



Fortification of Dairy

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For health care professionals

Introduction



1. Why is food fortified and what is already fortified in South Africa?
2. What is the role of dairy in the human diet?
3. What are the recommendations for the inclusion of dairy – Department of Health
4. What are the consequences of excluding dairy and what are the alternatives?
5. Why is dairy villainised?
6. Why is dairy being fortified?
7. Who will benefit from fortified products?

Why is food fortified?



In South Africa, staples are fortified to combat nutrient deficiencies

Food fortified in South Africa

[mandatory]

- maize
- flour (bread and cake)
- bread

Voluntary fortified foods

- breakfast cereals
- margarine
- cooking oils
- milk and dairy
- salt
- Stock powder

South African Food Based Dietary Guidelines

South African Department of Health Guidelines on Dairy:

Core Recommendation:

Consume milk, maas (fermented milk), or yoghurt daily.

- Target Population: These guidelines are essential for children (2-3 servings/day for bone development) and adults (to maintain bone health).
- Recommended Types: Focus on low-fat or fat-free, unsweetened dairy products.
- Key Nutrients: Dairy is the primary source of bioavailable calcium in the South African diet, essential for peak bone mass, especially during adolescence.



South African Food Based Dietary Guidelines

Specific Recommendations:

- Maas (Amasi): A traditional fermented product, often better tolerated by those with mild lactose intolerance.
- Health Benefits: Helps combat obesity, type 2 diabetes, and cardiovascular diseases.
- Versatility: Incorporate into meals (e.g., in porridge).
- What to Limit: The guidelines advise against high-fat or highly processed dairy products to manage saturated fat, sugar, and sodium intake

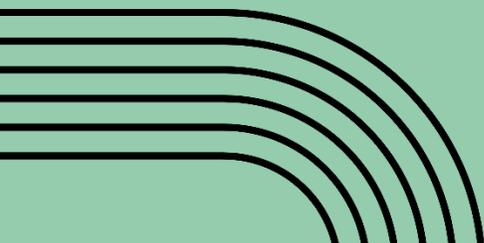
[Vorster, Wenhold, Wright et al. 2013]

[Taormina, Unger & Kraft, 2024]





What other recommendations are available?



The World Health Organization defines a healthy diet as one that consists mainly of fruit, vegetables, legumes, nuts and whole grains, together with moderate amounts of eggs, **dairy**, poultry and fish and small amounts of meat. Intake of whole and minimally processed foods is emphasised, while that of highly processed foods, often excessive in salt, saturated fats and sugars, should be restricted.

What makes dairy valuable?



Rich in Probiotics

Kefir and yoghurt provide a wide range of live probiotics, supporting gut flora balance, aiding digestion and immunity.



Highly Nutritious

High in protein, calcium, magnesium, and B vitamins, especially Riboflavin- optimize lean muscle mass & bone mineralisation



Easy to Use Daily

Convenient especially for children, adolescents and the elderly.

[Vorster, Wenhold, Wright et al. 2013]

What if dairy is excluded?

Macro-and micronutrient need to be replaced

- Probiotics for gut health
- Calcium for bones
- Tryptophan for calming the nervous system
- Proteins for cell repair and growth and prevention of sarcopaenia
- Riboflavin for energy production, maintenance of skin, hair and mucous membranes, crucial for eye health and supports erythrocyte production

Probiotic Rich

Bone Mineralisation

**Muscle synthesis
and repair**

Dairy alternatives

Rice milk: low in protein

Soya milk: good protein (7g per cup)

Almond / macadamia milk: lower fat

Oat milk: higher sugar content

Calcium availability 5-9x lower than skim milk

[Muleya, Bailey & Bailey, 2023]

Lactose intolerance

Saturated fats could increase cholesterol

Vegan and vegetarianism

Why is dairy villianised

Dairy can contain hormones: Recombinant Bovine Somatotropin

FDA and others state that this hormone is species-specific (not active in humans) and broken down in the digestive system

[Kolok, Bartlet-Hunt & Petali, 2018]

Lactose intolerance

cow's milk protein allergy

Saturated fats could increase cholesterol

Cost

Why is dairy villianised

Saturated fats in dairy have been associated with an increase in hyperlipidaemia

[Taormina, Unger & Kraft, 2024]

2-4% fat milk did not increase T2DM risk or mortality

regular fat yoghurt has been found to protect against obesity

Regular cheese not associated with CHD incidence, stroke

Regular fat milk had no effect on LDL-or total-chol



Why is dairy an appropriate vehicle for fortification ?

Dairy is consumed in large enough quantities to make it a suitable carrier for fortification.

New technology encapsulated micronutrients, stabilizing them in the milk

Dairy free options are fortified



Why is dairy an appropriate vehicle for fortification ?

