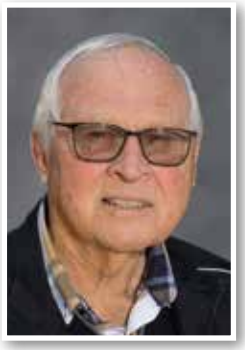
Prices are collapsing in EU Member States one after the other and producers are being forced to shut shop. The EMB is issuing an urgent warning that Europe will lose out both economically and socially if cows are no longer reared in rural areas and farms cannot remain in business. "Agriculture is the bedrock of rural regions and infrastructure and without it, rural areas would simply break down," explains Boris Gondouin, the French representative on the EMB Executive Committee. He says that it is well-known that the provision of key services like healthcare has already dropped to dangerous levels because there is an exodus of people and professions from rural areas. But this is only the tip of the iceberg. The environment as well as the cultural fabric in rural areas is also suffering as the number of farmers has reduced drastically. Without dairy farming and without family farms, biodiversity hangs in the balance. "In order to maintain biodiversity, we need to finally lay the foundation for economic and social sustainability," underlines Pat McCormack, the Irish representative on the EMB Executive Committee.

Elmar Hannen, his German counterpart and Vice-President of the EMB, adds: "It is really high time for policy-makers to muster the will to create a framework for better distribution of margins along the value chain. This would make cost-covering prices a reality for producers, while, at the same time, ensure that prices remain accessible for consumers." *Fair Milk*, a project created by EMB members that is active in numerous European countries, is a real-life example that shows that this is possible.

Kjartan Poulsen summarises the task before policy-makers and subsequent links in the food production chain as follows: "Activate voluntary production reduction at EU level NOW, and pay farmers fair prices so that no more farms go out of business, rural areas remain vibrant and the EU is assured stable security of supply. At this juncture, nothing less will do." And there is no time to waste. After all, farmers are already facing the full force of this crisis.

Environmental management by the Dairy Sector

The goal of the dairy sector is to provide nutritious food in an economic, social and environmental responsible manner, and to endorse the UN 2030 Agenda for Sustainable Development. The presentation will deal with environmental integrity as it pertains to greenhouse gas (GHG) emissions, soil health and nutrient supply, waste management, water quality and quantity, and biodiversity.



by Heinz Meissner

Greenhouse gas emissions

Reduction in GHG on dairy farms is a priority focus of research and expert support. Estimates from pasture-based dairy farms average 1.12 kg CO_2 eq/kg FPCM, which resembles main milk producing countries. Methane emissions from dairy cattle, because of various interventions such as improved feeding and breeding practices, declined by 31% from 2010 to 2017. Nitrous oxide on dairy farms results mainly from over-fertilization. Through testing and extension, nitrogen application has been successfully reduced from 300-400 kg/ha/year to 150-250 kg/ha/year.

Soil health and nutrient supply

Soils rich in organic carbon are associated with enhanced carbon sequestration, biodiversity, water cycling, productivity, and climate change mitigation. The influence on carbon sequestration is well illustrated in a case study on two farms: On one farm the soil C

declined from 4.9 to 4.2%. The farm CO eq emissions were 8 412 tons/annum, but because of the decline, the net emissions increased to 20 612 CO eq. On the other farm, soil C increased from 2.6 to 2.8%. The farm CO eq. emissions were 15 563 tons/annum, however due to the increase, the net emissions decreased to 7 123 CO eq.

Waste management

Waste is of concern from pre-farm gate through to dairy processing plants. Most dairy farms have waste disposal and sewage systems which use the solids as fertilizers and the water in irrigation or recycling for cleaning. Some large dairy processing companies have waste reduction and water cleaning operations, some of which generate methane for electricity and the purified water recycled for cleaning.

Water quality and quantity

Water is a finite and vulnerable resource and must be dealt with responsibly, both as it applies to quantity and quality. Recent developments and initiatives are steadily contributing towards creating a culture of circularity and sustainability. For example, a water stewardship program has been introduced which encourages innovative initiatives in water management, ecosystem protection, recycling, and effluent treatment.

Biodiversity

The country is rich in natural resources, which include its biodiversity and ecosystems. With increasing agricultural production, the development of a biodiversity-based agricultural system to ensure future sustainability has become a key driver. Therefore, many dairy farms have undertaken to integrate biodiversity-conscious approaches in their businesses. The vast costs involved in repairing ecosystems are understood and therefore the benefits in removing aliens, and monitoring soil health, structure, nutrients and biological activity, are recognised.

Extended shelf life milk processing:

Effect of simulated cleaning in place on the germination and attachment of Bacillus cereus spores

Prof Elna Buys

Chané Pretorius

The following extract is from an article of Chané Pretorius and Prof Elna Buys (University of Pretoria) as published in the International Journal of Dairy Technology.

