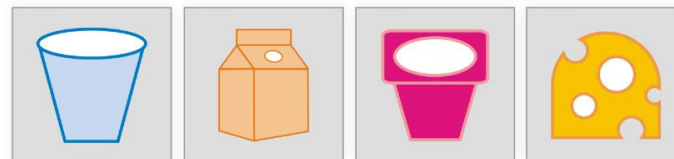




Consumer Education Project of Milk SA

Dairy Day Seminar



The Dairy Matrix: a new approach
to understand the health effects of food



Maretha Vermaak
Registered Dietitian

**Communicating the nutritional
and health benefits of dairy**

www.rediscoverdairy.co.za
www.dairygivesyougo.co.za

Before we start...

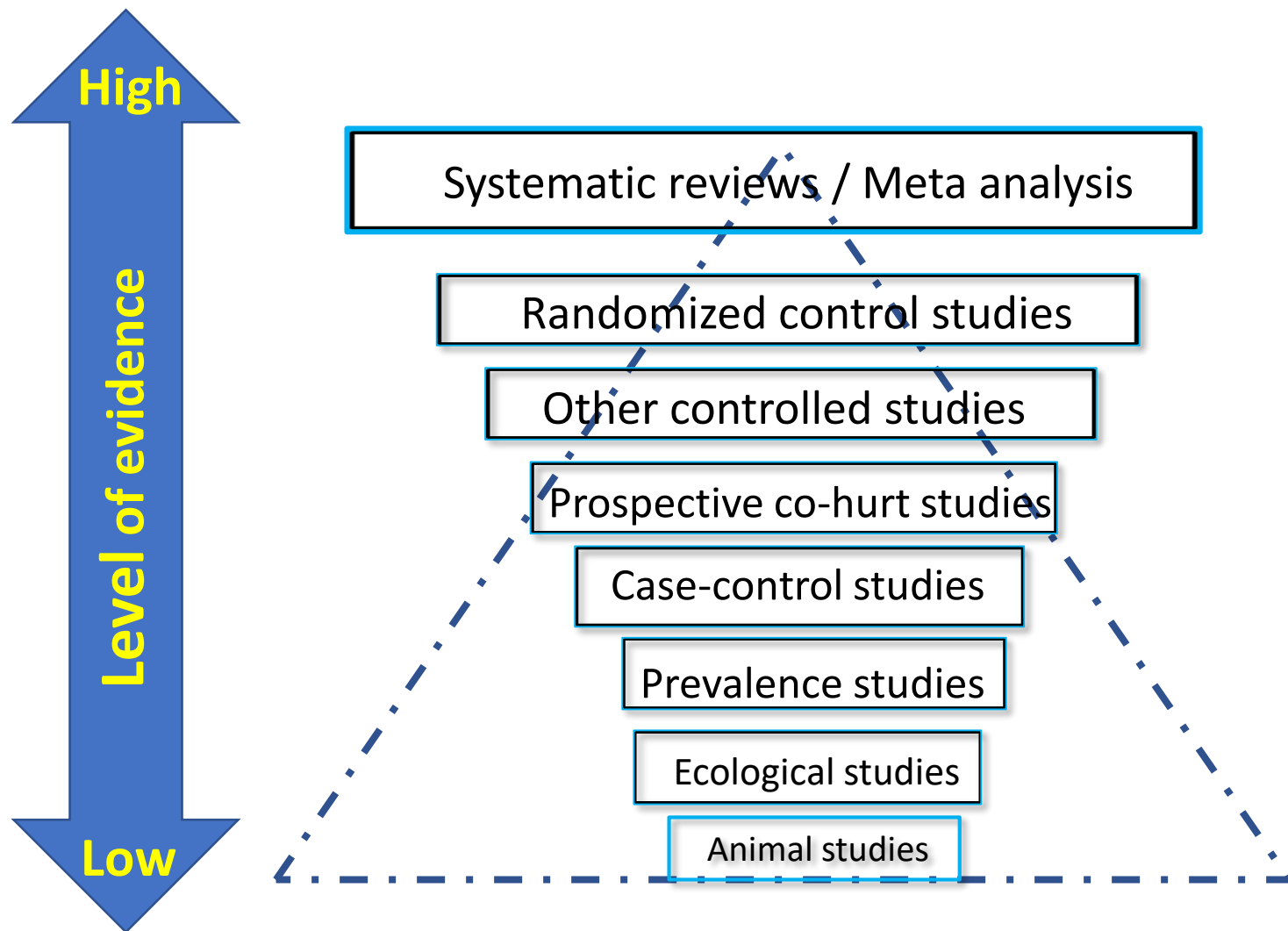
- **How** do we know **who** and **what** to trust....
- How do we react on **inconsistent messaging**
- How do we consider exposure to conflicting information that leads to increased **public confusion** and **less trust** in health recommendations



Milk South Africa



Focussing on the hierarchy of Scientific evidence



Outline of presentation

- The Dairy matrix

The WHOLE vs the SUM OF THE PARTS

The Matrix effect and health

- Milking your beverages for all they are worth

Comparing real dairy to plant-based beverages



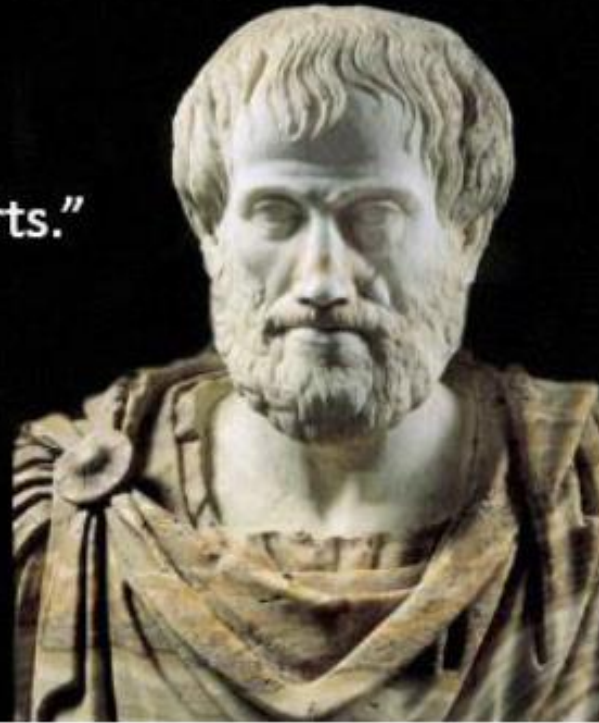
Milk South Africa



The ancient wisdom of Aristotle

**"The whole is greater
than the sum of its parts."**

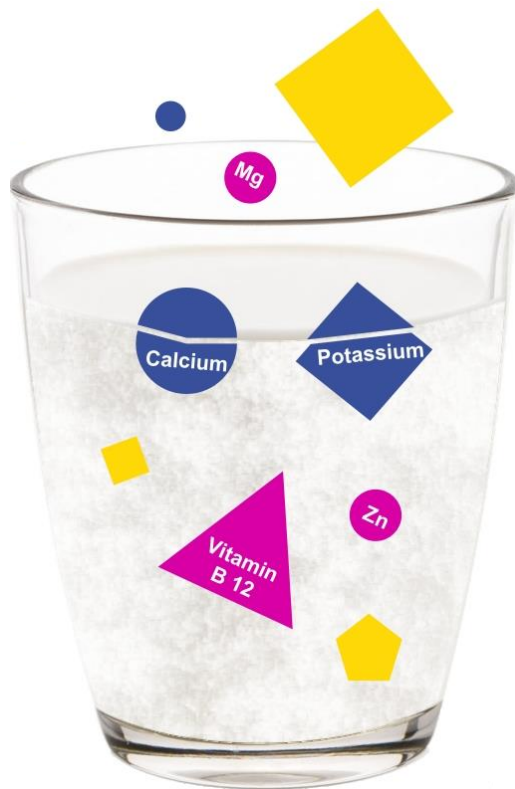
-Aristotle



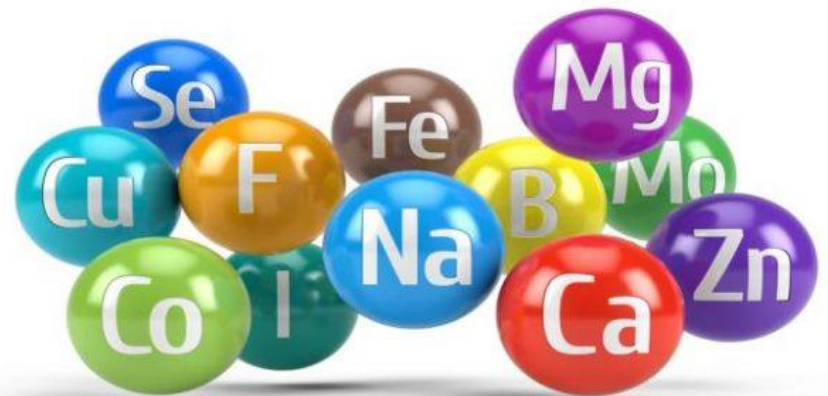
What is the **WHOLE**?



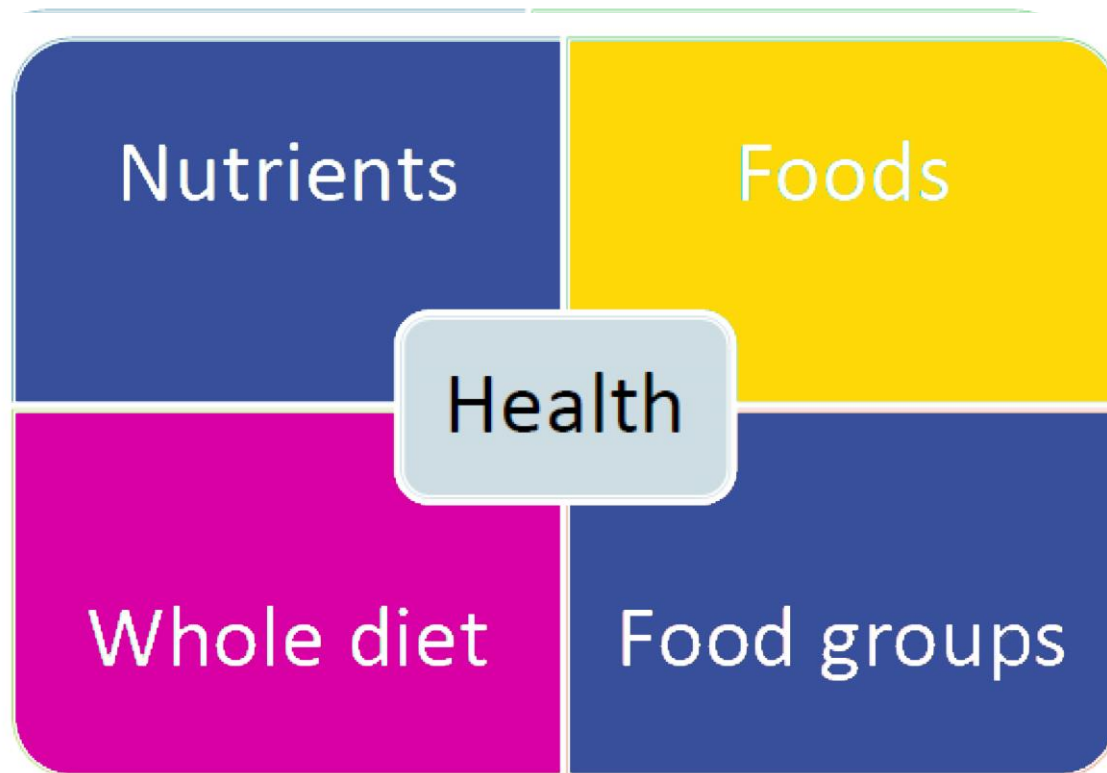
The sum of the PARTS... single nutrients



**FORTIFIED
FOODS**



Consider the **WHOLE** as a determinant of health



New direction in nutrition...