Dairy is naturally high in calcium, but low in vitamin D. Fortification with vitamin D will improve absorption of calcium whilst also providing extra vitamin D.

Dairy is a good source of protein but low in iron. People who do not eat meat or struggle to chew, can have dairy

Extra calcium could assist people who struggle with volume and only 30% of calcium is absorbed

Recent developments

Added calcium and vitamin D

Some companies have added extra calcium and vitamin D to their milk products.

Added probiotics

Some companies have added probiotics to their yoghurt products [Bifido. animalis & L.paracasei]

Added protein

Some companies have added extra protein to their milk products.

Mobility Foresights, 2025



Recent developments

Added folic acid

Some companies have added extra folic to modified milk powders, dairy blends and growing up milks

Added iron

Some companies have added iron to dairy products aimed at children

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A

**Calcium
requirements 500
- 1200mg**



B

**Vitamin D
requirements 800
- 1000 IU**



C

**Folic acid
requirements 400 -
800 mgms**



D

**Iron requirements
8 - 18mg up to
27mg for
prenancy**



Why fortification?

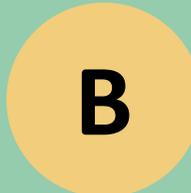
It is difficult to meet these requirements.

Milk can easily provide enough calcium, protein and riboflavin, but not vitamin D, folic acid or iron



A

Young children > 1
year



B

Adolescents



C

Pregnant & Lactating
women



D

Elderly



Who will benefit from fortification?

Fortified products are not necessary for everyone BUT there are vulnerable groups who might not be able to eat enough, have access to a variety of foods or have increased requirements



Practical application

What alternatives are there to the calcium found in dairy

How to get enough vitamin D

Are we getting enough folic acid

Are we getting enough iron?