The effect of simulated cleaning in place (CIP) was determined on the structure, attachment and growth of Bacillus cereus spores isolated from raw milk and biofilms in filler nozzles from extended shelf life (ESL) milk processing lines. Simulated CIP treatment structurally affected >98% of B. cereus spores, while 0.1% remained intact. Following simulated CIP treatment, B. cereus spores were able to attach to stainless steel coupons and form biofilms. B. cereus spores were capable of germination and growth under refrigerated conditions for more than 28 days. Contamination with B. cereus spores may lead to a reduced shelf life and potentially be a safety risk in ESL milk with a prolonged shelf life.

The study concluded that simulated CIP treatment affects the structure of B. cereus spores isolated from raw milk and filler nozzles of ESL milk processing lines. However, simulated CIP treatment was less effective against some B. cereus strains from filler nozzles and did not affect the ability of B. cereus spores to attach to stainless steel or germinate and grow in milk. Consequently, B. cereus spores that survive CIP may be less susceptible to subsequent CIP treatment and attach to filler nozzles in dairy processing plants, thereby contaminating ESL milk.

Contact Prof Buys at elna.buys@up.ac.za

IDF COUNTRY UPDATE

Dairy product markets

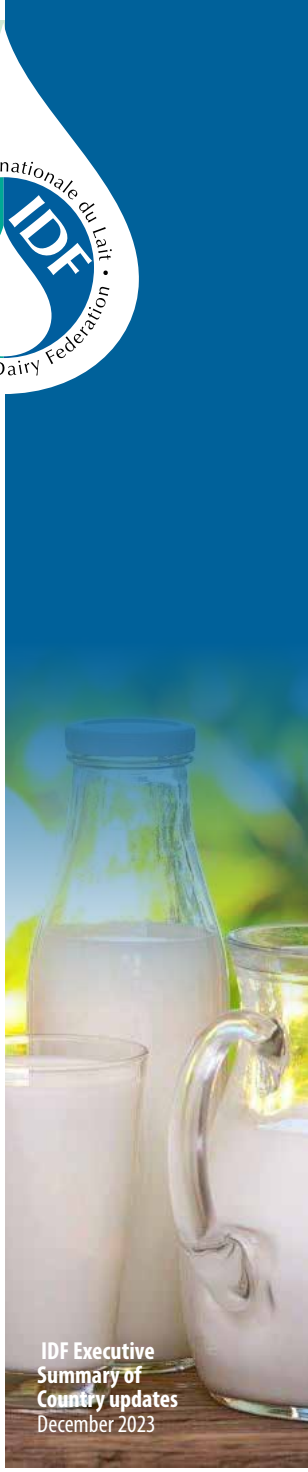
There is a noticeable rise in retail prices across most countries. Sales and consumption patterns vary depending on the product and country. India stands out with the most significant increase in all dairy consumption.

For the case of dining milk most of the countries showed a decline in consumption except for India and UK. For yogurt the consumption trend was more diverse with a group of countries that increased as India, Canada, Australia, United State and Norway, and another group decreasing as Germany, South Africa and China. Cheese exhibit higher consumption rates in many countries except for China, Germany and Italy, in contrast, butter have declined in most countries except for Israel, China, India and United State, while powders remain steady for most countries with less consumption in Chile and China.

The export trend showed an increase in countries as Netherlands (12%), Australia (18%) and Ireland (38%), and decline in others as Chile (-12%), France (-5%) and Italy (4.5%). For the case of the import trends, countries as Canada(8,7%), UK (10%), Australia (17%), Italy (18,2) and Iceland (48%) have increased their import and Chile (-8,5%), Netherlands (-2%), South African (-2%) and Norway (-1,5%) have decreased it.

Summary

For the period considered in this report, global milk production showed variations, with increases in some countries, led by China, and a notable decrease in Norway. Retail prices rose amid inflation in most countries, impacting consumption patterns. However, India experienced a significant increase in dairy consumption, especially in yogurt, ice cream, and cheese. Marketing campaigns emphasized sustainability and nutrition. Globally, farm gate prices increased in many countries with a considerable drop in others as Belgium, United State and UK. Global efforts toward sustainability focus on achieving net-zero emissions, collaborating with research institutions. Animal welfare is a global priority in the dairy industry. Dietary trends lean towards sustainability, reduced sugar, protein and increased plant-based alternatives. The industry faces diverse market conditions, with some regions anticipating stability and growth, or others challenges such as weakened demand.