The FOOD matrix
a new approach
to understanding
the health effects of food

Moving
beyond
single
nutrients



Milk South Africa



Moving beyond single nutrients



Traditionally the **study of nutrients and health** - 'reductionist' approach

- Oversimplification of nutrition
- Leading to classification of some foods as
 - negative
 - super foods

because of one piece of information

- Examples:



Almonds demonstrate that the degree of chewing affects the energy/fats extracted



Carotenoids in carrots –raw pieces vs cooked with oil – show large differences in the bioavailability – **3%** vs **39%** when cooked with oil



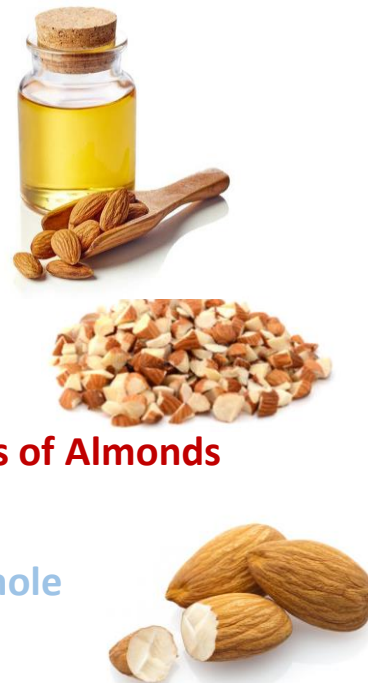
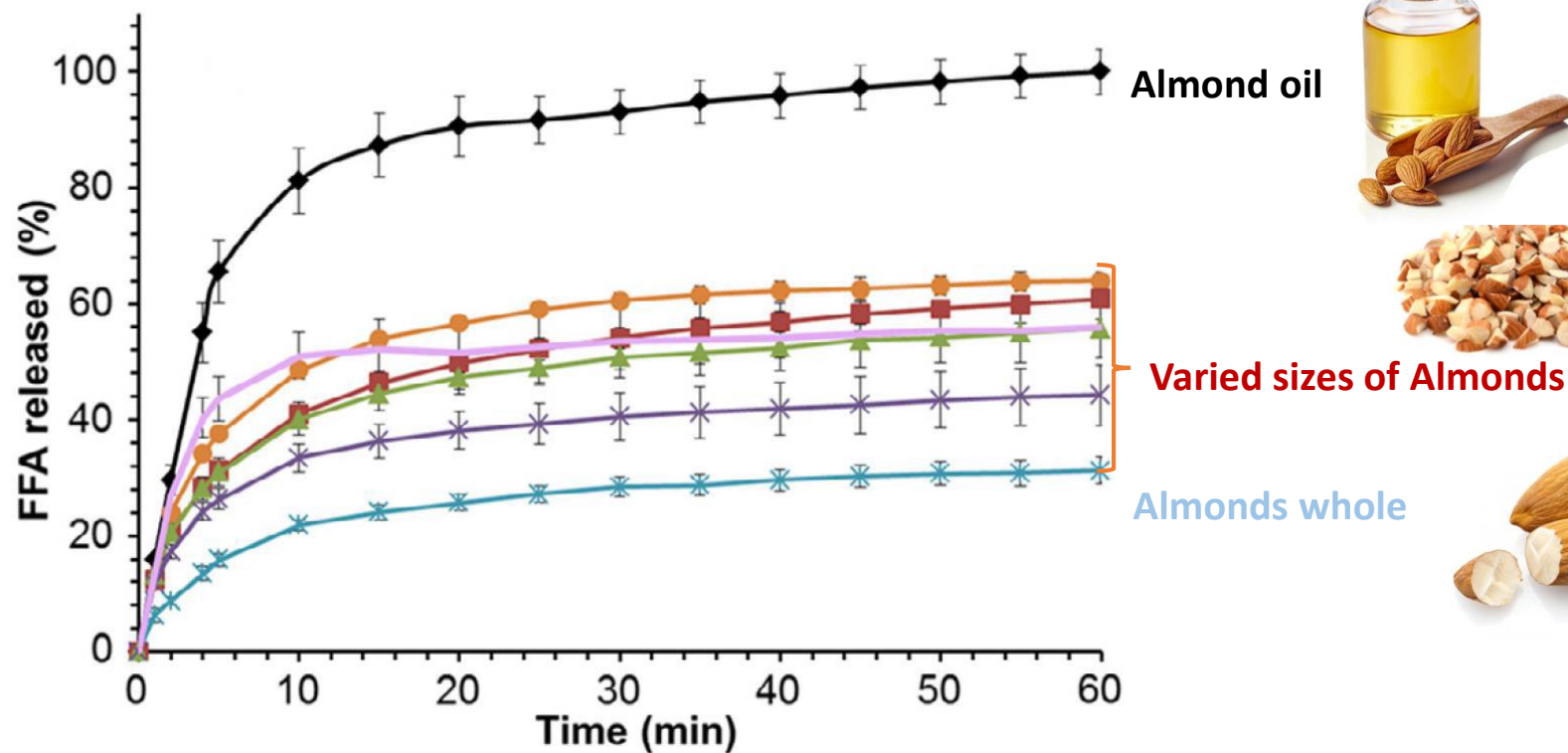
ITH ATRICA



MILK Sou

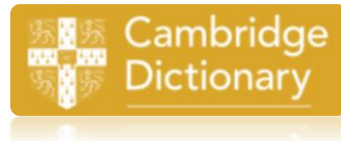


Effect of Almond particle size on lipid bio-accessability



The FOOD MATRIX

What is a matrix?



- substance in which other things are fixed or buried
- a set of related things that affect the way something develops or changes



The Food matrix

Foods consist of a large number of different nutrients contained in a complex structure.

The **food matrix** → nature of the **food structure and the nutrients therein**

The food matrix will determine the nutrient's

- **digestion**
- **absorption**
- the **overall nutritional properties** of the food'



The interaction of nutrients in dairy forms a **winning team**.

The Dairy matrix

'The nutrients in milk or other dairy **do not work in isolation** but rather **interact as a team**.

The concept of the dairy matrix explains the fact that **health effects of the individual nutrients may be greater when they are combined together**'

Thorning *et al*, (2017) AJCN





The interaction of nutrients in dairy forms a winning team.



The whole

is more than the sum of the parts



DAIRY
PRODUCTS



FORTIFIED
FOODS

The matrix effect of
DAIRY

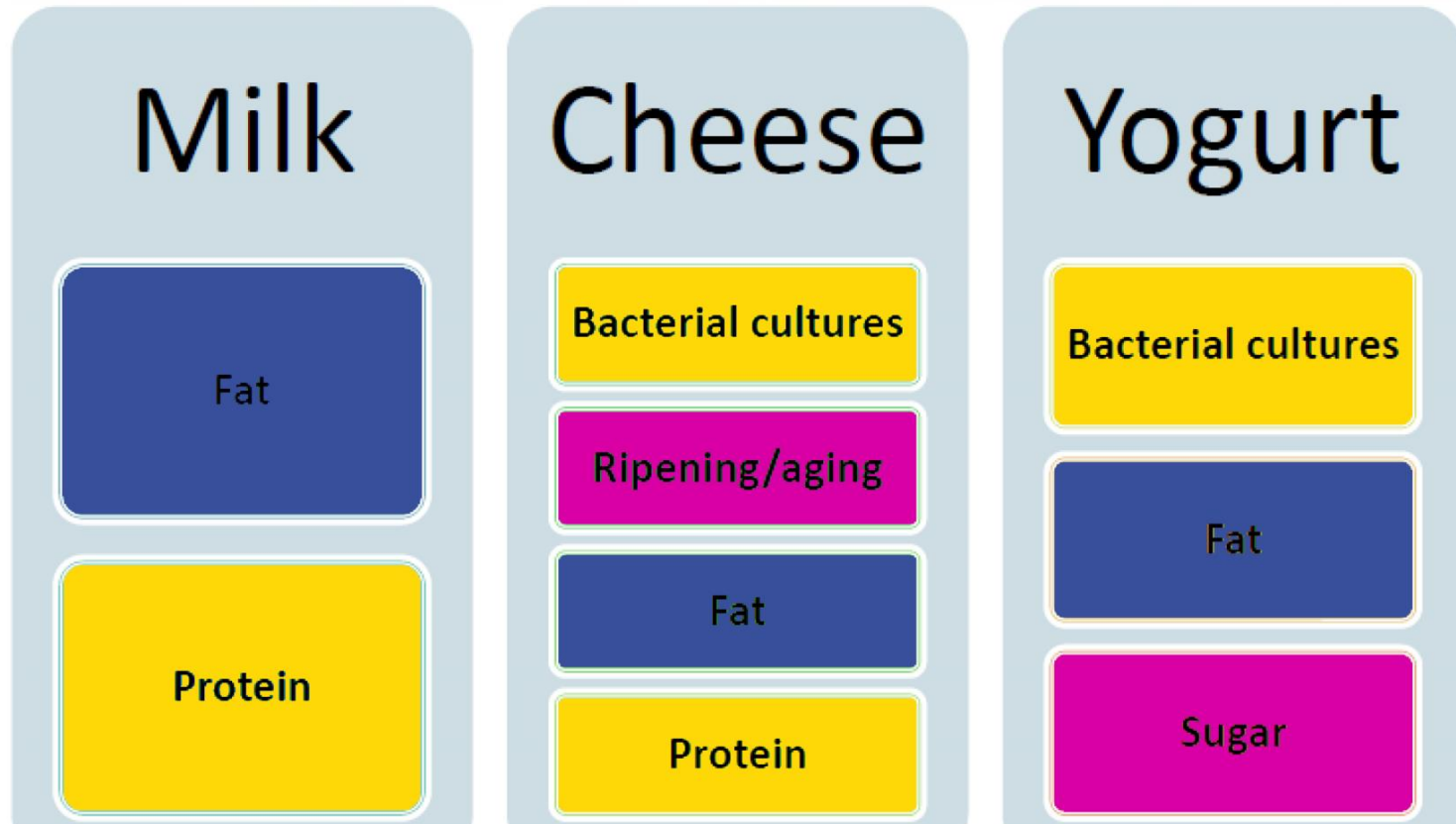


Milk: Consider the WHOLE as well as the parts

Milk and dairy are more than just calcium

- High quality protein
- Bioactive peptides
- 400 different fatty acids
- Lactose
- > 8 vitamins
- > 5 minerals
- Fermented products with unique composition

