

# Milk Essay

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HERE'S TO  
2023



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# Milk SA's Research Committee Zooming in on Industry Challenges

Research has been high on Milk SA's agenda since its establishment in 2022, as little dairy-specific R&D had been conducted for some time and because this was one of the core pillars for industry growth.

The Committee had the following on its agenda at the October 2022 meeting:

- Evaluation of a report (by Dr Heinz Meissner and Dr Bobbie van der Westhuizen) on breeding objectives.
- Communication of R&D results and other matters to milk producers and the rest of the industry.
- Joining Animal health and Animal Welfare into one sub-project and formalizing the Service Level Agreement with Dr Mark Chimes, the newly appointed manager for this discipline.
- A current project under the management of Asset Research, to determine the carbon and water footprints of milk and plant-based beverages (such as soy "milk") on a nutrient basis.
- Consideration of a proposal from the University of Pretoria on "Immune profiling of the early to latent stages of Bovine infection with *Brucella abortus*: A new opportunity for vaccine and drug development".
- Progress with the project to identify and characterize the fungus related to Sporidesmin Induced Liver Disease, under the leadership of Dr Anthony Davis.
- Water and wastewater management in the dairy industry.
- Consideration of a proposal to find an analytical method to test for psychrotrophs and phosphate addition to milk, where test results could be available fairly quickly.
- Recommendations by the Dairy Standard Agency on the prevention of aflatoxin in unprocessed milk.
- Communication to industry members on the correct handling of Contagious Abortion.

*Dairy R&D  
Committee members  
contemplating  
important matters*



# NEW TECHNOLOGIES TO ADDRESS *BRUCELLA ABORTUS*

New technologies exist to produce vaccines which can be far more effective than the existing live vaccines S19 and RB51 and which will also not be harmful to human beings. A project proposal in this regard was submitted by the University of Pretoria (UP) to Milk SA and the Red Meat Research and Development (RMRD SA). Positive discussions followed with OIE, FAO, DALRRD and

the National Animal Health Forum (NAHF).

Milk SA, the Red Meat Producers' Organisation (RPO) and RMRD SA accepted the project in principle and were hopeful for commencement in the first quarter of 2023. As the project will be rather costly, the three organizations - in liaison with UP - have been finalizing the budget and negotiating funding agreements to put it into effect.

## Milk SA staff visits Van Gaalen Cheese in Skeerpoort

Van Gaalens is a family-run farm based in the agricultural village of Skeerpoort that has been producing Gouda cheese in the traditional way since its inception in 1994.

For their annual year-end function, the Milk SA staff went for a cheese tour at Van Gaalen Kaasmakerij, and Anja explained how cheese was made from milk to the final product. There was also a variety of their lovely cheeses to taste.



*The Milk SA staff with Anja (second from left).*

# World Dairy Situation Report, 2022



**Bertus  
van Heerden**

*The 2022 World Dairy Situation report was published by the International Dairy Federation (IDF) in October 2022. As always, it provides a general survey and overview of the global dairy industry in the previous year. The compilation includes the most relevant and up-to-date information on global production, processing, trade, prices and consumption of milk and dairy products. The complete report is available from IDF.*

Bertus van Heerden (Milk SA Manager: Economics & Markets) compiled a summary report for the South African dairy industry to provide a snapshot of the world dairy situation in respect of 2021. This report is available on the Milk SA website.

Some salient points from Bertus' report are as follows:

- In 2021, global per capita consumption increased by 1.4% to 118.2 kg milk

equivalents, while the world population grew by 75 million people (1.0%) to 7.87 billion.

- Global milk production (all species) grew by 2.1% in 2021, down from the average growth of 2.4% per year. The subdued growth was due to the difficult supply situation in the key exporting regions caused by aggressive increases in energy, animal feed and fertilizer prices.
- The increased costs were a result of worldwide supply chain disruptions and strong economic activity in certain regions that increased demand. Global dairy product output (production) increased strongly for cheese (+2.9%) and whey powder (+2.8%).
- The output for whole milk powder (WMP) (+1.3%) and butter (+0.9%) were at lower levels, while skimmed milk powder (SMP) fell by 1.5% due to processors favouring cheese and WMP.
- Global liquid milk production decreased by 0.4% in 2021. International prices for SMP, WMP and cheese ended 2021 at the highest levels since 2014.

# Update on the Agricultural and Agro-Processing Masterplan (AAMP)

*A pre-workshop meeting of agricultural and agro-processing business partners (“business”) was held in September 2022, in preparation for a workshop with the Director-General on the way forward.*

Consensus was reached about outstanding matters and how to address them in the envisaged meeting with the Director-General. These issues concerned – amongst others – finances required by emerging business from commodity organizations; a host of issues put forward by labour such as housing and evictions; and the principle (agreed by business) that the work of the agro-processing cluster should lean towards primary production and not the retail environment.

Mr Theo Boshoff, Mr Christo van der Rheede, Dr Ndumiso Mazibuko, Ms Leona Archery and Mr De Wet Boshoff were nominated by business to attend sessions to be held with the Director-General in the above regard, which will be the commencement of phase two of AAMP. The National Agricultural Marketing Council will facilitate the engagements and a date was being awaited.

The pre-workshop meeting was a hybrid meeting with only a few participants present in person. Mr Christo van der Rheede and Mr Theo Boshoff chaired the meeting.





# Year-on-year changes in inflation for food and non-alcoholic beverages

Inflation for Food and Non-Alcoholic beverages reached 12% in July 2022 (year-on-year), while fuel registered a 30,1% year-on-year.

Regarding food, inflationary effects are still driven by agricultural commodities such as maize, wheat, soybeans, and sunflower oil. Local maize prices breached R5 000 per ton in the third quarter of 2022 as the ZAR weakened to above R18.00 to the USD and global prices continued their upward trajectory.