The benefits of the use of the Lactoperoxidase system (LPS) in the dairy industry

The biological properties of milk promote the development of microorganisms which may compromise its quality. Consequently, the use of techniques for preserving the milk matrix from its collection until processing is necessary. While refrigeration on the farm and refrigerated transport of milk from the farm to the processing plant has become the norm in the commercial dairy industry, this option is not always available in the informal sector. The application of the so-called lactoperoxidase system (LPS) has been suggested, particularly in raw milk preservation, in situations where prompt refrigeration is difficult, and especially in developing countries and during extended or continuous failure of the electricity supply.

by Prof Piet Jooste

What is lactoproxidase

Lactoperoxidase (LP) is a member of the peroxidase family, a group of natural enzymes which are widely distributed in nature and found in secretions of mammary glands (colostrum and milk), salivary and lacrimal glands. It is an enzyme that is synthesised in the greatest quantity by the mammary gland, having the function of protecting the glands against bacterial pathogens. Its action alters the metabolism of bacteria and causes lesions or changes in the various structures of the bacterial cell such as the cell wall, the active and passive transport systems, glycolytic enzymes, and nucleic acids, which consequently cause interference with the microorganism's ability to multiply.

Activation of lactoperoxidase

According to a fact sheet of the International Dairy Federation (2013) lactoperoxidase acts as a catalyst, oxidizing thiocyanate ions in the presence of hydrogen peroxide into hypothiocyanous acid. The acid dissociates in milk and the hypothiocyanate ions react with sulphydryl groups to inactivate the metabolic enzymes of bacteria. This prevents bacteria from multiplying and potentially extends the acceptable quality of the raw milk.

Regarding the antibacterial effect, different groups of micro-organisms show a variable degree of sensitivity to the LPS, which may have

a bactericidal or bacteriostatic effect depending on factors such as type of microorganism, pH, temperature, incubation time and cell density. The difference in sensitivity to the LPS can probably be explained by the differences in the cell wall structure and its properties. The antimicrobial activity can cause lesions or modifications in the various structures of the microbial cell (as referred to above), leading to the death, or inhibiting the growth, of microorganisms.

Gram-negative catalase-positive organisms, such as pseudomonads, coliforms, salmonellae, and shigellae, are inhibited by the LP system. Depending on the medium, pH, temperature, incubation time and cell density, these microorganisms may be killed. It has been shown that the LP system can increase storage times of raw milk by delaying growth of psychrotrophs (Wolfson and Sumner, 1993).

Gram-positive bacteria are more resistant. The LPS can however be both bactericidal or bacteriostatic toward *S. aureus,* an important cause of bovine mastitis. *Listeria monocytogenes* is a troublesome pathogen in the dairy industry, so much so that the consumption of milk and contaminated products can result in foodborne listeriosis. L. monocytogenes can be found in raw milk, in poorly pasteurised milk and its derivatives. The risk of listeriosis is amplified by the ability of *L. monocytogenes* to grow at low temperatures and its relative resistance to heat when compared to other bacteria. The system can also be bactericidal or bacteriostatic against *L. monocytogenes.*

The antibacterial activity of the LP system on the growth and survival of L. monocytogenes in UHT milk and French soft cheese has been determined experimentally. In UHT milk, the presence of the LP system either inhibited growth or completely inactivated inoculated cells. Complete inactivation occurred at different times depending on initial inoculum concentration and storage temperature. In another study, research workers determined that the LP system, using the inherent milk lactoperoxidase, effectively inhibited the growth of L. monocytogenes and S. aureus at 35 and 37°C, respectively

Prolonging the shelf-life of milk produced in the informal sector

The natural lactoperoxidase system in raw milk is effective for about two hours. Adding a pre-packaged activator (IDF 2013) containing thiocyanate and a source of hydrogen peroxide such as sodium percarbonate, activates and extends the effects of the natural lactoperoxidase system (LPS) in raw milk. Where refrigeration is not possible, the addition of the pre-packaged activator increases the acceptable quality of raw milk for about 24 hours at 15°C or between 6 and 8 hours at 30°C, allowing smallholders

sufficient time to store and/or transport their milk to a central depot for processing. The IDF fact sheet warns that while the addition of a chemical activator to raw milk may be the only choice for some small dairy producers located in rural areas, these chemicals must be used correctly. They should not be used to disguise poor quality milk and should only be added at safe levels. The antimicrobial agents of the LPS delay milk deterioration, thus preserving the microbiological quality of the milk. The method can be applied to the raw milk of several species, although the system's effectiveness depends on the type of microbiological contamination, the numbers of microorganisms and the milk temperature during its use. The Codex Alimentarius Commission (CAC) provides guidelines which focus on the application of the LPS to avoid milk deterioration during collection and transportation to the processing plant when proper refrigeration is not feasible. Since the adoption of these guidelines, a substantial amount of data on the effectiveness of the LPS has been obtained not only from laboratory and field studies but also from the adoption of large-scale use of the system in commercial milk production in some countries such as Cuba, Colombia, Peru, Venezuela, Cameroon, Kenya, Uganda, Pakistan, and others (CAC 1991). Overall, these data confirm the effectiveness of the LPS in preventing the deterioration of raw milk at room temperature. Utilising the lactoperoxidase system (LPS) at different temperatures and time within the structure defined by CAC (1991), is subject to:

a. the application of the principles of good hygiene practice in milk production that is necessary in order to ensure milk of good microbiological quality;
b. The storage temperature of the milk treated with the LPS that determines the inhibitory effect of the treatment.