All Dairy is not created equal



All Dairy is not created equal

Milk

Cheese

Yogurt

PLUS

- variation in physical structure
- consistency – liquid, gel, solid



The Dairy Matrix effect and health

- Bone health
- Sarcopenia
- Muscle strength
- Weight management
- Cardiovascular disease

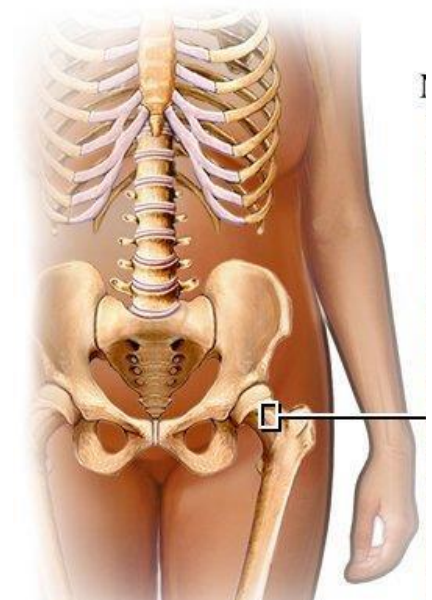


Milk South Africa

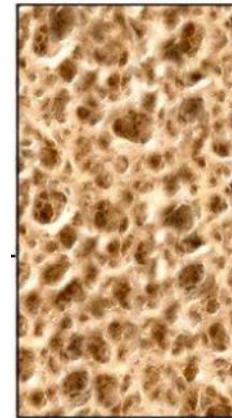


Bone Health: Evidence of the matrix effect

- Bone strength refers to
 - quality
 - structure
 - mass and
 - turnover of bone
- 80-90% of Bone Mass content = Calcium and Phosphate
- Bone Mass also requires → Protein, Vitamins A, C, D and K
Mg, Zn, Cu, Fe and Fluoride



Normal bone matrix



Osteoporosis



The Calcium in Dairy

- Contain a **favourable Ca : P ratio** (1 : 0.8) and a range of interacting nutrients
- Appears more beneficial than other forms of calcium – stimulates renal resorption of calcium, meaning that it has a longer-lasting effect
- **Protein** in dairy may enhance calcium balance by promoting absorption
- **Casein phosphatides** and / or **lactose** enhance calcium absorption
- **Fermented dairy** additional benefit in enhancing calcium absorption

Average adult need a 1000mg of
calcium a day

Milk South Africa



Calcium sources from food = 300mg calcium



1 glass (250ml)



2 tubs (200ml)



2 slices (40g)



1 tin sardines with bones



2 cups cooked spinach



7 cups cooked broccoli



9 cups of cooked cabbage



3 cups of baked beans

Sarcopenia: Evidence of the matrix effect

Sarcopenia is the progressive decrease in lean body mass and strength with age

It affects up to 45% of those aged over 60 years

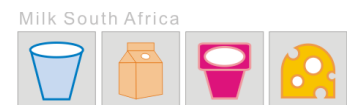
↑ fatigue ↓ appetite and quality of life

- cause physical impairment, disability and dependence on others
- impairs the metabolic adaption to illness and disease



Sarcopenia: Evidence of the matrix effect

- **Increased protein intake** has been suggested for older adults to minimise the risk of sarcopenia
- **Milk protein** proof to be specifically beneficial for increasing muscle protein synthesis in older people
 - **Whey protein** support rapid increases in muscle protein synthesis
 - **Casein** support sustained increases in muscle protein synthesis and decreases in muscle protein breakdown
 - Milk is a very good source of **leucine** which is especially important in stimulating muscle protein synthesis
 - The anabolic effect of milk may be an effective way for **maintenance of muscle** mass and strength in the healthy elderly and fast recovery in the frail elderly
- The nutrient density of milk and dairy are also beneficial for older people



Muscle strength: Evidence of the Matrix effect

Performance nutrition: Recovery after exercise

Ideal Rehydration

Fluid, Sodium, Potassium

Slow gastric emptying



Muscle recovery and repair

High quality protein

Essential amino acids

Branch chain amino acids

Skeletal amino acid uptake

Glycogen re-synthesis

Weight management: Evidence of the matrix effect

- **Whey proteins** in milk and dairy can affect **levels of satiety** – due to the fast appearance of amino acids in plasma which may help to decrease excessive food intake and prevent weight gain
- **Dairy's Branch Chain Amino acids** enhance **muscle protein** synthesis and muscle mass and protect against loss of lean mass during weight loss
- **Milk proteins** may also influence gut hormones by stimulating hormones involved in satiety
- Increase the hormone ghrelin that **suppresses appetite** and
- Increase thermogenesis, thus **increasing resting energy expenditure**

Cardio vascular disease: Evidence of the matrix effect

Milk nutrients

- Calcium
- Protein
- Fatty acid profile
- Vitamins
- Magnesium
- Sodium
- Potassium
- Microbiota



Health Benefit

- Reduced risk of stroke
- Reduced blood pressure
- Reduced circulating cholesterol
- Neutral to reduced risk for CVD



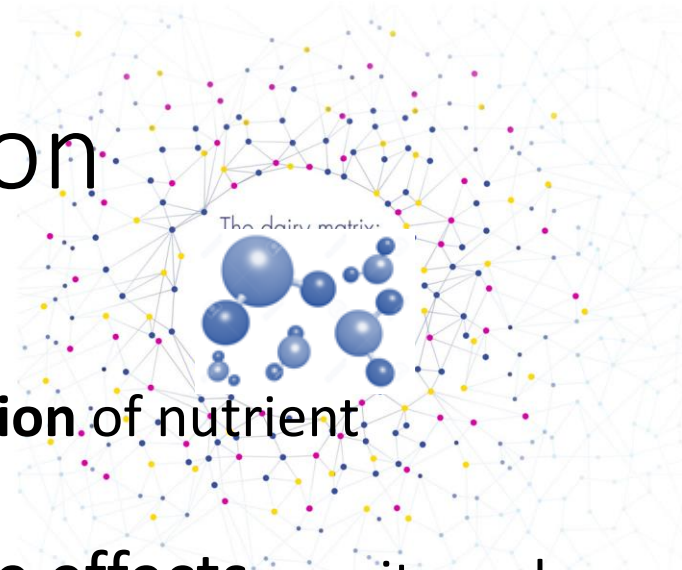
Cardio vascular disease: Evidence of the matrix effect

Mechanisms

- **Bioactive peptides** inhibit Angiotensin-1-converting enzyme
- Slow down vascular smooth **muscle constriction**
- Increase nitric oxide production, resulting in **vasodilation** – blood vessel relaxant, improving blood flow
- **Decreases blood clot formation** and cholesterol levels through **soap formation with fatty acids**
- **Binds bile acids**. More cholesterol converted to bile acids, which reduces circulating cholesterol
- Fat globules are trapped in **casein matrix**
- Short Chain Fatty Acid production through **fermentation** helps lower cholesterol levels
- Dairy Saturated Fats **increases LDL particle size** with decreased ability to penetrate arterial walls

Dairy matrix: conclusion

- **Food matrix effects exist**
- The matrix effect is mainly a **combined function** of nutrient composition and food structure
- May be physical, chemical or associative effects – or it maybe all of these factors?
- The health effects of a food cannot be determined simply on the basis of the **individual nutrients** it contains ✗
- The food matrix can determine **nutrient digestion and absorption**, thereby also altering the overall nutritional properties of the food
- Evidence to date suggests the dairy matrix may have **unique benefits** for bodyweight control, bone and muscle mass development and cardiovascular health



Milking beverages for all they are worth

Comparing **REAL DAIRY**
to plant-based milk alternatives



Setting the bar...

The nutritional profile of real MILK is tough to match

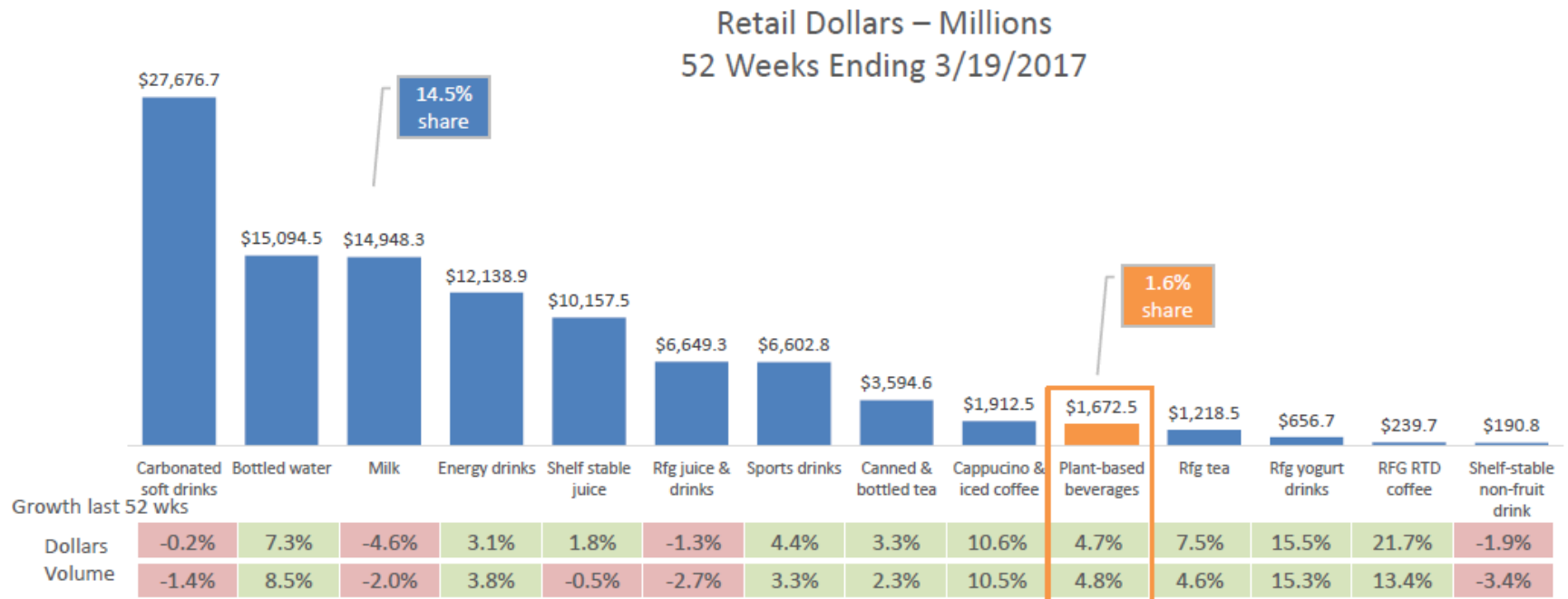
- Nutrient rich profile:
 - 9 essential nutrients
 - high quality protein
 - no added sugars
- Milk is the leading food source of **3 of the 4** nutrients of public health concern in SA
 - calcium
 - potassium
 - vitamin A
- Low-fat and fat free milk and milk products are recommended by health authorities as part of healthy diet patterns
- There is an extensive body of research showing dairy's health benefits on critical issues related to public health.