BFAP's view is that food inflation will remain high over the next three months as the full effects of persistently increasing commodity prices and weaker exchange rates filter through to retail markets. "We expect that food inflation could peak in the first quarter of 2023, after which the higher base effects apparent from March 2022 will result in smaller inflationary effects during the rest of 2023. Two variables that should be closely monitored to gauge inflation rates during 2023 are global maize prices and the ZAR/USD exchange rate. In terms of the former, a reduction in prices based on a favourable Southern hemisphere crop could go a long way in curbing Bread and Cereal inflation

during the first half of 2023, whilst this could also spill over into meat prices by the second half of the year. In terms of the ZAR/USD exchange rate, analysts note that the ZAR is undervalued and could strengthen to levels of R16.50 in the first quarter of 2023."

	Year-on-year % change October 2022
Oils and fats	25,7
Bread and cereals	19,5
Meat	10,5
Milk, cheese and eggs	10,5
Fish	10,3
Sugar and sugar-rich foods	9,8
Non-alcoholic beverages	9,1
Vegetables	3,9

BFAP also measures the cost of basic healthy eating for low-income households in the South African context by way of the Thrifty Healthy Food Basket (THFB). For October 2022, the information was as follows:

- In October 2022, the cost of a THFB was R3 298, which represents a change of:
  - +R10 / +0,3% month-on-month; and
  - +R367 / +12,5% year-on-year.

The full report can be viewed on BFAP's website.

Source: Bureau for Food and Agricultural Policy (BFAP)

# Daily consumption of dairy products encouraged by researchers



*In recent years, nutrition science has shifted its focus from nutrients to whole foods and dietary guidelines have also moved away from nutrient-based approaches to advocate food-based dietary patterns. The most important discovery is that the health effects of nutrients are modified by the food matrix and the carbohydrate content of the diet.*

The food matrix concept is that nutritional and health effects of a food are a result of both a food's structure and its nutrient composition, and how these interact with each other. In the case of dairy products, the dairy matrix has a positive effect on overall health. Although dairy foods contain saturated fatty acids, the intake of dairy foods is not linked to cardiovascular disease and has sometimes shown to even reduce cardiovascular disease.

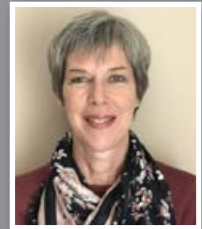
During November 2022, Milk SA's Consumer Education Project hosted a webinar on the "dairy matrix" with the following speakers:

- Professor Arne Astrup MD, DMSc, Center for Healthy Weight, Novo Nordisk Foundation, Denmark
- Professor Renee Blaauw Ph.D. (Nutritional Sciences Professor: Therapeutic Nutrition) Division of Human Nutrition, Stellenbosch University, South Africa

Prof Astrup said health professionals still recommended that people limit their saturated fat intake to a minimum, but that this was outdated advice. "Within the next five years, the medical community should have new dietary guidelines that will move away from nutrition-based recommendations towards more whole food-based recommendations".



Prof. Arne Astrup



Prof. Renee Blaauw

He emphasized that the dairy matrix was highly complex, especially when it came to fermented products. "During fermentation, the bacteria that form through the fermentation of some of the sugars and other ingredients produce a very interesting and biologically active product, which carries its own benefits. There truly is something magical in whole dairy", Astrup added.

Prof Renée Blaauw said studies indicated that fermented dairy products could lower the risk of cardiovascular disease." According to the Department of Health, % of South Africa's non-communicable diseases are heart-related. Various studies have not only shown that dairy is not harmful to the cardiovascular system, but should actually be consumed daily", she added.

## Changes in the quantities of retail sales of specific dairy products and specific other food products

Product	Sales in the month of Sept 2022 versus the sales in the month of Sept 2021		Sales in the 6 months from Apr 2022 to Sept 2022 versus the sales in the 6 months from Apr 2021 to Sept 2021		Sales in the 12 months from Oct 2021 to Sept 2022 versus the sales in the 12 months from Oct 2020 to Sept 2021	
	%	Ranking	%	Ranking	%	Ranking
Rice	12.0	1	14.4	1	15.3	1
Bread	6.2	2	8.1	2	8.0	2
Maize Meal	1.7	4	4.5	3	6.3	3
Prepackaged cheese	2.1	3	0.6	6	1.5	4
Maas	-1.8	7	1.3	5	0.6	5
UT milk	0.1	5	-1.1	8	0.2	6
Margarine	-3.5	8	1.8	4	-0.1	7
Instant Cereals	-5.3	11	-1.4	9	-0.4	8
Short Life Juice	-5.9	12	-0.8	7	-1.2	9
Butter	-4.9	10	-3.7	14	-1.7	10
Tea	-8.5	15	-2.8	11	-1.9	11
Cream cheese	-9.0	16	-3.2	13	-2.8	12
Coffee	-14.4	17	-5.4	15	-3.2	13
Flavoured milk	-1.2	6	-2.7	10	-3.7	14
Yoghurt	-6.1	13	-2.9	12	-4.2	15
Cream	-6.9	14	-6.2	16	-5.9	16
Fresh Milk	-3.9	9	-7.6	17	-8.0	17

Table compiled by SAMPRO for Milk SA



## Increases and decreases in the average retail prices of specific dairy products and specific other food products

Product	September 2022 versus August 2022 (1 Month Ago)		September 2022 versus March 2022 (6 Months Ago)		September 2022 versus September 2021 (12 Months Ago)	
	%	Ranking	%	Ranking	%	Ranking
Coffee	3.8	1	8.3	8	26.0	1
Maize Meal	0.5	11	18.5	1	21.6	2
Bread	0.7	8	14.3	3	20.9	3
Instant Cereals	0.9	7	5.7	14	13.9	4
Short Life Juice	2.4	2	16.9	2	11.7	5
Margarine	-0.4	14	9.2	6	11.6	6
Maas	1.7	3	8.9	7	10.0	7
UH milk	1.0	6	11.3	4	9.3	8
Flavoured milk	1.7	4	10.7	5	8.9	9
Cream	0.6	10	6.6	12	8.9	10
Yoghurt	1.0	5	7.5	10	8.6	11
Cream cheese	0.7	9	6.6	13	8.4	12
Butter	-2.6	17	7.6	9	7.4	13
Pre-packaged cheese	-2.0	15	7.5	11	5.7	14
Tea	-2.3	16	1.9	17	5.2	15
Fresh Milk	-0.0	12	5.1	15	5.1	16
Rice	-0.3	13	3.3	16	-1.3	17