It is important to note that unlike pasteurisation, the **LPS does not make milk safer for consumption; it only preserves the initial quality of the product from the farm until it reaches the processing plant.**

Possible application of the lactoperoxidase system in the commercial dairy sector

- Commercially refrigerated and transported milk

  In Western Countries, including South Africa, milk is cooled and stored for increasingly long periods because of distribution circumstances. After 2 d, such milk can deteriorate through the multiplication of psychrotrophic organisms (mainly pseudomonads), which produce extremely heat-resistant lipases and proteases which survive pasteurization. These enzymes can render the milk testing positive to the Alizarol test at the processing plant platform or it can lead to spoilage of dairy products such as pasteurised and UHT milk, butter, and cheese.

  The bactericidal effects of the activated LPS are greater at low temperatures (0- 5°C). Studies found that observable multiplication of surviving natural milk microflora started after 12 d in LP system-treated milk at these temperatures, compared to 4 d in untreated milk. After 22 d, viable counts in untreated milk reached 10^6 -10^7 cells per ml compared to about 101 cells per ml in LPS -treated milk. In another study results showed that

at 4°C the standard plate count in LPS milk remained basically unchanged for at least 104 h, whereas bacterial multiplication in the controls started after 48 h.

- Fermented dairy products

  Bovine milk lactoperoxidase is relatively heat resistant, with the enzyme being only partially inactivated by short-time pasteurization at 74°C, for 15 seconds leaving sufficient activity to catalyse the reactions between thiocyanate and hydrogen peroxide. The antimicrobial compounds in the LPS may interfere with the activity of lactic acid starter cultures causing problems during the manufacture of fermented products such as cheese, yoghurt etc. The effect of the LP system on the behaviour of a thermophilic starter culture commonly used in the dairy industry for cheesemaking found this starter culture to be very sensitive to the LP system; the activity of the starter culture being strongly reduced. Other researchers however made acceptable varieties of soft and hard cheeses from chemically treated milk. Using the LP system, it was possible to compare cheese yields with products made from untreated and treated 8 d old milk. Chemically treated milk increased yields by 2% as compared to control cheese.

  Researchers established some factors that can affect the use of raw milk treated with the LPS for producing fermented dairy product. These included the type of milk, the type of starter cultures used and their inoculation rate, as well as the concentration of thiocyanate and hydrogen peroxide used to activate the system. The yield of fresh cheese from raw cow's milk treated with the LPS was significantly higher than that of cheese made from milk without using the system. Related research also determined that the taste of fermented milk and cheese could be improved by LPS action, by changing the balance of the microbial types in the raw milk. Yoghurt made from milk treated with the LPS did not present any significant differences in the chemical composition or sensory properties when compared to control yoghurt. In another study LPS activation of the milk promoted an increase in the yield and sensory quality of cheese. Evidence from studies indicates that the LPS has no negative effects on the quality of cheese and fermented products when using a milk which has undergone an appropriate heat treatment after using the system.

Conclusion

It is possible that the LPS can have a significant effect in producing dairy products on an industrial scale, since thermal processes at lower temperatures provide greater nutrient retention in foods which are more sensitive to heat – such as creams and dairy drinks – which translates into final product quality, in addition to energy savings.

It is also important to consider that the current trend of the 21st century consumer is towards more natural foods. These consumers are careful and attentive to preservation methods and health promotion, thus reaffirming the future potential of the LPS in the production of dairy products.

The FoodBev SETA Dairy Sector Skills Plan 2023/24

The Skills Plan highlighted the following:

The sector is relatively healthy with turnovers in the billions and trade surplus in the millions. The sector had a significant year (2022/23) with its turnover increasing by 32% to R54.3 billion.

The trade surplus was boosted by an impressive increase in exports which resulted in a significant R731 million contribution to the economy.

This financial year Workplace Skills Plan / Annual Training Report submissions and employment number were down, indicative of a sector attempting to stabilise after significant external shocks.

The employment breakdown of the sector by occupations illustrates that the sector is predominantly dependent on elementary occupations, which is expected in a developing country.

The number of companies that have submitted Workplace Skills Plans / Annual Training Reports has decreased by 7%.