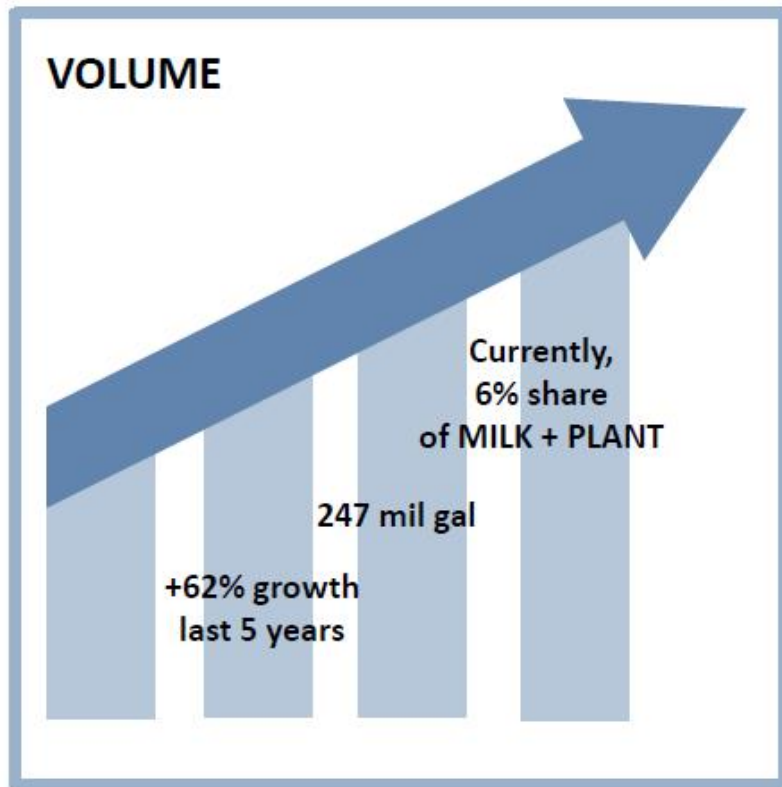
Milk South Africa



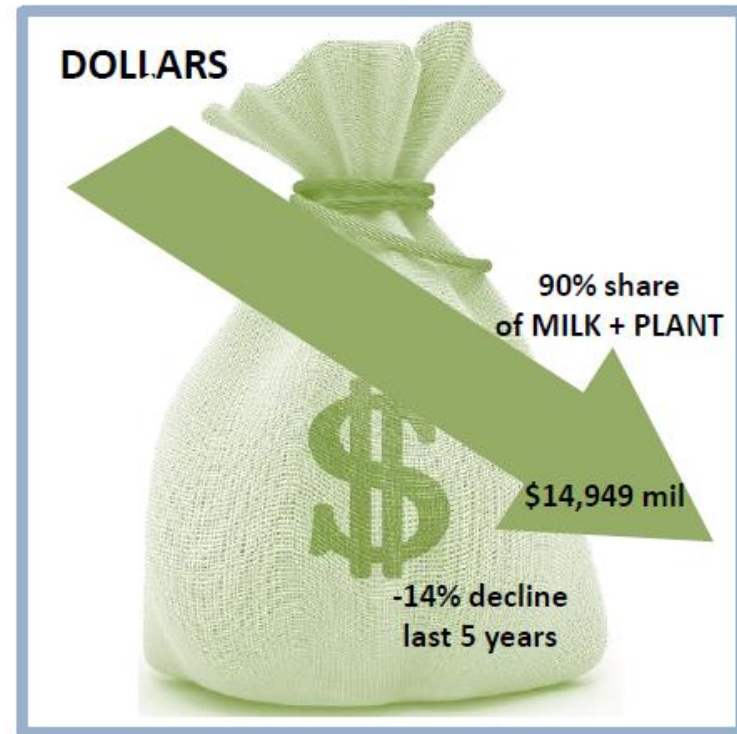
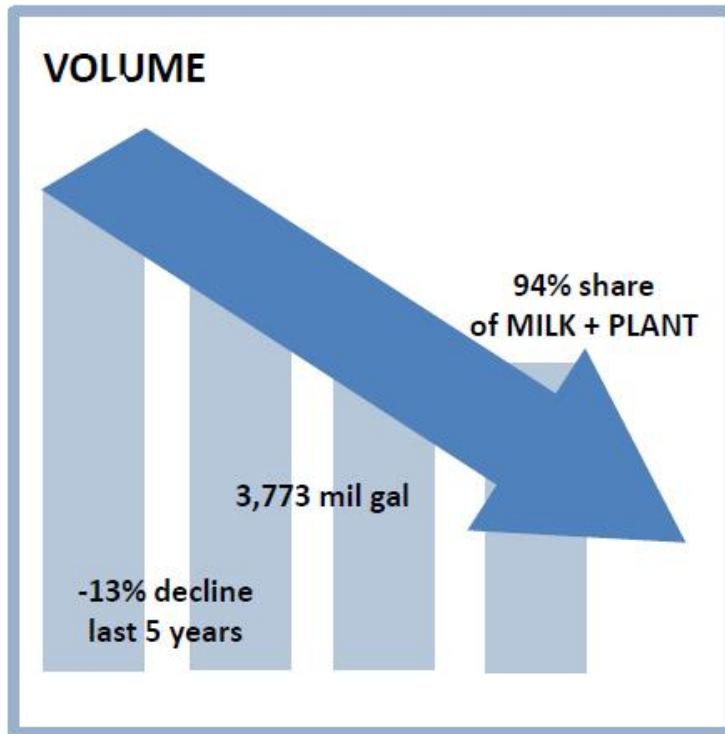
Plant-based beverages are one of the faster growing categories - \$1.7 Billion



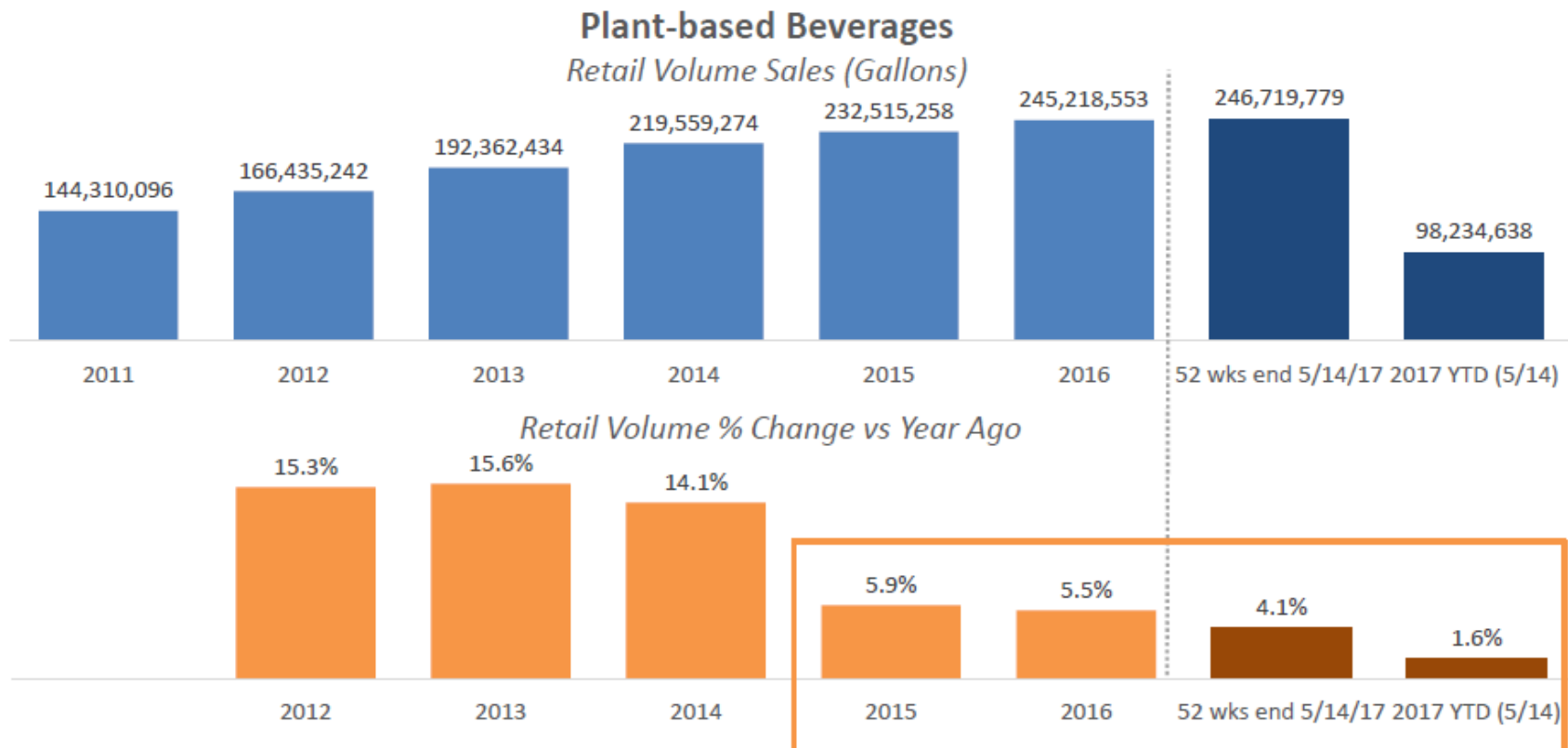
Over the Last Five Years, Retail Sales of Plant-based Beverages Have Grown by Over 60%