Table compiled by SAMPRO for Milk SA

# FOOD FOR THOUGHT – FROM IDF'S 7<sup>TH</sup> SYMPOSIUM ON SCIENCE AND TECHNOLOGY OF FERMENTED MILK

*On November 29 and 30, 2022, the International Dairy Federation hosted its 7th Symposium on Science and Technology of Fermented Milk online. The event had over 250 registrants from 40 different countries around the world.*

## **The role of yoghurt and fermented milk on human health**

One of the key topics addressed during the congress was the positive impact of fermented dairy, particularly yoghurts, on human nutrition and health. "Eating yoghurt is associated with better health. A causal relationship exists between lactose tolerance and eating yoghurt, and consistent associations exist between fermented milk consumption and lower risk of certain diseases", affirmed Dennis Savaiano, Virginia C. Meredith Professor of Nutrition at Purdue University.

## **4th IDF Symposium on Microstructure of Dairy Products**

The 4th IDF Symposium on Microstructure of Dairy Products was part of the programme during session 3, which focused on the latest research on the microstructure of fermented milks. "The microstructure of fermented milk is the key for product texture, rheology and sensory properties. Microbial exopolysaccharides as an additional factor of influence", explained Dr Doris Jaros, Senior researcher and private lecturer at Technische Universitaet in Dresden, Germany.

## **Exploration of novel ingredients and processes for fermented dairy**

The last session of the symposium was focused on the exploration of novel ingredients and processes for fermented dairy. "We are harnessing the power and diversity of microbes to improve our food experience and to create more natural 'clean-label' products for the more health-conscious consumer", said IDF expert and Member of the Standing Committee of Microbiological Hygiene, Dr Olivia McAuliffe. Dr McAuliffe is Principal Research Officer at the Teagasc Food Research Centre in Cork, Ireland, where she leads a research programme on Cultures, Fermentation and Biotransformation.

This session also included the participation of Dr Kommineni, Sr. Research and Innovation Manager for Yoghurt & Fermented Dairy at Danone North America. "The growing consumer desire for high protein – low sugar foods are an excellent opportunity for the dairy industry to develop high protein fermented foods such as yoghurts", he explained. "However, developing these products requires novel processing technologies and functional dairy ingredients to overcome taste, texture, and processability challenges with high protein", he added.





November 2022

## Executive Summary of

## IDF Country Update – November 2022

Scientific excellence  
Industry applicability  
Strategic networking  
Global influence

### Series summary

Members of the IDF Standing Committee on Dairy Policy and Economics and the Standing Committee on Marketing updated market results and conditions in 22 countries during the previous six months<sup>1</sup>. Spanning the globe, these countries represent over 60% of the world's milk production and the vast majority of its world trade in dairy products.

Now in the third year since the beginning of the Covid-19 pandemic, the dairy industry around the world is showing signs of a general transitioning towards a new post-pandemic reality. Factors unrelated to the pandemic also impact milk production and consumer choice.

### Milk Production

On a country basis, the median growth rate was a negative 1.2%, but within a wide range of -7% to +7%. Only 6 countries report increasing production; of these, only China and Russia are large milk-producing countries. This is in contrast to the previous year when growth was slower than the historical

trend but still positive, especially in the robust milk-producing areas of North America, New Zealand and Ireland. This year, Australia and New Zealand reported the largest production declines and the US, Canada and Ireland were only barely above the median but still negative.

### Farm Gate Milk Prices

In contrast to last year, milk prices have been very high, but no small part of this is due to the fact that production costs have been very high. Of chief concern is the dramatic increase in grain and energy prices primarily caused by the conflict in Ukraine. In many parts of the world, harsh weather patterns, exacerbated by climate change, have added stress to the production of feed crops and/or the health of dairy animals. This has ranged from drought to flood as well as extreme temperatures.

### Dairy Product Markets

A common impact of the early pandemic economy was reductions in meals eaten outside the home, whether by government

1. Australia, Canada, Chile, China, Denmark, France, Germany, Iceland, India, Ireland, Japan, Republic of Korea, Netherlands, New Zealand, Norway, Poland, Russia, South Africa, Sweden, Switzerland, United Kingdom, United States. In 2021, 18 countries participated, including 15 of those participating this year.

restrictions or choice. In 2022, eating patterns began to drift back but consumers still show some reluctance to move fully back to pre-pandemic dining.

Across all dairy products, unusually large increases in retail prices combined with mixed volume often netted higher sales. Sales and consumption patterns vary by product and country. Chile, China, India, New Zealand, Poland and Iceland report increases in consumption that are at or above trend growth. In contrast, year over year declines were observed in Canada, France, South Africa, Sweden, Korea, and Switzerland. Thus, there is no particular pattern explained by geographic location, demographic profile, or economic development.

Cheese, powders, and ice creams enjoyed more increases by country than decreases. The opposite was true for yoghurt and milk. Butter and creams were balanced. In some cases, such as beverage milk, this reflects a resumption of a longer-term trend. In other cases, such as cheese, butter and yoghurt, it reflects the switching, at least to some degree, to more consumption at restaurants, schools, and so on.

Compared to 2021, a more uniformly buoyant tone was evident in every country's sales report. Although it is too early to judge a long-lasting effect, there is a sense that many consumers "rediscovered" dairy products when consumption shifted much more to the home and that this may have a longer-term benefit to dairy consumption.