Most of the companies are situated in Gauteng, Western Cape, and Kwa-Zulu Natal. The employee provincial distribution is similar to the company distribution.

The sector is significantly male dominated and skewed towards Africans. Even though the sector is dominated by Africans, their representation in the higher occupational groups like managers remains small. Coloured and Indian/Asian employees are also not significantly represented. The representation of employees with disabilities is also low. However, there is an opportunity to achieve transformation goals through the Professional occupational category. Africans and employees with a disability have significant repression which can open doors to managerial positions.

The FoodBev SETA Dairy Sector Skills Plan 2023/24 is available from the Milk SA Office.

South Africa well represented at the World Dairy Summit in Chicago - October 2023

The representatives participated in various Standing Committees of the International Dairy Federation and the sessions of the World Dairy Summit during October 2023 in Chicago. An annual report will be issued in due course.

L-R: Nico Fouché, Dr Mark Chimes, Bertus van Heerden, Melt Loubser, Fanie Ferreira, Jompie Burger, Dr Liska Robb, Maretha Vermaak, Christine Leighton, Dr Colin Ohlhoff and Dr Ndumiso Mazibuko

Maretha Vermaak *commended in Chicago*

Maretha Vermaak received an award in Chicago at the World Dairy Summit on October 2023, for her exceptional contributions to the Science and Programme Coordinating Committee (SPCC) of the International Dairy Federation. Maretha has been a member of this Committee over the past four years and is the Dietician of Milk SA's project on Consumer Education.

Amongst others, the SPCC ensures that the IDF's programme remains relevant to the changing needs of the dairy sector, balancing scientific integrity and industry applicability, and thus consider new areas of activity and changes in emphasis or priority in the IDF programme of work.

Well done Maretha, we are proud of you!

Maretha Vermaak receiving the award from Caroline Emond (Director-General: IDF) at the World Dairy Summit Gala Dinner in October 2023

SKILLS & KNOWLEDGE DEVELOPMENT DISPENSATION IN THE SECONDARY DAIRY INDUSTRY SECTOR:

Progress and Achievements

Dispensation in bird's eye view

The Skills Development Act and Skills Development Levies Act mandates the payment by employers of 1% of remuneration cost as Skills Development Levy to SARS, who in turn splits that into a 20% allocation to the National Skills Fund (NSF) and 80% to the SETA. The SETA is mandated to spend 10% (of the original 100%) on internal administration (to run its business and fulfil its obligations); must pay 0.5% (of the original) into the TVET Colleges fund and the remaining 69.5% (of the original total levy) is split into a mandatory (20%) grant and discretionary (49%) grant, the remaining 0.5% (from all SETAs) funding the Quality Council for Trades and Occupations (QCTO). The mandatory grant is based on the submission of a workplace skills plan (WSP) and annual training report (ATR) that indicates fair compliance with the WSP. The discretionary grant funds the attainment of PIVOTAL learning interventions (such as trades, vocational certificates (manufacturing), support activity qualifications and national skills development imperatives such as adult education and training (AET)) and is split 80:20 to pivotal (qualifying) and 'other' training. SETAs may obtain additional funding from the NSF. SETAs may retain funds committed to approved projects for the reasonable duration of such projects, but all excess must be paid over to the National Skills Fund (NSF).

Micro and small enterprises that qualify, may be exempt from paying the levy and still access discretionary grants from the SETA for learning interventions that can be connected to enterprise development initiatives, as well as national imperatives.

Intended amendments to the expenditure pattern of the Skills Development Levy

Although there is still some road to cover, SETA Boards (all) are currently considering and discussing several proposed amendments to the expenditure pattern of the retained levies (that which is not allocated to TVET Colleges, QCTO, the SARS collection fee and the National Skills Fund contribution). This is not a done deal yet and it is foreseen to only be implemented by 2024. Currently no new developments have been reported that can be reported on. This remains an important issue on the agenda.

The revised learnership funding model

In the May 2023 Board meeting of FoodBev SETA, the following improvements to selected interventions in the grant funding policy were adopted:

- Learnerships for employed workers increased from R22k for 12-18 month programmes to R25k per learner (up to 240 credits) AND interventions greater than 240 credits (2 years and longer) were added with an allocation of R44k/learner:

- Learnerships for unemployed (temporary contract) workers increased from R64k limited to 12 months to R67k for 12 months and R88k for 18 months, of which R25k is for training costs and the remainder as stipend at R3.5k/month;
- Learners with disabilities (both in the employed and unemployed categories get slightly more for reason of a higher stipend amount to accommodate the disability.
- Revision of the rules for grant funding also indicated the following important aspects newly added to the revised policy:
- If enterprises do not comply with mandatory grant requirements, they will not be allowed to remediate after closing dates (submission of acceptable Workplace Skills Plans – WSPs – and Annual Training Reports – ATRs – that reasonably reflect achievement of the WSP);
- Track records on previous training implementation performance, may lead to disqualification;
- Cancellations of planned training interventions in the past may disqualify enterprises from access to grants – implying number of allocations requested and given vs submitted enrolments.