Dairy replacements

Milk provides: per cup

~300 mg calcium

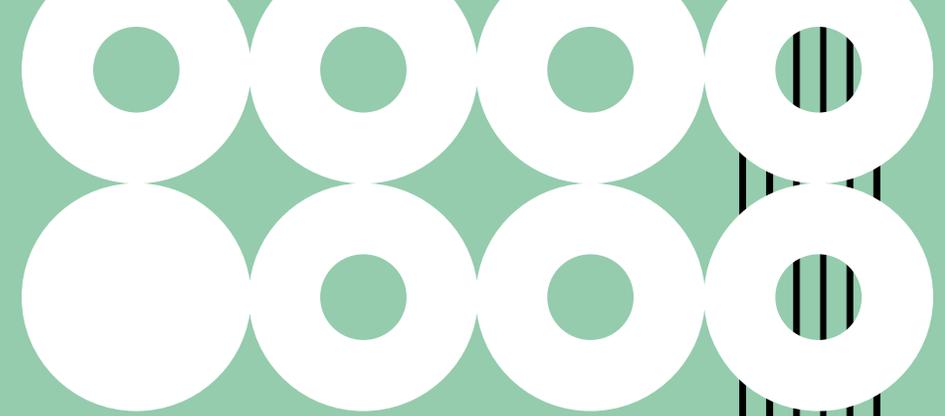
~ 0.4 - 4.4 IU vitamin D

~ 5- 10 mgm Folic acid

~ 0.1 mg Iron

~ 0.4 - 0.5 mg Riboflavin

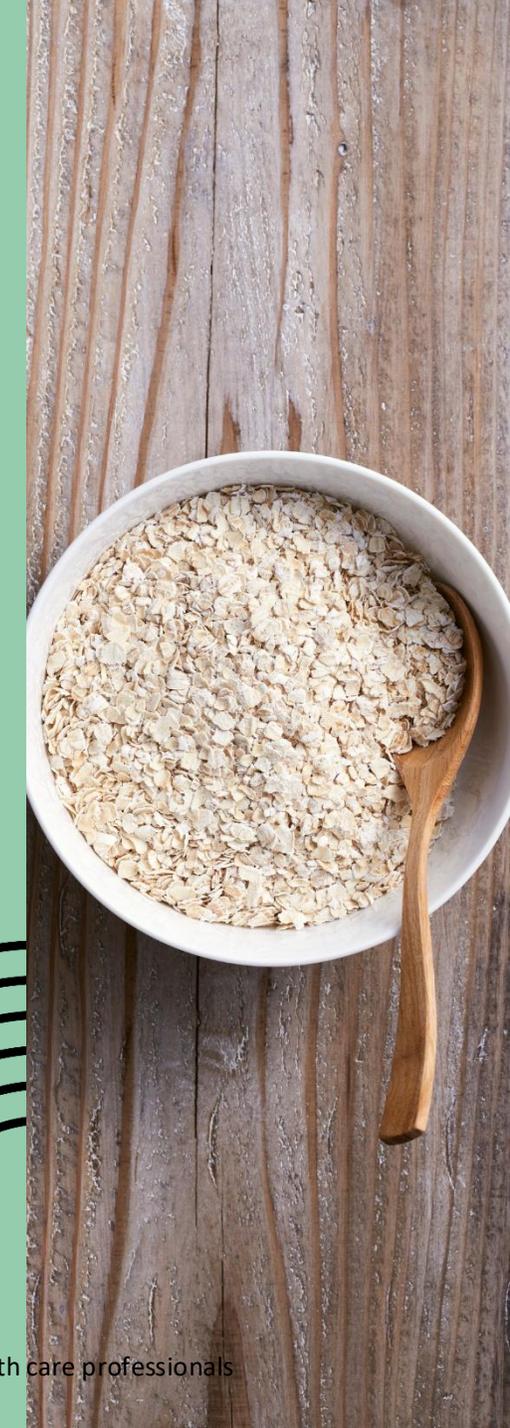
~ 8g protein





Calcium replacements

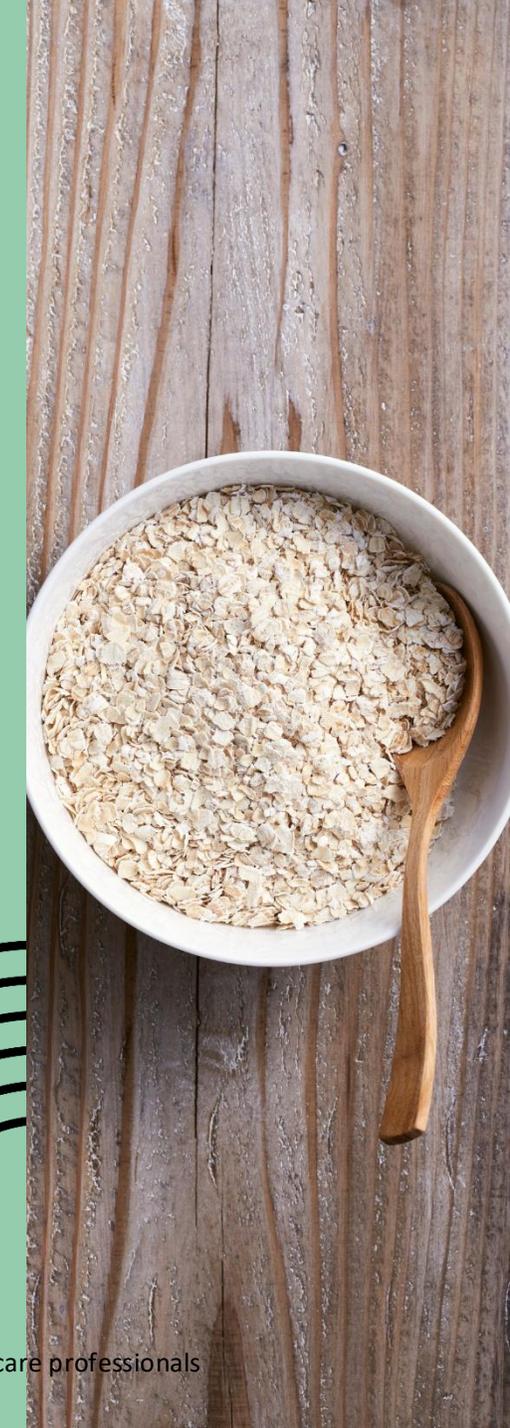
maize	16 portions	150g
oats	30 portions	150g
rice	10 portions	150g
chickpeas	2.6 portions	150g
lentils	4.6 portions	150g
peas	3.0 portions	150g
tofu	5.5 portions	150g
kale	0.2 portions	150g





Calcium replacements

almond milk	2.7 portions	200ml
oat milk	7.3 portions	200ml
rice milk	5.8 portions	200ml
soya milk	22.3 portions	200ml
raisins	8.2 portions	30g
apricots	8.4 portions	30g