Global trade in dairy products grew in almost all countries despite ongoing challenges to supply chains. It was not unusual for countries to report increases in both their dairy imports and exports, meaning the various countries enjoyed advantages in different products.

### **Dairy Product Prices**

Last year, many countries reported some trepidation about the prospect of higher dairy product prices and whether that would deter consumption. The increase in retail prices has exceeded expectations, but it has been in the context of higher levels of all consumer prices, spurred especially by energy and food. In this environment, dairy is not singularly affected by inflation, but it is expected that higher prices and reduced disposable income will have consumption effects. This would include decreases in higher-valued dairy products but also increases in more value-priced basic dairy foods.

### **Marketing Dairy Products**

Dairy product marketing efforts continue to promote familiar themes, such as the health benefits of dairy products and a balanced diet. Indeed, health and well-being remain the most common marketing theme across countries, with some pointing particularly towards School Milk, child nutrition, or other demographic-related niches. Reinforcing dairy foods as culinary enjoyment and cultural tradition is another common theme. More recent marketing themes related to sustainability, climate and trustworthiness are growing in emphasis.



## Market Conditions and Prospects

To one degree or another, countries are transitioning away from a pandemic mentality and behaviour to something that feels more normal. This has broad consequences for production, marketing and consumption. With the added challenge of inflation levels that are troubling and the prospects for recession, the over-arching tone is one of uncertainty, with a shading of optimism around the pandemic but less so on economic conditions.

## Environment

Broad concerns about environmental issues are being met more and more with actions. Climate change is a fundamental issue, but the list also includes ongoing care about water and soil quality, the use of plastics and recycling, and the like. Many countries report national or industry initiatives to address environmental concerns, ranging from increased regulations and restrictions to positive actions the dairy sector is taking to address high-level concerns.

## Nutrition and Health

Consumer attitudes span a complex range, including those who enjoy dairy foods and consider them to be very much a part of a healthy diet to others who advocate for a more plant-based diet for health and/or climate reasons. Various countries report public efforts that tend to draw attention to real or perceived negatives. There is a growing movement to provide simple scoring systems, typically displayed on the front of food packages, that provide simple but arguably overly simplified indications to consumers about the

nutritional and/or environment-friendly characteristics of foods. Public officials are learning that these designations are not as clear cut as they are sometimes portrayed but this by itself does not deter the desire for simple consumer indicators. The dairy sector emphasizes that foods must be evaluated in the context of a total diet and from the broad perspective of their overall nutrition profile.

## Dairy Farming Systems

Animal care and handling continue to resonate with many consumers, while also being very consistent with farmers' personal management goals. All countries report activity in this area, ranging from issues of particular importance locally, such as a national standard of care, to broader initiatives around education and industry-based standards.

## Summary

Short and long-term challenges seem to be coming with increasing frequency, much like climate change related weather patterns. While we may be transitioning from pandemic effects that provide some hope towards normal, recent economic events are creating great concerns about affordability that impact both producers and consumers. Longer-term discussions about diet and health, production and environmental outcomes, local foods and affordability, and so on continue to shape what is produced and how. At one level, the stage seems to be set to re-invest in milk production, but with supply chains not yet fully recovered from pandemic disruption and darkening economic clouds that raise investment costs and reduce household income, the current situation and future outlook are tenuously uncertain.







By Matthew Kinghorn

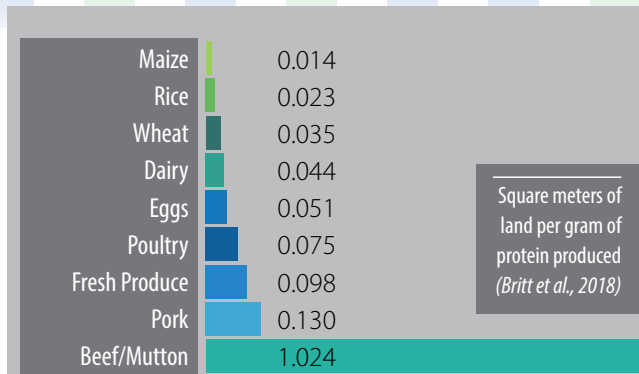
## The nutritional challenge demands the harnessing of knowledge and technology to develop better dairy cows and more productive and sustainable dairy farms

*Matthew Kinghorn attended the 12th World Congress on Genetics Applied to Livestock Production (WCGALP) during July 2022 in Rotterdam, where he presented a paper as part of his Master's degree in Animal Science, majoring in animal breeding at the University of the Free State. He submitted this article to Milk SA, which financially supported his participation in the congress.*

The future demand for dairy products and technologies is expected to grow due to an increased per capita income worldwide, and due to the fact that dairy products effectively meet the nutritional requirements of humans from the standpoint that production of milk uses less land to produce 1g of readily available protein compared to poultry, pork or beef production (Britt et al., 2018).

With the world's population expected to grow from approximately 7 to 10 billion by 2067, increased and sustainable production of dairy products is of paramount importance. An increased population size likely means increased average consumption of dairy products. According to Britt et al. (2018) the current global average consumption of dairy products (on a fresh milk equivalent) is 87kg per person and based on extrapolated






figures, this is expected to increase to 119kg per person by 2067. In order to meet such a demand, each cow will have to produce more milk annually and do so in a sustainable and environmentally friendly way. The effects of decades of increasing global temperatures can be seen in warmer year-round temperatures, greater variation in precipitation and longer growing seasons towards the polar latitudes. Future climates will likely experience longer periods of drought and excess rainfall and more frequent severe weather conditions (Britt et al., 2018).