It is important that participating enterprises take cognisance of these new rules,

Qualification registrations

Provisional: The 5 remaining Dairyman qualifications (in the suite of 10) has been approved as Learnerships by QCTO and funding may be applied for learners to be enrolled in these. They are :

- Fresh Dairy Products;
- Liquid Long-life Dairy Products;
- Processed Cheese;
- Butter/Dairy Spreads;
- Ice Cream/Frozen Dairy Products.

Assessing Kamlesh Karnan

Issues in respect of the Dairy Laboratory Analyst qualification have not been resolved. There were recommendations from SAQA relayed to FoodBev SETA by QCTO to consider increasing the level of the National Qualifications Framework (NQF) at which the qualification should be registered from 3 to 4 AND that consideration ought to be given to register it as 8 discreet qualifications and not a single parent qualification with 8 part-qualifications (which is the preference of the technical expert group involved in the design).

Progress with enterprise site accreditations

Provisional: Final sign-off by the Verifier for QCTO and the Skills Development Provider (SDP) involved in the site accreditation process initiated and led by Milk SA and SAMPRO jointly, resulted in the final submission of applications for the following sites (as Assessment Centres):

- Coega Dairy;
- Cookhouse Creamery;
- Clover (Durban/Queensburgh);
- Clover (Bloemfontein);
- Fair Cape (Killarney);
- Fair Cape (Malmesbury);
- Fair Cape Dairies;

- Lactalis (Bonnievale);
- Lactalis (Kyalami);
- Lactalis (Ladismith);
- Ladismith Cheese;
- Woodlands Dairy (Humansdorp)

The final outcome is awaited.

The way forward for Dairyman learners

Currently there are two categories of learners involved in interventions in the Dairyman suite of qualifications. One such group is the learners who, between 2011 and 2015, formed part of the 'Pilot Study' which was a requirement from QCTO and conducted by SAMPRO (personally by the Project Manager). There are 29 such candidates who have submitted portfolios of evidence to the SETA. These learners will be subjected to an External Integrated Summative Assessment (EISA), similar to current learners in the programme. The feasibility of this policy statement by QCTO is under consideration, as some had left the industry and others have been promoted up the ranks. The willingness of such learners to redo the exam will have to be investigated. Thoughts are also circulating amongst experts that 'Industry Recognition' ought to be awarded to these learners who might not be willing to embark on such stressful ventures again, especially considering the time lapse between their programme and the time frame of registrations and new 'rules' as to assessment by the authorities (the first pilot studies were conducted in 2011 and lasted up to 2015 – pilot studies were compulsory at that time; the portfolios of evidence of those who chose to complete them are currently residing in a store room at the SETA).

The second group is currently busy (and in the finishing stages) with at least six different qualifications of the Dairyman 'family'. All have compiled their portfolios.

Both groups will have their portfolios subjected to what the SETA calls 'Exit Moderation', which will (if the evidence is sufficient) be followed by an invitation to the so-called External Integrated Summative Assessment (EISA). The EISA will be preceded by a preparatory intervention (termed by the new SETA policy as the Qualifying Exam) to be presented to the learners and concluded by a theory assessment (the final assessment model has not been designed, but it would seem that the SETA – who is the Assessment Quality Partner (AQP) – is willing to accept the Internal Practical Assessments and 30 batches of product made (with records in the portfolios) as sufficient evidence for the practical component of the EISA). This still needs to be finalised. Work on the arrangements for both the Qualifying Exam and EISA has not been concluded yet.

The biggest challenge is to arrange for the various preparatory interventions for both groups and align that with the timing of the SETA for the different EISA events. This project will co-operate with the SETA in getting these activities done.

Compiled by Gerhard Venter (with inputs from the Chairperson of the Dairy Chamber of FoodBev SETA and the Chairperson of Milk SA's Advisory Sub-committee on Secondary Industry Skills Development).

Potential export of dairy products to the People's Republic of China

For an extended period of time, government departments are informed of the importance of the export of dairy products and the need to develop protocols in order to meet the import requirements of other countries. A few years ago, the Office of SAMPRO facilitated a visit by a delegation from China to a dairy factory, but at that stage, China was not given priority to the possible import of dairy products by China from South Africa.