Retail Sales of Dairy Milk is Trending Down

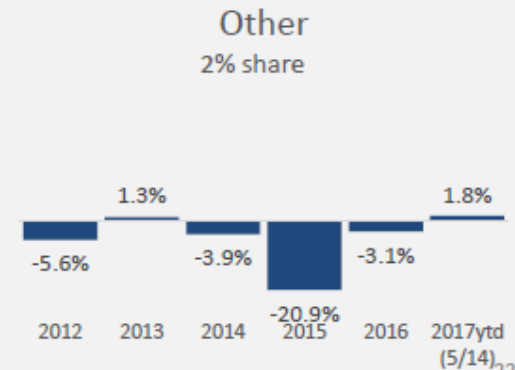
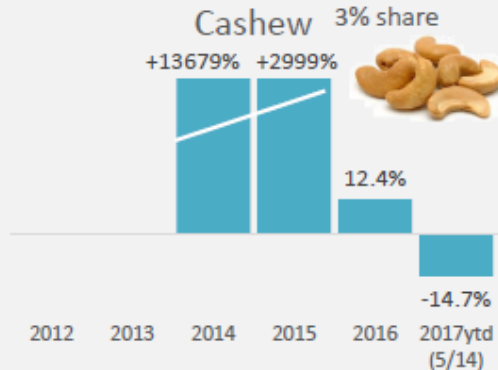
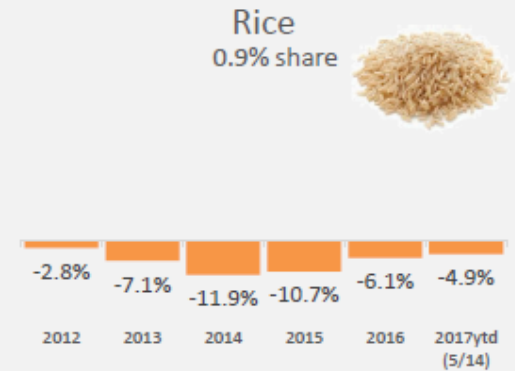
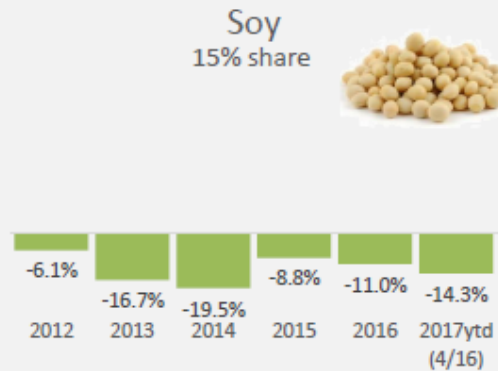
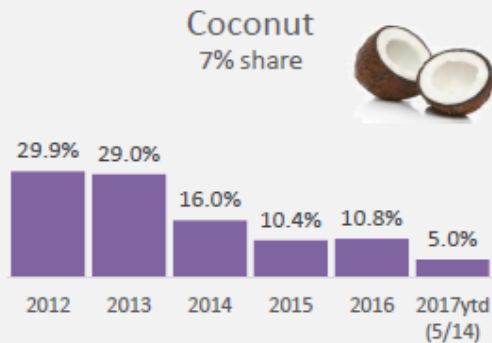
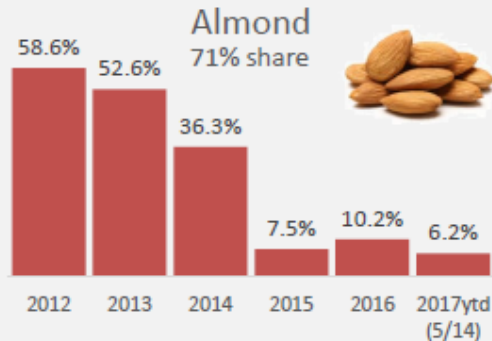


Plant Beverage Sales However, are Growing at a More Moderate Pace in Recent Years

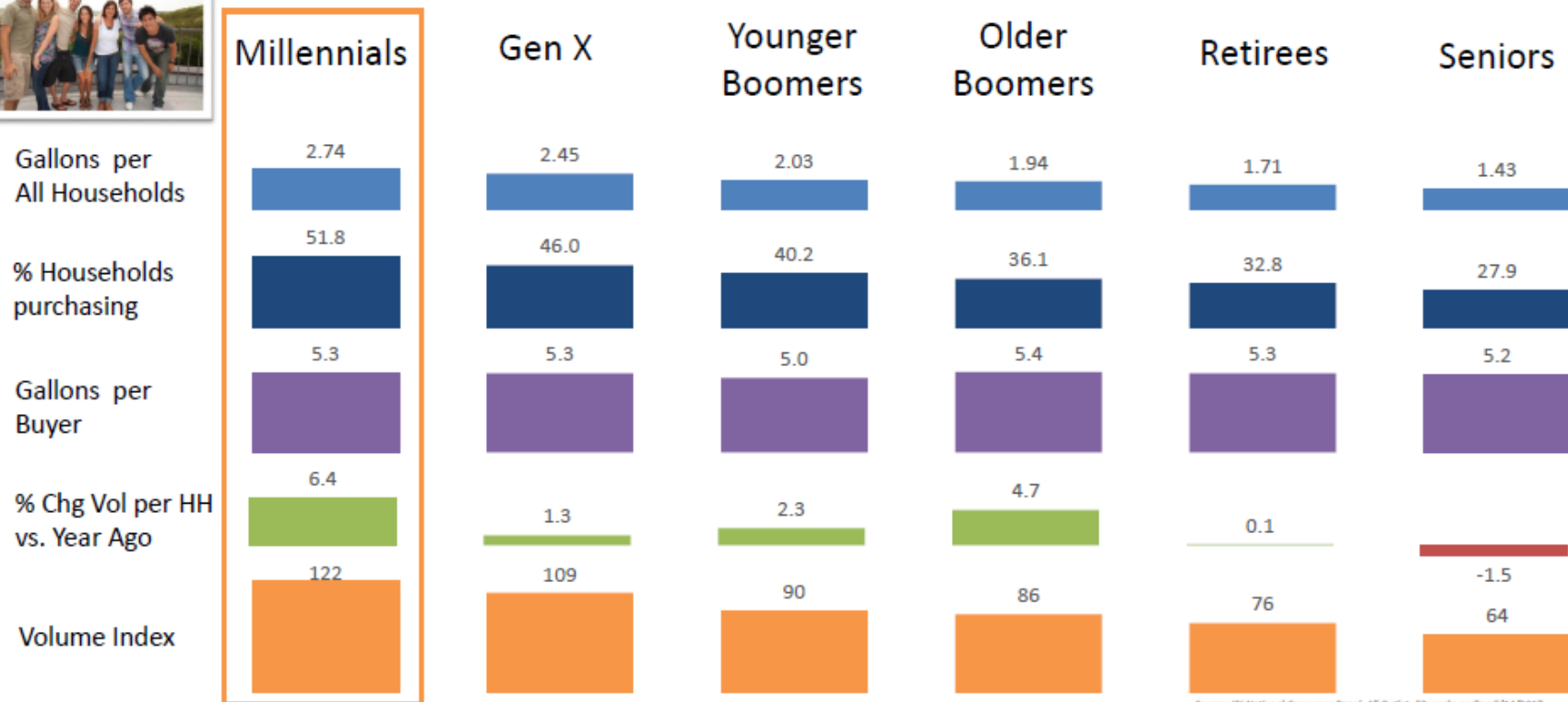


Almond and Coconut Continue to be Growth Engines in Plant Beverages

Retail Volume % Change vs. Year Ago



Millennials are More Likely to Purchase Plant Beverages and are Increasing their Purchasing



Source: IRI National Consumer Panel. All figures 42 weeks ending 6/14/2019



Consumer engagement with broad food trends



Deeper interest in knowing about food –who made it, what are ingredients, who produced it



Heightened interest in farm animal issues as well as less prioritization of meat in the diet



Increased focus on food absence claims/food sensitivities – gmo-free, antibiotic-free, hormone-free, gluten-free, lactose-free, dairy-free



Broadened focus from healthy “me” to healthy “planet”

Growing attributes consumers seek when choosing beverages

Prefer Beverages



Good for Me
64% Drinkers



All Natural
49% Drinkers

Pay More for Beverages



Fulfill Needs
56% Drinkers



High Quality
53% Drinkers

Support Companies that



Give Back to Communities
33% Drinkers



Help Global Organizations
29% Drinkers

Buy



Environmentally Friendly Products
40% Drinkers

1st to Try



New Beverages
26% Drinkers

When it Comes to Drinking Beverages, Only 2% People Drink Both Dairy Milk and Plant-based Beverages

49% don't **DRINK** either product weekly

45% People
Drink Only
Dairy Milk
(145 mil people)

2%
drink
both

4% People
Drink Only
Plant-based
(13 mil people)

Only 4% of milk drinkers
also drink plant-based
beverages weekly

1/3 people who drink
plant-based beverages
also drink milk weekly

6 million people

Source: 2016 Kantar Worldpanel; consumers age 18+

57



Milk South Africa



Attributes that matter A LOT to consumption decision

Top Attributes that Matter to Both Plant Beverages and Dairy Milk

- Safe
- Nutritious
- General health & well-being
- Strong bones & teeth
- Taste



Attributes that Index High for Plant Beverages Relative to Dairy Milk

- No artificial hormones
- Improve quality of life
- Antibiotic free
- Manage health issues
- GMO-free