To meet an increasing demand and to mitigate the effects of climate change, dairy cows will need to be more robust (resilient) and have improved health and longevity. This will be driven primarily by genomic selection schemes that reduce generation interval by utilizing advanced reproductive technologies such as In Vitro Fertilisation (IVF). Animal welfare will continue to receive increased attention and automated technologies and sensors will help to improve sustainability of production. Future genetic improvement research will likely be focused on genotype by environment interactions, health, welfare, feed efficiency and methane excretion.

## Genotype by Environment Interaction

When speaking about genotype by environment (G x E), a phrase often used is phenotypic plasticity. This refers to the variation in phenotype which results from complex relationships between a genotype and its environment. A genotype that shows high phenotypic variation across environments is termed “phenotypically plastic” while the one that shows low variation is termed “robust” or “stable” (Kebede et al., 2022).

A genotype by environment interaction has been shown to exist in South African Holstein dairy cattle in previous studies by Ducrocq et al. (unpublished data) and van Niekerk et al. (2019, 2021). In the latter two studies clear differences in genetic parameters between herds on total mixed ration and pasture production systems were shown, specifically for persistency of production between the two production systems where genetic correlations were below 0.64. This is indicative that sires’ progeny will not necessarily perform the same/ similarly across these two environments.



Ducrocq et al., 2015 showed that production systems used by herds are largely dependent on the rainfall (long term annual average) of the herd's location (nearest town) in SA. They also showed that rainfall had the largest effect on the genetic variability of milk production traits using a reaction norm model. Further investigation by van Niekerk et al. (2022) (unpublished data) found that the genetic background responsible for average production levels and persistency over lactations were not consistent over different rainfall areas.

### Heat Stress

High ambient temperature combined with high relative humidity negatively affects both productive and reproductive performance of dairy cattle. Cattle experience heat from both environmental factors including radiation, conduction, and convection, as well as through metabolic processes such as exercise, growth, lactation, gestation and feeding (McWhorter et al., 2022). One possible attempt to mitigate the effects of climate change is to select heat-tolerant dairy cattle. In a study done by Ekine-Dzivenu et al. (2022) on small holder sub-Saharan dairy cattle, it was found that there was an antagonistic relationship between milk yield and tolerance for heat stress, which suggests that selection for increased milk yield whilst disregarding heat tolerance will result in deteriorating heat tolerance. However, moderate heritabilities for

heat tolerance suggest that genetic progress can be made for this trait. Similar conclusions were made by Finocchiaro et al. (2022).

### Feed Efficiency and Methane Emissions

Feed is a major cost in dairy production; hence increased feed efficiency is key to achieving sustainable improvements in herd profitability. Better efficiency of feed utilization is also associated with a reduction of major greenhouse gas emissions and therefore might contribute towards mitigating climate change. Thus, genetic improvement of feed efficiency could be a solution to increasing environmental sustainability and herd profitability of the dairy industry. Feed Intake tests, although valuable, can be quite expensive. Cavani et al. (2022) investigated the genetic parameters of feeding behavior and the genetic correlations with milk energy, metabolic body weight and change in body weight as potential indicators for feed efficiency. They concluded that cows that eat at a slower rate tended to be more feed efficient and this could potentially be used as an indicator; however further research is required to confirm these findings.

With many governments setting guidelines and targets to reduce greenhouse gas emissions across sectors, it is becoming increasingly important to research different methods for reducing greenhouse gas emissions. One such method is the use of rumen



microbes to predict greenhouse gas emissions. Tiezzi et al. (2022) investigated genetic parameters for growth, feed intake and greenhouse gas emissions in Holstein-Friesian bulls and found high heritability estimates for growth traits and moderate to high estimates for emission and feed intake traits. Thus, selection for reduced emissions appears possible and reduction of methane will likely reduce carbon dioxide emissions due to the high correlation between them. Feed intake could serve as indicator traits for emission traits.

## Conclusion

The world faces a challenge in feeding its expanding population during the next 50 years, and it is forecast that dairying can meet this challenge by exploiting knowledge and technology to develop better dairy cows and more productive and sustainable dairy farms. Discoveries and application of new practices such as genomics and continued research into genotype by environment interactions, heat tolerance, feed efficiency and methane excretion will be key to increasing production in a sustainable way and remaining competitive in the global market.



# Top producers awarded



Johannes Loubser from Fair Cape Dairies in Durbanville who farms with 1283 cows, won the ARC Special award for Innovative Development by a dairy producer. The farm uses a 560 kilowatt solar energy plant which enables them

to produce milk off the grid as well as process and cold-room store it before going to the market. "This award goes to our labourers. We are fortunate to have a top management team on our farm and this goes to them" said Johannes.

Nompi Zim, daughter of the late Jan Zim, won the ARC national small-scale Master Dairyman of the year award, which went to this enterprise for the fourth time in a row. Nompi said that her farming knowledge and good relationship with relevant stakeholders such as the ARC, the Free State Department of Agriculture and her milk buyer have contributed to the dairy's success.



*Acknowledgement:*  
<https://www.foodformzansi.co.za>



**Dr Heinz Meissner**  
**R&D Programme Manager,**  
**Milk SA**

## Research & Development projects in progress

Here are the ongoing projects in 2023, which will receive coverage in the Milk Essay as allowed contractually and in terms of achievements to date:

- Integrated control of Faciolirosis – UKZN (Matthew van Wyngaard)
- Probiotic yoghurt to control candidiasis and listeriosis – UP (Elna Buys)
- Strategies to reduce N excretion and emissions on pastures – US (Emiliano Raffrenato)
- Buffer zones and wetland construction on dairy farms – INR and Confluent (Ian Bredin & Jackie Dabrowsky)
- Cost effective biological waste water treatment on dairy farms – INR and DUT (Theolin Naidoo & Sheena Kumari)
- Seasonal effect on trace minerals in EC pastures – Chemuniqu (Elizabeth Kuhn)
- Precision recording of BCS and lameness in cows – UP (Este van Marle-Köster)

- Assessment of cow welfare traits in SA Holsteins – Chemuniqu (Robyn Scheepers)
- Enterobacteriaceae, coliforms and *E.coli* in milk to update R1555 – DSA (Chané Pretorius)
- Impact of GAP interventions on the dairy industry – DSA (Tania Blignaut)
- Model-based estimation of the environmental footprint of milk and milk analogues – Asset Research (Enrike Maree)
- Model-based estimation of carbon sequestration to determine net carbon emissions – Asset Research (Riana Reinecke)
- NIR to detect mastitis bacteria species in milk - UKZN (Mark Laing)
- Diagnosis of sporidesmin toxicity (Facial eczema) in the EC – Humansdorp Veterinary Clinic (Anthony Davis)

Dr Heinz Meissner is the R&D Programme Manager of Milk SA, who ensures optimal outcomes for the projects through expert advice, liaison, facilitation and harmonization of intellectual and other resources.