On 18 July 2023, the Managing Director of Dairy Standard Agency (Mr Jompie Burger) and the Manager of the Market Access and Customs Duty Project of Milk SA (Mr De Wet Jonker), met with representatives of DALRRD and the main messages from the meeting, are as follows:

- China showed interest to import dairy products from South Africa;
- DALRRD wishes to urgently understand which dairy enterprises are interested in exports to China and to establish which dairy products are relevant, in order to commence with the development of an appropriate dispensation for the export of dairy products to China. In this regard, meetings of BRICS in the immediate future, are important;
- Urgent attention is required to develop a protocol regarding compliance with the import requirement of China;
- The development of the protocol referred to under (c), requires comprehensive work and close interaction between DALRRD and the dairy enterprises which wish to export;
- Amongst others, the protocol referred to under (d), involves a chemical residue monitoring program, in respect of which Dairy Standard Agency (DSA) conducted up to now, meaningful work and in respect of which DSA can make important contributions in the future;
- It is not realistic to implement for the purpose of export, a chemical residue monitoring program in respect of all South African processors and their suppliers of unprocessed milk;
- In light of (f), the idea is that only the processors which wish to export and their suppliers of unprocessed milk, will be defined to participate in, amongst other, the chemical residue monitoring program.

Dr Katarina Tsic from the EU-SADC EPA Support Programme visited South Africa from 27 November to 8 December 2023 to amongst others, assist industry members with the development of a National Residue Control Programme for various commodities.

THE GREENHOUSE GAS DEBATE IN LIVESTOCK CONTINUES

PRELUDE

Methane emissions in particular, and nitrous oxide as potent greenhouse gases (GHG), have been in the political, activist and general public debate for some time. Central in the debate has been livestock ruminants, in particular beef and dairy cattle, since estimates show the global production of these gases from livestock may be upwards of 20% of total. Since methane is a comparatively short-lived polluter in the atmosphere and perceived to have a high global warming potential, it is logical that the focus to reduce emissions should be on this gas, and therefore on beef and dairy cattle where methane is produced by enteric fermentation in the rumen, with some additional emissions also coming from their manure. Therefore, on the global environment protection platforms, supported by anti-animal activism, the call to decrease cattle numbers has increased. In fact, in the EU, several countries have promulgated legislation to reduce cattle numbers by up to 30% by 2030. Nobody questions the necessity of reducing methane emissions, but the question is if the policy to reduce cattle numbers is correct. This review summarizes ways to reduce GHG and endeavour to answer the question whether reduction in cattle numbers is the way to go.

REDUCTION METHODOLOGIES

Methane

Enteric methane production can be reduced by feed composition and processing manipulation, feed additives, increased productivity and genetic means. In feed composition, less methane is produced in the rumen per kg feed with high quality forages and concentrates than with low quality forages with further reductions possible with feed processing.

A number of feed additives has shown potential to reduce methane production, including addition of microbial populations that increase lactate and succinate in rumen as fermentation intermediates, nitrate, 3-Nitrooxypropanol (3-NOP), ionophores

such as monensin, and red seaweed. Short-term experiments have shown decreases of up to 30%, but because of adaptation of the rumen population over time, the observed reduction may not last. Nitrate, although comparatively effective, is reduced to nitrite which could be toxic to the animal, and red seaweed with active compound bromoform results in bromium in the milk as well as iodine from some species. A further limitation is that, for ecologically reasons, red seaweed has limited capacity in application when harvested from the sea and therefore has to be produced on land with cost implications. Overall, decreased methane production by feed additives should not reduce milk production and should coincide with maintained or improved feed efficiency if the methodology is to be accepted at farm level.

Perhaps the lasting long-term solution to methane mitigation is utilising genetic variability. A recent study has shown a difference in lactating Holstein phenotypes in inherent enteric methane production of 20-25% which coincided with increased efficiency. Genetic selection and associated management improvement should also emphasise higher milk yield per cow and less dry cows and non-productive heifers in the herd, as this will result in the same or more milk production with a smaller herd and consequently lower overall methane production.

Nitrous oxide

The relationship between cattle and nitrous oxide is primarily indirect through their feed supply. Nitrous oxide is emitted in comparatively small quantities from cattle manure and mainly following chemical N fertilisation and pesticide application of crops, cover crops and cultivated pastures. It is a dangerous atmospheric polluter with implications to the ozone layer and much higher global warming potential than methane and carbon dioxide, and therefore has to be addressed urgently. The implications are that agricultural practices need to limit N fertilisation and other chemical substance applications. One way is the supply of organic N through cattle manure as substitute for chemical nitrogen fertilisation by following regenerative agricultural practices.