Attributes that Index Low for Plant Beverages Relative to Dairy Milk

- Calcium



Lactose intolerance as a driver of plant-based beverage consumption

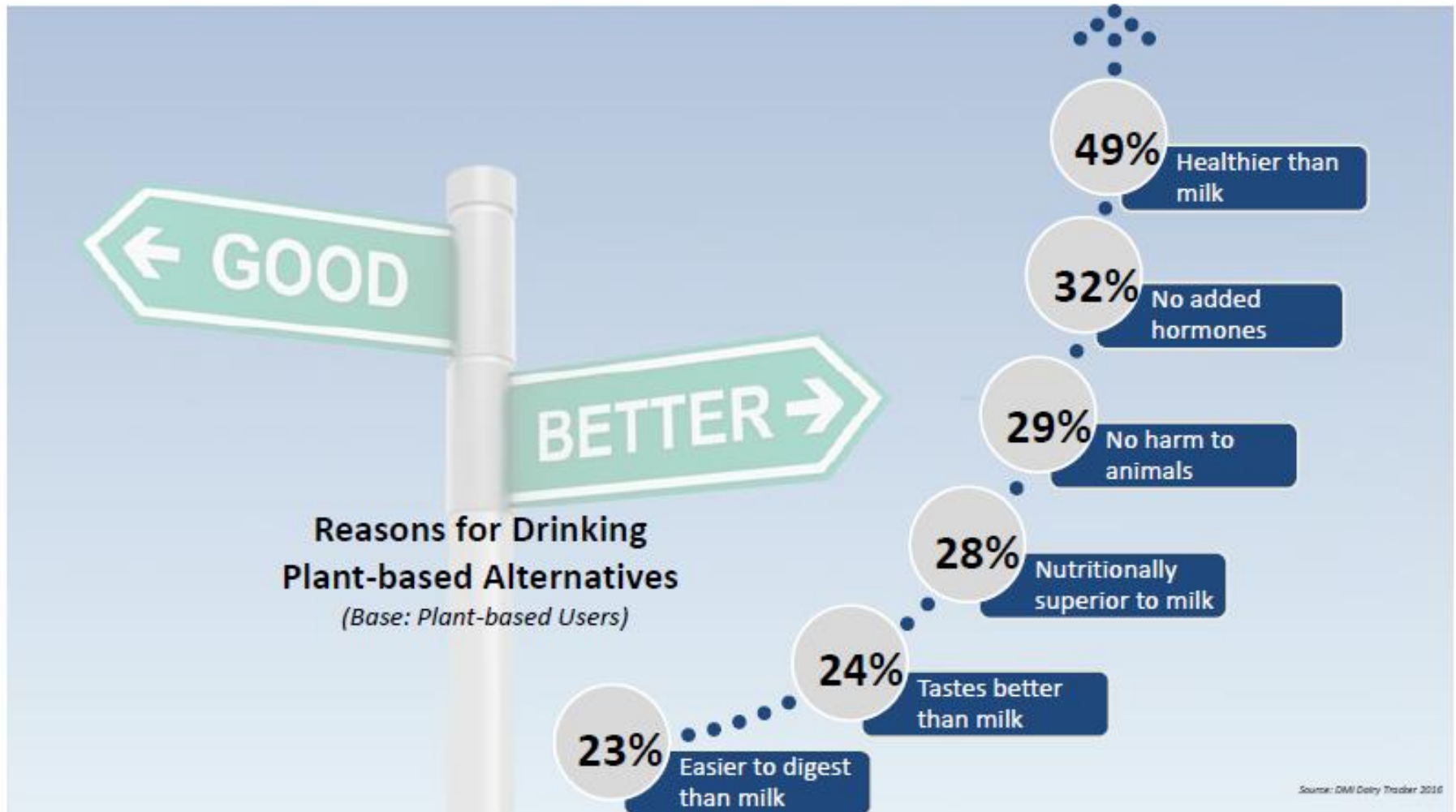


12% of Plant Based Beverage Drinkers
drink the category because
they are Lactose Intolerant

88% drink the category for other reasons

Source: Kantar 2016

WHY consumers choose plant-based alternatives



What does sciences say about the nutritional differences between MILK and plant-based beverages

- The **assumptions** are made
 - that dairy alternatives are just as healthy as dairy foods
 - if something is called “milk” it has the same nutritional properties as cow's milk
- People exclude milk from their diet because
 - Cow's milk allergy
 - Lactose intolerance
 - Following a trend
 - Exclusion diets
 - Personal lifestyle choice
 - Beliefs about animal mistreatment



Milk South Africa



Typical plant-based alternatives

- Soya milk
- Almond milk
- Coconut milk
- Rice milk
- Oat milk



The facts

- Plant-based alternatives **do not have the same nutritional content as cow's milk**
- Plant-based alternatives are **highly processed products** with high volumes of water added
- Plant-based alternatives are not naturally high in nutrients
➡ necessitating **fortification**
- It is **not a natural source of calcium** – fortified with calcium carbonate or phosphate
- Processing often produce **by products** such as okara and carrageenan
- Plant-based alternatives are generally **expensive** – making it hard to reach nutrient recommendations

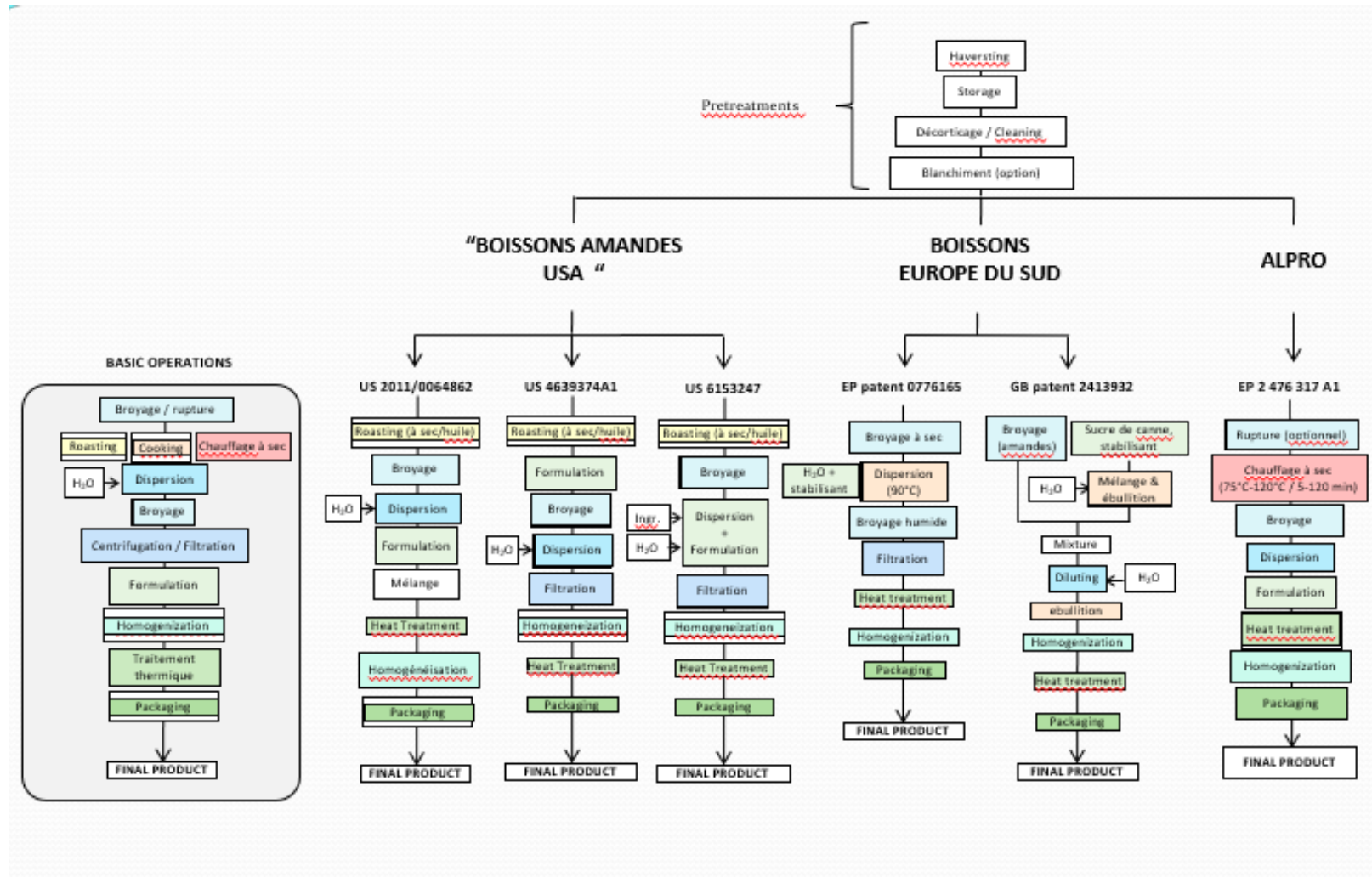


Processing of plant-based alternatives

- Starting material is a seed or a nut
 - either used after soaking and milling or "as is"
 - **solvent extractions** are used to extract other components e.g. fat
- **UHT treatment** is necessary (130-148°C for various seconds) to decrease spore contaminants and to denature antinutritional factors such as
 - phytates
 - protease inhibitors
 - oligosaccharides (simple sugars)
- Because products are harvested from soil chemical and microbiological **contaminants are common** (e.g. inorganic arsenic)

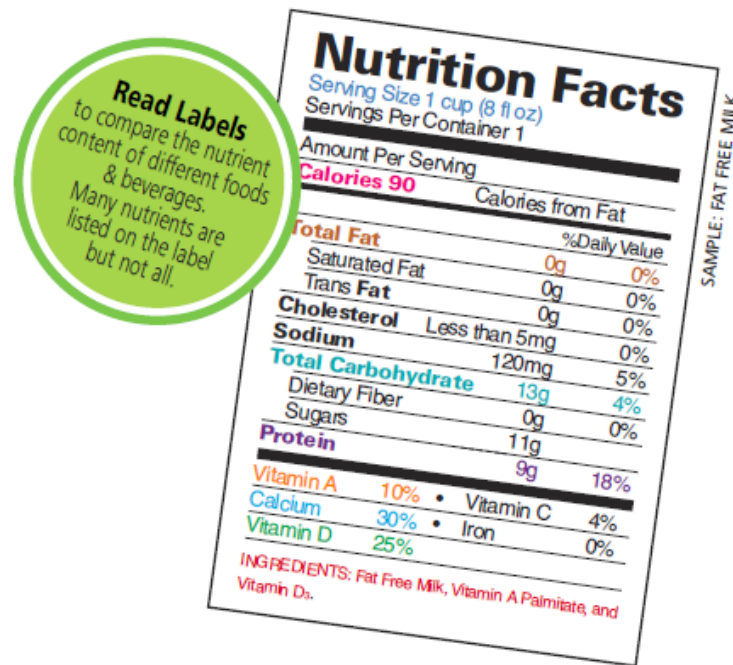


Processing steps in producing Almond milk



Comparing the nutrient content of PBB with MILK

✓ Check the labels, **get the facts**...drink **MILK**



6 Steps to guide you through the nutritional facts

Step 1

Energy or kJ's

The calories will vary depending on the amount of

- ✓ protein
- ✓ fat and
- ✓ carbohydrate

the beverage contains

Most beverage labels list the energy per 100g and per 1 cup serving (250ml)



Milk South Africa



6 Steps to guide you through the nutritional facts

Step 2

Protein

got protein?

What Milk(s) provides the most or best quality Protein?

- Protein is needed to build and maintain muscle, keep our blood healthy and our body structure strong.
- This is especially important for children, teens, athletes and seniors.
- Dairy Foods should provide around 6 - 9 grams of protein per serving.



Milk South Africa



6 Steps to guide you through the nutritional facts

Step 3

Total Carbohydrates

- Find and **circle** all the added sugars listed on the ingredients list of the beverage
- The total carbohydrate number includes the amount of complex carbohydrates, dietary fibre and sugars
- Sugars include **added sugars** such as sucrose, fructose – words ending with a '**ose**'
- **Added sugars** add flavour but also more energy (kJ's) – look out for the words cane sugar, corn syrup or syrup.
- Sugar may also refer to **naturally occurring sugars** - lactose the natural sugar found in milk



6 Steps to guide you through the nutritional facts



Step 4

Fats

List the beverage(s) with the least amount of **Total Fat**

Fats are an essential part of a healthy diet

The type and amount of fat you consume is important to your overall health

According to health authorities worldwide it is preferable to choose low-fat or fat free dairy foods most often



Milk South Africa



6 Steps to guide you through the nutritional facts

Step 5 Calcium



Identify the **type of calcium** in the milk

Distinguish between natural containing calcium and added calcium

There may be two forms of added calcium found in the ingredients list of plant-based beverages

- calcium carbonate
- calcium tri phosphate

6 Steps to guide you through the nutritional facts

Step 6

Check out
THE INGREDIENTS

Which Milk(s) has the highest number of ingredients?