# Industrial water use and wastewater management to be investigated

*The Water Research Commission (WRC) has contracted the University of Cape Town (UCT), to investigate industrial water use and wastewater management. In a nutshell, the investigation aims to understand the industrial dairy processing steps; to determine water consumption and the generation of wastewater; to evaluate the management processes in the aforementioned regard; and to formulate recommendations.*

The Milk SA Dairy R&D Committee decided that UCT should consult with the organized dairy industry (involved in the processing and manufacturing of dairy products) regarding the work and the questionnaire for the study.

On 26 October 2022, the Office of the SA Milk Processors' Organisation held a meeting

with the producers of processed milk and the manufacturers of other dairy products, who are members of SAMPRO. The purpose of the meeting was to brief the members on the above study, on the objectives of the study and what it aims to achieve.

A dairy industry representative team has been established to interact with the research team for the study. The team includes the Manager of Milk SA's R&D Programme (Dr Heinz Meissner), the Manager of Milk SA's Environment Sub-Project (Dr Colin Ohlhoff), SAMPRO's Senior Economist (Dr Ndumiso Mazibuko), Mr Gert Barnard (Lancewood Cheese) and Mr Ronald McCabe (Dairy Group). This team will also be at liberty to consult with the Managing Director of the Dairy Standard Agency (Mr Jompie Burger), the CEO of SAMPRO and technical experts.



# Recommendations for control of Sporidesmin Toxicity (Facial Eczema) in South Africa

Dr A.J. Davis, Milk SA Facial Eczema Programme and  
Dr Heinz Meissner, Milk SA Research & Development Programme Manager

The guiding principle to managing facial eczema in dairy cattle is to know when toxic levels of sporidesmin are expected to be present in pasture and to intervene timeously. Sporidesmin is produced after sporulation of the fungus *Pseudopithomyces chartarum* and sporulation occurs under specific, measurable weather conditions. Reduce exposure to the toxin by strategic administration of Zinc Oxide to the ration.

1. Monitor weather patterns – Light rain followed by three days of 12 °C minimum grass temperature and 100% relative humidity are conditions conducive to spore formation.
2. Do regional spore counts on sentinel farms. Alert farmers when counts reach 20 000 spores/gram of pasture or if there are sequential weekly counts of less than 20 000 but more than 10 000 spores per gram.
3. Farmers should submit pasture samples for spore counts on their own farms and on specific camps to confirm when counts increase on their own farms.
4. Supplementation of Zinc oxide (ZnO) in the diet three weeks before pastures become toxic is the only prophylactic treatment known to be effective against sporidesmin toxicity (*Reference: "The protective effect of zinc has been found to be related to its ability to inhibit the generation of a superoxide radical by the cyclic reduction/oxidation of sporidesmin" (Munday 1984) "Effective control of FE using zinc requires regular zinc supplementation (usually daily) before pasture becomes toxic" (Smith & Embling 1999).*)
5. Commence with ZnO supplementation in feed at 20mg/kg Elemental Zn (12-14g ZnO per 500kg cow) when spore counts start increasing as in (2). **Reference:** quoted from Dairy Australia November 2011, updated 2013: *"The desired dietary intake of elemental zinc required when 'prevention dosing' to maintain protective blood serum zinc levels (between 20-35 µmol/L) is 20 mg/kg liveweight/ day. As previously discussed, zinc administration should commence 2-3 weeks before pastures become toxic."* (Dairy Australia Facial Eczema Working Group 2013).

6. Monitor Zn concentrations in serum from 10 animals at various stages of production. Bleed these same 10 animals monthly from commencement of zinc supplementation until spore counts reduce.
7. Adjust inclusion rates of ZnO based on the serum zinc concentrations.
8. No mycotoxin binders are known to work against sporidesmin.
9. Mycotoxin binders can be included in the diet at rates shown to be effective against other hepatotoxic mycotoxins (e.g. aflatoxin and fumonosins) where these occur or are expected.
10. Organic forms of zinc are ineffective at reducing sporidesmin toxicity (De Frain et al. 2010).
11. Ensure an optimal level of antioxidant protection in the ration. Organic selenium is useful. Free copper will potentially catalyze the reaction and **aggravate** sporidesmin toxicity (Dawson & Laven, 2007: Failure of zinc supplementation to prevent severe facial eczema in cattle fed excess copper).

### Comment:

Work with your nutritionist to ensure that the ZnO supplemented is as close to the recommended dosage as possible. This is difficult when cows are fed according to their stage of production and there are therefore large differences in amounts being fed to different groups. Consider mixing a mineral ration which will standardize the amount given. It is essential to strategize a practical approach. Useful, practical guidelines for Zn inclusion in dairy rations are described in a publication by Dairy Australia, 2013 (Follow the hyperlink to this PDF in the reference section).