CARBON SEQUESTRATION AND CATTLE NUMBERS

Methane entering the atmosphere is part of the biogenic carbon pathway which results in photosynthesis. Being a short-lived gas in the atmosphere, methane is oxidised after about 10-12 years to carbon dioxide of which the carbon will be built into plant carbohydrates and through the plant roots will enter the soil where carbon may accumulate. If this process is maximised, about 2-3 times more atmospheric carbon can be sequestered than what methane emission reduction can achieve. Herbivores (later mainly cattle), have been an essential part of the biogenic carbon pathway for millennia since grazing stimulates photosynthesis, which implies that effective grazing management to maximise photosynthesis and plant biomass should be exploited in mitigation. To maximise this option, cattle numbers should not be reduced.

The question may be asked why then do we see methane accumulation in the atmosphere. If herbivores (cattle) are the only source of methane, and the numbers stay the same the emission of methane will be in equilibrium with the oxidation to carbon dioxide

which during the timeframe of the biogenic carbon cycle will return to the earth, and no net warming due to methane will result. The problem largely relates to the entering of methane into the atmosphere from fossil fuel origin, peat and methane trapped beneath ice masses in the polar regions (and now being released due to global warming) is 'new' to the atmosphere and results in accumulation because the rate of removal is exceeded.

OTHER IMPLICATIONS OF REDUCING CATTLE NUMBERS

Apart from the implications to carbon sequestration, the decision to reduce the number of cattle must always be taken in consideration of other socio-economic implications, a major one being food security – particularly in poorer countries. Beef and dairy cattle are responsible for a major part of food and sustenance which (i) cannot be replaced by plant food sources, both nutrient and volume required wise, and (ii) animal foods are necessary in many dry countries which do not have the water to irrigate plant crops.

In a study in the US where water, soils and climate are conducive to major increases in plant food production, reduction in cattle numbers to target showed that recommended nutrient levels to support a healthy nation cannot be met. Another consequence is that the targeted reduction will reduce the US overall carbon footprint by no more than 2-3%. Similarly, in SA if cattle numbers are reduced by 25% the mitigation will be of the same order, but the implications to socio-economics, sustenance and food security will be devastating. The implication is that if much larger GHG emitting sectors such as energy and transport do not simultaneously reduce their carbon footprint, the effort in the livestock sector will be fruitless.

BOTTOM LINE

The arguments above indicate that there is no justification in global reduction of cattle, but effective mitigation of methane and nitrous oxide (and of course carbon dioxide) with measures discussed above should be enhanced. This is the responsibility of all sectors of the economy. In addition, the phasing out of fossil energy and being replaced by 'green' energy sources should happen earlier rather than later.

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Impressions from the IDF Standing Committee on Environment (SCENV)

Held in Chicago on 15 October 2023

- A new work item on Solid Waste will be presented in 2024. After several successful Action Team meetings, Dr Colin Ohlhoff (South Africa) developed the idea of a webpage which reflects an infographic of the dairy production and supply chain. This will initially only extend from the processing stage to possibly post-consumer and will include food waste and loss. Case studies from members will be linked to the infographic and this could ultimately serve as a best practice guide for members to identify areas along the chain where organic waste/food waste/losses can be reduced or minimized.

- The Action Team on Ecosystem Services led by Sophie Bertrand (FR), is indirectly participating at the FAO/LEAP TAG on Ecosystem Services that will deliver guidelines on the assessment of Ecosystem Services from livestock. This guideline on measurement of Ecosystem Services requires different indicators for each of the dairy production systems. The first complete draft is expected soon.

- The IDF Carbon Footprint guide was launched in India at the World Dairy Summit of 2022. The next step, namely to create a 'verification model' which will support the IDF guide, was accepted as a New Work Item. The purpose is to develop a model to verify calculations and Carbon footprint tools against the IDF methodology. The Action Team have planned this work to end Autumn 2024.

- The IDF Dairy Sustainability Outlook contains 26 articles and several articles focused on nutrition. The issue is available from Milk SA.

- The initiative of Pathways to Dairy Net Zero Initiative contains four streams:
  - Carbon emission and accounting
  - Reduction of Greenhouse Gases in processing
  - Methane mitigation
  - Animal nutrition.

SCENV Standing Committee participants in Chicago, October 2023

Impressions and highlights

from IDF Dairy Farmers Roundtable Held in Chicago on 15 October 2023

The round table meeting in Chicago, October 15th had approximately 50 enthusiastic participants from all over the world, including from South Africa. Following participant introductions, the agenda included discussions on Labour, Climate Change/Sustainability, and Opportunities and Challenges for New Farms.

Regulations and the speed of change represented the primary concerns. This included a particular concern about the extent to which new regulations were science based, added to the frustration associated with working in the ever-increasing regulatory landscape.

The next significant issue related to consumer perceptions and demands. This topic was discussed thoroughly in the later theme discussions as well.

The third and last area of attention focused on recruitment of the next generation of farmers. The difficulty here was considered to be closely related to both regulatory, landscape and the perception of farming in general; who would volunteer to be among the 1% that feed the 100% if that is not appreciated.