The product ingredients are listed in **descending order of prominence**

and weight

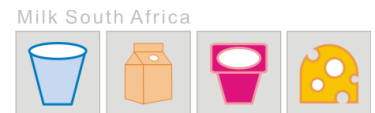
Milk should be the first ingredient

Additives that improve or maintain taste, texture and appearance such as carrageenan are listed on the ingredients list along with added sugars and nutrients

When it comes to milk... not all products are created equal

Read the label and compare

- ✓ Check the energy per cup (250ml) serving
- ✓ Total fat can vary per category of beverage
- ✓ Total carbohydrates can include natural occurring and added sugars
- ✓ Real milk is a great source of protein – 8 grams or more
- ✓ Natural occurring calcium is easily absorbed in our bodies
- ✓ Less is more when it comes to the ingredient list – start counting



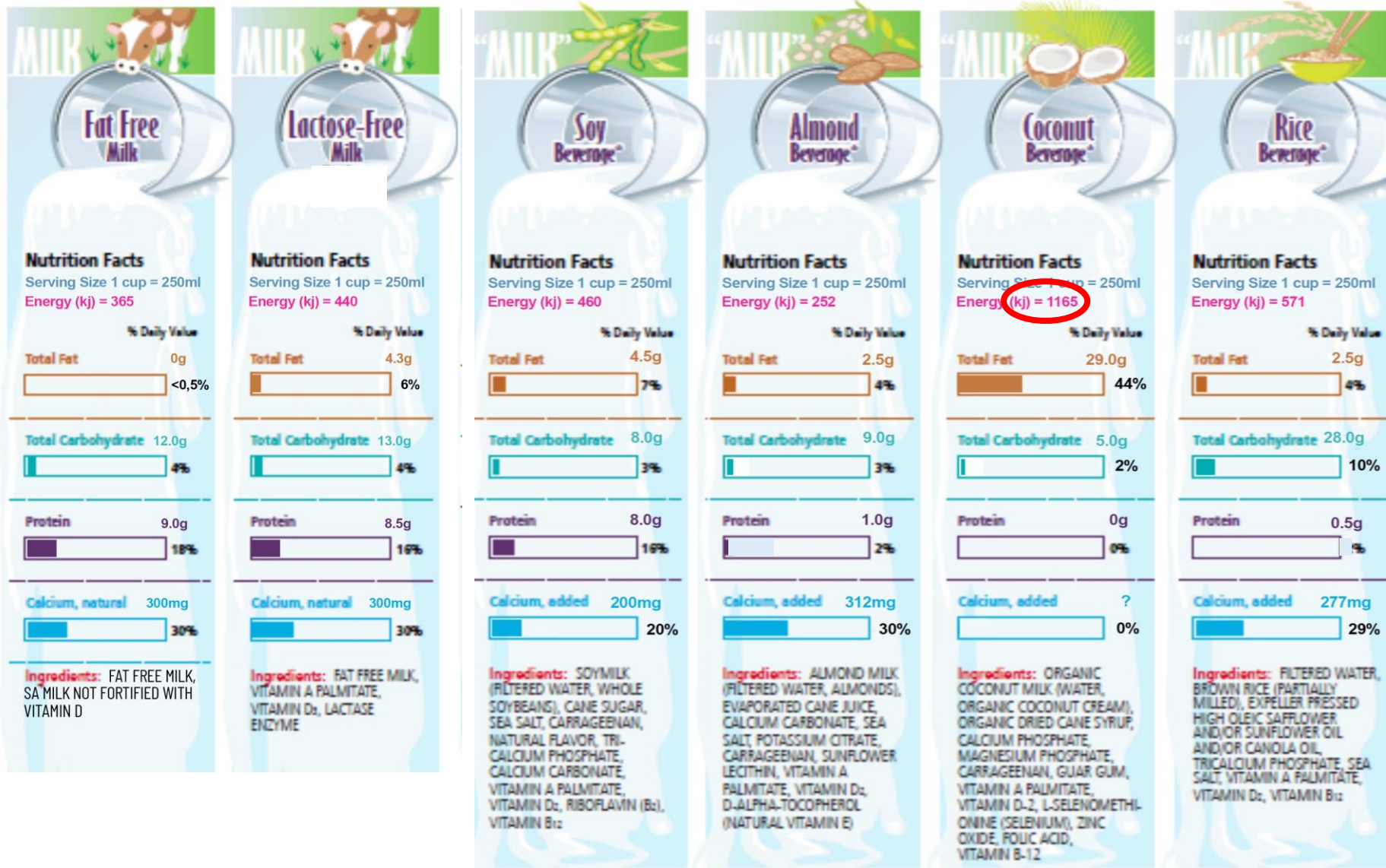
Composition comparison



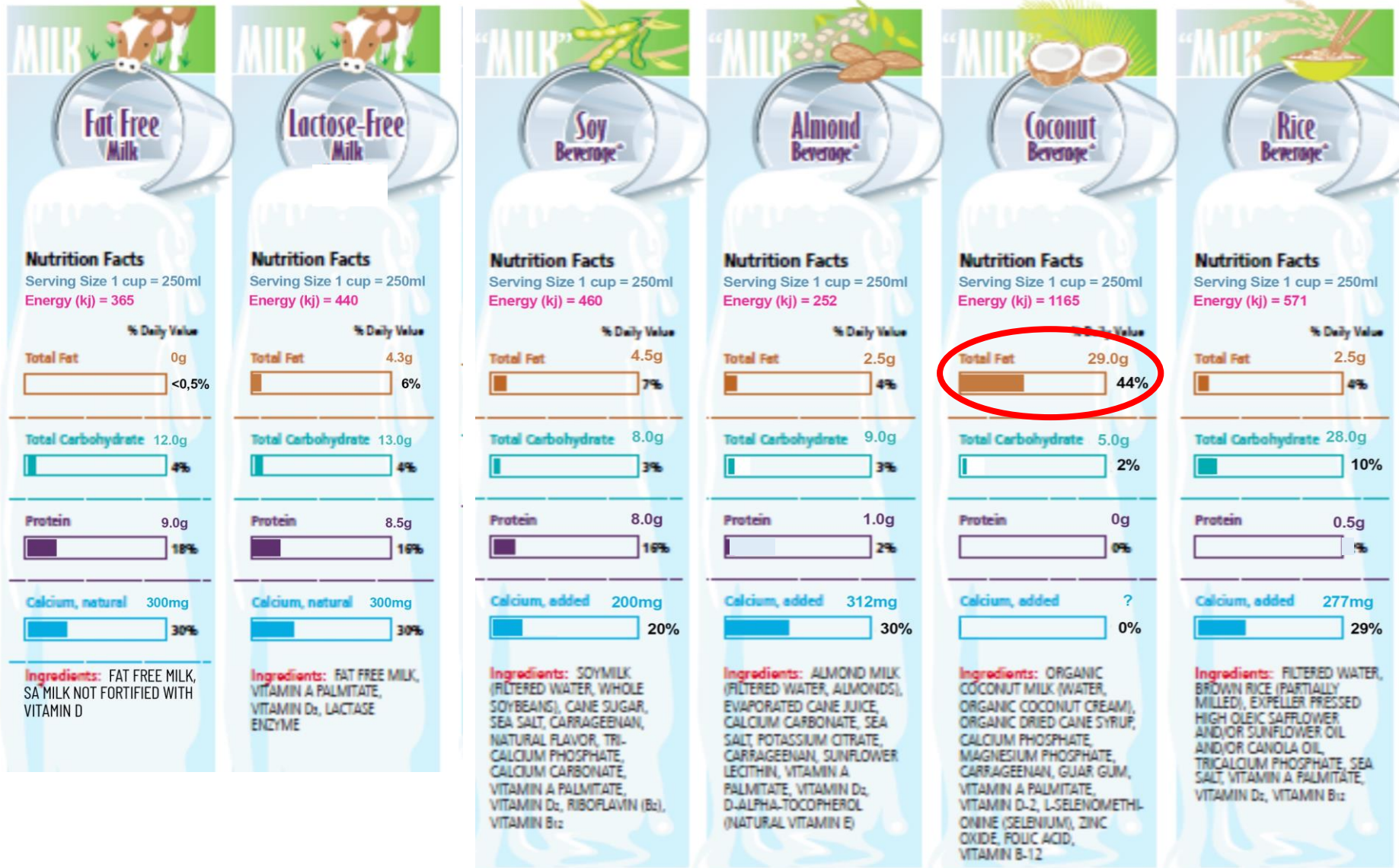
Composition comparison



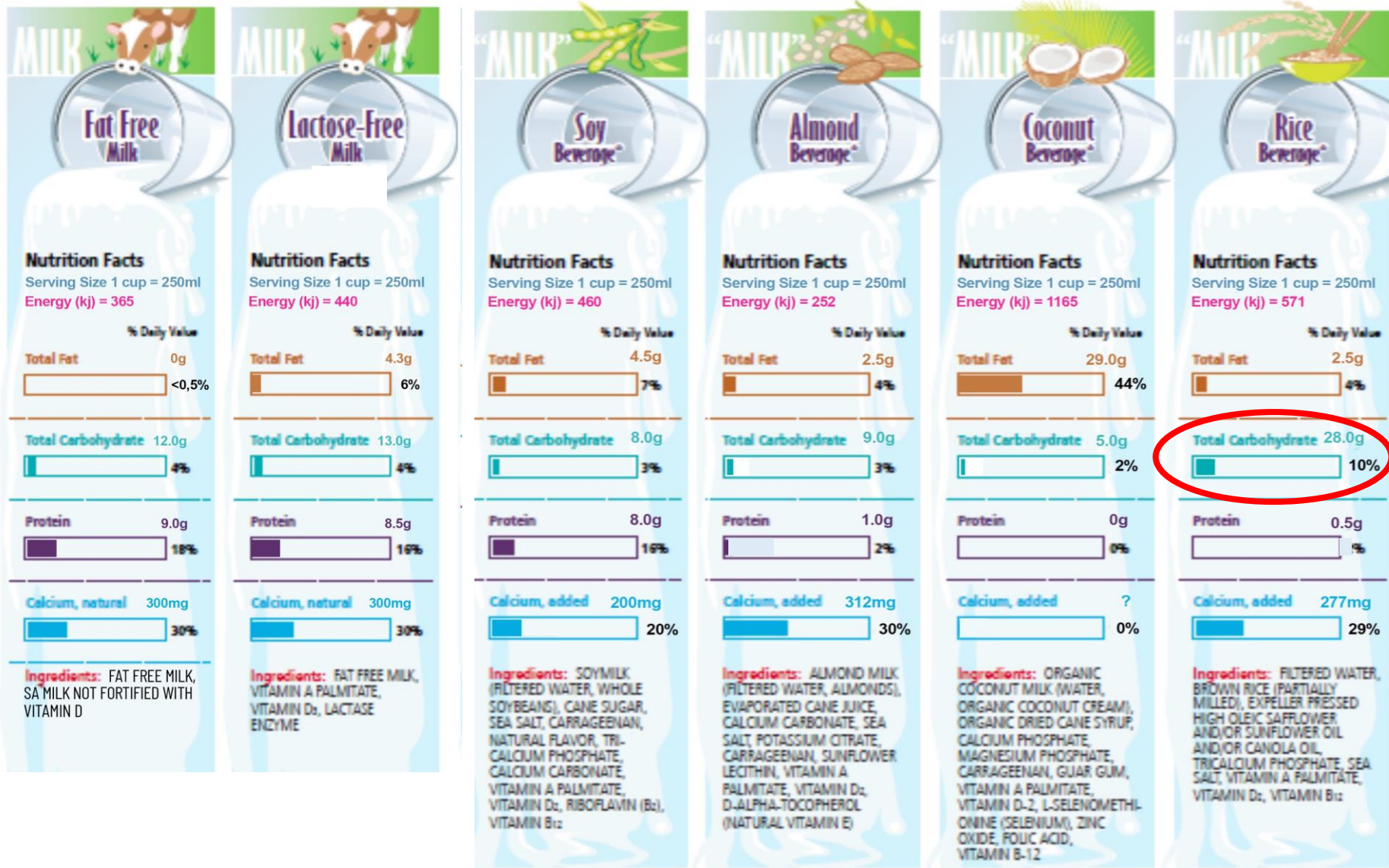
Composition comparison



Composition comparison



Composition comparison



Composition comparison



Composition comparison



Composition comparison

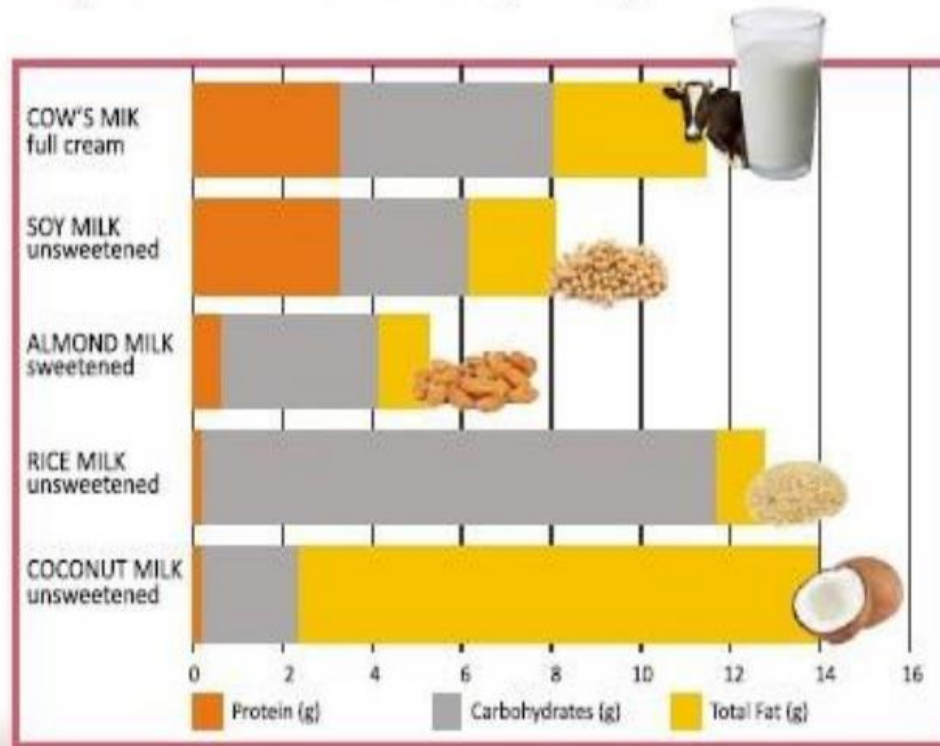


Composition comparison

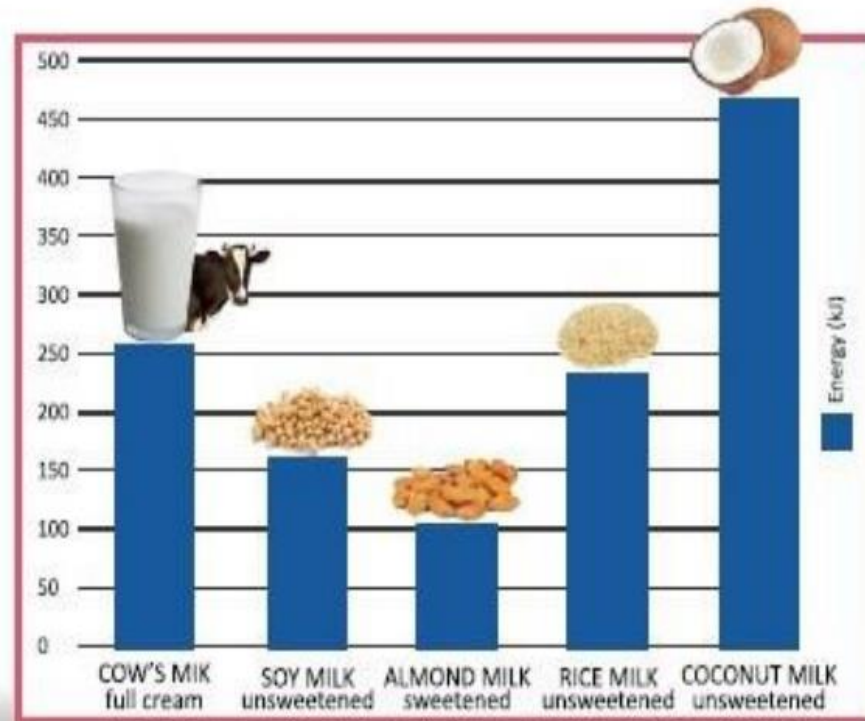


Composition comparison

Comparison of macronutrients per 100 g.



Comparison of energy content (kJ) per 100 ml.



Remember

When comparing beverages also consider:

- Cost
- Which Milk is the best deal?
- Taste
- Will you drink it?
- Availability
- Can you find it at your local store?



Summary

- Plant beverages are **a growing market** with significant spending support
 - The category *may gain strength* from new entrants that offer new health halos or from additional capital investment.
 - The category *may be vulnerable as focus on “added sugar”* intensifies and as **protein content is highlighted** and better understood by consumers.
- Plant beverages have **created a premium image** offering a large variety of choices, **appealing packaging**, and a narrative that connects to current consumer needs
- Plant beverages pull in younger consumers as well as multicultural consumers **Products are utilised as ingredients** in other beverages or as additives in cereal as well as beverages on their own, with marketing support encouraging these uses
- Plant-based beverages showcase their commitment to **sustainability** and social responsibility initiatives

Industry opportunity

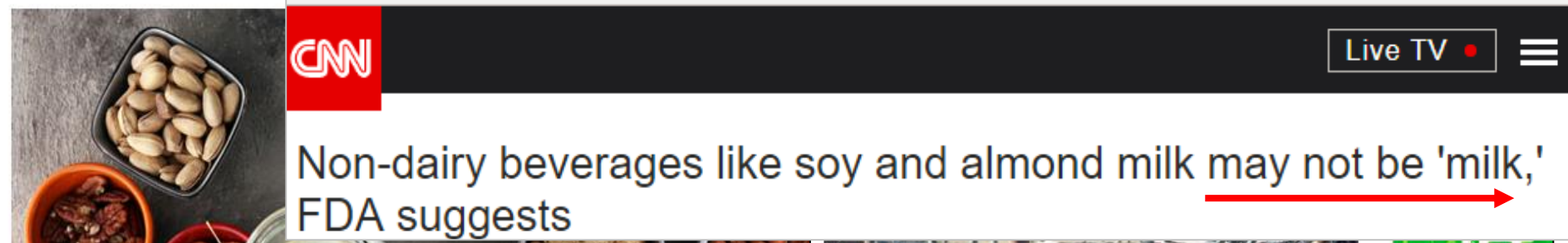
- Continue to **move dairy milk beyond a commodity image** by developing real milk's through continued innovation