### References:

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# Six characteristics Dairy Farms in the future will have in common

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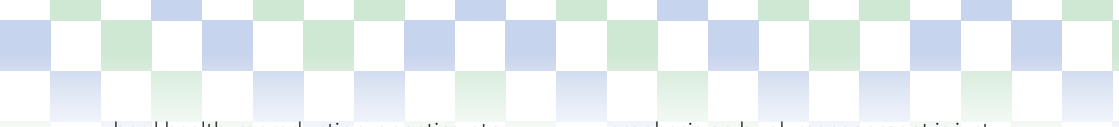
Dairies around the world have the same goal: produce milk to sell in the market and do so at a profit. In most cases, being profitable in the dairy business means operating with a 2-5% margin when times are good. This makes farming a challenge, and in the future, only the most efficient will survive.

Successful farms in the future will have these six things in common:

- **Breed for health and longevity.** It takes an average of 1.5 lactations for a dairy animal to pay off her rearing costs and generate profit for the business. Mastitis can affect all aspects of the cows' health and is one of the most common reasons that cows leave the herd. Elevated Somatic Cell Count is correlated to a decline in both reproduction and milk production. The most economically successful farms focus on genetic traits that correlate to health, mastitis resistance and efficient reproduction, creating healthy cows that spend more time in production, generating more lifetime profitability.
- **Consultants visit the dairy regularly.** Worthwhile consultants serve as an objective set of eyes. Consultants rarely tell a manager anything they don't already know; rather they point out the abnormal that has become normal and develop a workable solution. Successful dairies seek support from trusted advisors with varying expertise in nutrition,







herd health, reproduction, genetics, etc. Be aware that too many people advising on one area can slow progress due to conflict and differing opinions. Align with a consultant who is trustworthy and offers relevant advice. Ultimately, the goal is to find a consultant capable of teaching and training dairy staff.

- **Clear, written protocols.** Great dairies have written protocols for every aspect of the farm. Protocols are created by farm management and the consultant responsible for the specific area the protocol pertains to. The best protocols include pictures or diagrams and must be posted in a highly visible area. Clearly communicated protocols make staff aware of what is expected on the job, promoting team accountability and consistency in performing daily tasks.
- **Training.** Protocols are useless unless the staff is trained to work within the protocol. Great dairies realize that untrained employees are a liability as they interact with the profit units (cows) every day. Successful dairies have a comprehensive training program for all employees who interact with the cows. The best investment a dairy farm can make is in training its people.
- **Nutrition.** We have genetically selected for dairy cows capable of producing 50 plus litres of milk per day, a volume far beyond what a calf requires. Dairy cows are being asked to give unprecedented volumes of milk, stay healthy, and become pregnant again quickly. Great dairies are obsessed with nutrition at every stage of life, age, and lactation. Feed ingredient quality is paramount. The best farms monitor quality, rejecting feeds that do not meet strict quality specifications. The

emphasis on bunk management is just as important. Employees responsible for feeding are trained and monitored to ensure each feeding includes the correct type and volume of ingredients and that mixing and delivery times are adhered to. The goal is for every cow to have a consistent mouthful of feed every time she goes to the bunk. Dairies that address nutrition minimize health problems and maximize fertility, reducing or eliminating antibiotic and hormone use in the milking herd. Great heat expression and fantastic fertility while producing 45 litres per cow per day are possible when feeding the right nutrients in the right quantities in the right way.

- **Cow Comfort.** The greatest common denominator for successful dairies is their focus on basic animal husbandry. The best dairies provide their cows with a clean, comfortable, well-ventilated environment. Water troughs are cleaned weekly; feed alleys are cleaned regularly; beds are groomed daily and filled twice per week. The cows in these environments are always clean, regardless of season. Stocking density in the close-up and fresh pen never surpasses 85% and first lactation cows are never housed with older cows until at least the end of the first lactation. Remember, “Clean, comfortable, well-fed cows are happy, healthy cows that give a lot of milk and get pregnant.”

The greatest difference between a world-class dairy and the average dairy is not fancy buildings, expensive equipment, or top-of-the-list genetics. The difference is in following the six principles above to maximize genetic expression from the cows in their herd.



# CHANGES ON THE MILK SA BOARD OF DIRECTORS

## Resignations

**Colin Wellbeloved**, who was appointed to the Milk SA Board on 1 May 2018 and who was also Vice-Chairman of the Board for the past two years, has stepped down as Milk SA director and MPO Chairman. "I thoroughly enjoyed my years on the Board of Milk SA and my life experience is much richer for it", Colin said. The CEO said Colin's resignation was truly regretted, especially because of his wealth of experience and understanding of the dairy industry and organized dairy industry; his excellent communication skills and approachability; and his positive outlook on life.



MPO nominee, **Porchia Carstens**, served on the Milk SA Board since 22 January 2015. The first female director of Milk SA, Porchia will be remembered for her passion for effective communication. She was also a member of Milk SA's Consumer Education Advisory Committee.

## New appointments



**Luke Gibbs**, left, and **Neels Neethling**, right, were nominated to serve on the Milk SA Board for the next term of two years. Luke is also the new Chairman of MPO.



# Chairman's Address

to the Members  
of the  
General Meeting  
of November 2022



*Dr Bonile Jack-Pama*

*Milk SA held its General Meeting of Members on 30 November 2022 at which occasion the Chairman, Dr Bonile Jack-Pama, delivered the following address:*

COVID and the war in Ukraine have changed the whole world immensely. Locally, we are also facing a myriad of set-backs, including –

- Foot-and-mouth disease;
- Failure of government on almost every front;
- A weak rand;
- Poverty and unemployment;
- A shrinking tax base;

The effect of all this is devastating for both business and the consumer and for many, it has become a struggle and a relentless competition for survival. Producers and the rest of the value chain bear the brunt of skyrocketing input costs such as fertilizer, fuel, feed and energy costs amid a weak economy. It is tragic to see many a business that was built up from scratch, succumbing to the pressure. Surviving businesses respond to the changing environment by constantly revising their growth strategies and by continued innovation. And, the resilience of those dairy entrepreneurs is astonishing and praiseworthy.