- Promote Real Milk as an **ingredient in other beverages** – at retail level, in foodservice and as homemade (e.g., smoothies)
- **Improve communication** on dairy's value proposition
 - **Dispel myths** regarding the nutritional profile of plant beverages
 - Continue to leverage protein and milk as a **complete nutrient package**
- Showcase **dairy's sustainability** platform in communications

Labelling of milk-based alternatives - note for the industry



European dairy industry calls on bloc to get tough on 'misleading' labels

Three European trade bodies have issued a reminder to member states not to go soft on misleading practices.



FDA to crack down on misuse of 'milk'



NC State University will build a dairy education center and on-campus cafe off Lake Wheeler Road at the site of the university's dairy farm. There, the public will be able to learn about the university's herd, its milk and ice cream processing facilities.
By Travis Long

NATIONAL

If it doesn't come from a hooved animal, you can't call it 'milk,' NC bill says



Labelling of plant-based beverages in South Africa

The **CEP of Milk SA** is working with **DSA** to ensure labelling on dairy alternative products is controlled



agriculture,
forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

Directorate Food Safety and Quality Assurance, Private Bag X343, Pretoria 0001
30 Hamilton Street, Pretoria

From: Division: Animal and Processed Plant Products

Tel: (012) 319 6093 • Fax: (012) 319 6265 • e-mail: ThabangK@daff.gov.za

Enquiries: Ms. Thabang Rampa • Ref: 20.4.11.1.5/ Dairy and Imitation Dairy Products

13 June 2018

Managing Director
Dairy Standard Agency
Att: Mr. Jompie Burger

E-Mail: jompie@dairystandard.co.za

Dear Mr. Burger,

USE OF DAIRY TERMS TO DESCRIBE IMITATION DAIRY PRODUCTS

1. Introduction



Milk South Africa



Final words

Real MILK and other DAIRY are **natural food**

that provides an irreplaceable package of

9 essential nutrients:

- ✓ Calcium
- ✓ Potassium
- ✓ Phosphorous
- ✓ Protein
- ✓ Vitamin A
- ✓ Vitamin B12
- ✓ Vitamin B2
- ✓ Magnesium
- ✓ Zinc



The Food-based Dietary Guidelines for South Africans recommend “Have milk, maas or yoghurt every day” and for adults and children ages 9 and older to include 2-3 servings of dairy foods in their daily eating plan



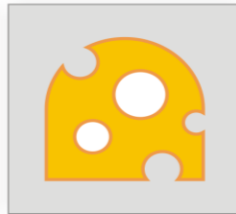


Consumer Education Project of Milk SA

Thank you



maretha@dairycep.co.za



Communicating the nutritional and health benefits of dairy

www.rediscoverdairy.co.za
www.dairygivesyougo.co.za