Milk SA is keeping pace with the demanding

macro and micro environment which is not only complex, but also hostile. While dairy entrepreneurs are competing with each other, dairy products are also increasingly competing in the market with other products and services.

Therefore, we as Milk SA must always be on the front foot with dairy regulations and standards, trade protocols, consumer trends, reliable and usable information, practical research, etc., thereby working in harmony and in support of the SA dairy industry. We have done so for 20 years already in conjunction with MPO, SAMPRO, DSA and SANCIDF; their intellectual capital and love for the dairy industry.

I praise every individual for his / her contribution towards the achievements of Milk SA and the successes of the dairy industry. I also encourage everyone to stand tall and firm together through the storms and to remember that this is a noble industry with a noble cause.

# CEO's Report

at the  
General Meeting of  
November 2022



*Delivering his report at the General Meeting of Members in November, the CEO, Nico Fouché, said it was a pity that every time the bar was raised, more role-players exited the industry, which was also a world-wide phenomenon.*

He said that while production of unprocessed milk had increased by 7,3% over the seven years from January 2015 to January 2022:

- 850 producers of raw milk had left (-46%);
- 24 processors had left (-15%); and
- 43 PDs had left (-39%)

He mentioned that in 2016, dairy entrepreneurs and organized labour had sought relief through NEDLAC, from which exercise it appeared that Government's failure was the greatest limiting factor by far, for fair competition. This was echoed by the Agricultural and Agro-processing Master Plan report.

Milk SA was monitoring the external environment constantly - mainly through its projects - and its agility to respond and influence the relevant public and other institutions, were some of the critical functions of an industry body like Milk SA.

The CEO said that Milk SA could not negotiate better product prices or prevent competitor products from entering the markets, but as an industry organization, Milk SA was:

- Facilitating better product quality and safety;

- Producing reliable industry information;
- Influencing consumer behaviour;
- Advising Government on trade protocols;
- Addressing industry challenges through research;
- Assisting existing black dairy entrepreneurs on their journey to commercialization;
- Promoting actions to ensure a more sustainable environment;
- Facilitating the most relevant learning dispensations through the SETAs;
- Defending and promoting the SA dairy industry's position at any Government level and on any other platform – nationally and internationally;
- Sharing scientific knowledge with 53 other countries through SANCIDF; and
- Joining forces in NAHF to improve animal health.

He said that Milk SA, through its projects, had linkages with all the relevant national and international institutions with which it dealt on a daily basis. Milk SA has been a well-established company for over 20 years with the necessary institutional knowledge, which had earned respect amongst these institutions.

As Administrator of the statutory regulations, Milk SA can proudly say that it has been fulfilling its responsibilities excellently since 2006. He added that the current debtors' book was the healthiest ever; that during the past 16 years 2006 to 2021, levy income had exceeded the budget 12 times; and that for this period, income had exceeded the budget by 4,4%. He said that although the financial position was healthy, budgeting and expenditure now needed a far more conservative approach,

due to the poor shape of the national and international economies.

In conclusion, the CEO said that Milk SA had grown immensely in form and output since its establishment twenty years ago; that it was reassuring to see that the vision, mission and strategic intent of Milk SA which were defined 20 years ago, were still relevant; and to see that the industry leaders of 20 years ago, were still carrying the flag of Milk SA.

## NEW EDITION OF THE IDF ANIMAL HEALTH REPORT AVAILABLE

*A new edition of the IDF Animal Health report was published in November 2022 and is already available on the publication section of the IDF corporate website, as well as on the Milk SA website.*



This edition presents animal health and welfare research from eight different countries and one international organization, showcasing the many efforts that the Global Dairy sector is making in all regions of the world to control and prevent infectious diseases in animals.

It also contributes to knowledge and experience sharing by compiling relevant success stories that can serve as inspiration for global farmers and processors worldwide. The edition includes different approaches to Mastitis treatment and prevention in Denmark and Sweden, measures to control Foot and Mouth Disease (FMD) in South Africa and

Nigeria and the struggle against Bovine Reproductive Disease and Infectious Bovine Rhinotracheitis (IBR) in India. Interesting stories on *Mycoplasma Bovis* screening in New Zealand, a control programme to reduce respiratory diseases in bovines in Norway and an analysis of the effects of pegbovigrastim in Dutch dairy cows, also for part of this edition.

In addition, the IDF Animal Health Report highlights contributions by key IDF stakeholders. In the present edition, an article on the role of the World Organisation for Animal Health (WOAH, founded as OIE) in monitoring global trends in Tuberculosis in animals, was included.



## New year's message from the CEO

We all know that the macro and micro environments are going to deteriorate, but what we do not know is how bad the road will turn out to be around the bend. Daily, increasingly sophisticated vehicles are being launched on progressively deteriorating roads - just like genetically advanced and perishable agricultural produce and foods destined for export are being bottle-necked and delayed by ill-administrated policies and inefficient government facilities. As South Africans, we really do not need to struggle with the basics on top of Russia/Ukraine, the climate and economic threats.

Each organization and institution should make use of every opportunity to hold public institutions and officials accountable for their actions and inactions. Milk SA, MPO, SAMPRO and DSA have made the dairy industry's position very clear in the drafting of the Agricultural and Agro-processing Master Plan (AAMP) which is a government initiative

with the intent to optimize the potential of the agricultural and agro-processing sectors in South Africa. May we see the speedy and effective implementation of the agreed objectives in 2023!

Every producer of raw milk, input supplier, processor of dairy products and other role-player feels the pain in a world where the balance between "need" and "want" (from a consumer perspective) has shifted drastically in the last three years.

The need for cohesion, co-operation and trust in these times is vitally important. The "Strength in Unity" approach needs to be upheld and lived by all players. Industry organizations must invite role-player participation and ensure that their roles, objectives and projects impact tangibly on industry and sector specific competitiveness and viability.

Let us greet each God-given day with gratitude, hope and ingenuity.