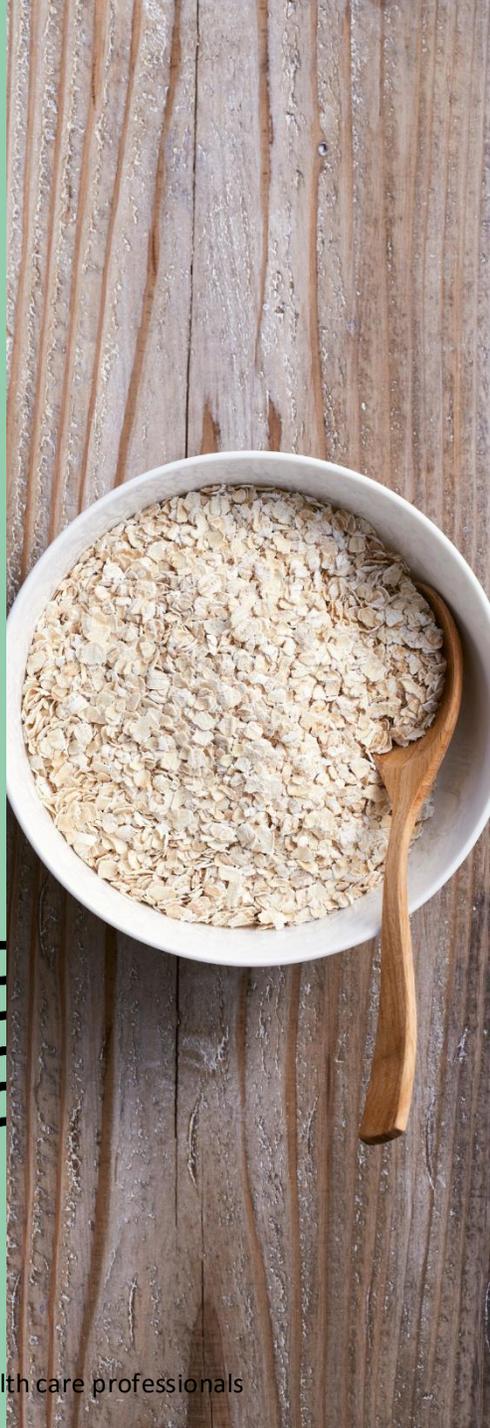




Vitamin D: 800 - 1000 IU

fatty fish	210-250 IU	100g
egg yolk	41-68 IU	1
Fortified cererals	80-350 IU	40g
liver	42 IU	90g
milk	0.4 - 4.4 IU	250ml
margarine	100 IU	15g
almond milk	100-160 IU	250ml
soya milk	100 - 120 IU	250ml

<https://odsfactsheets>VitaminD-HealthPractitioner.nih.gov>





Folic acid: 400 - 800 mgms

orange	55	1
egg yolk	22	1
liver	212	90g
asparagus	134	90g
beetroot	148	250ml
lentils	358	250ml
spinach	58	250ml
fortified cereals	140	250ml

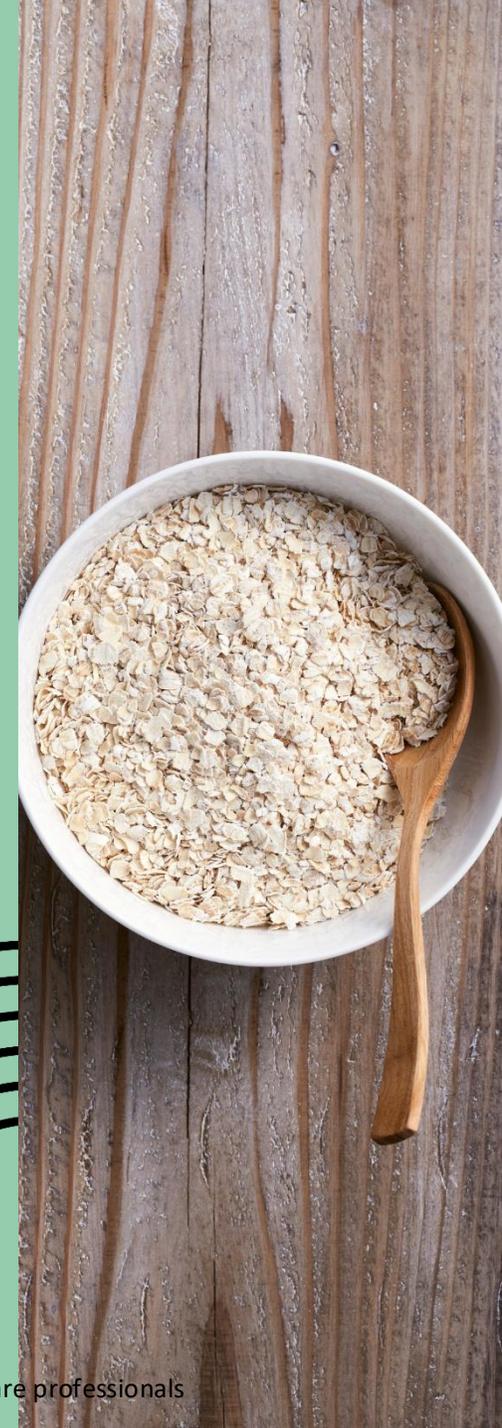


Iron: 8 - 18 mg (27mg pregnancy)

shellfish	3	100g
spinach	2.7	100g
liver	6.5	100g
lentils	6.6	1 cup
red meat	2.7	100g
pumpkin seeds	2.5	28g
tofu	3.4	125ml
dark choc	3.4	30g

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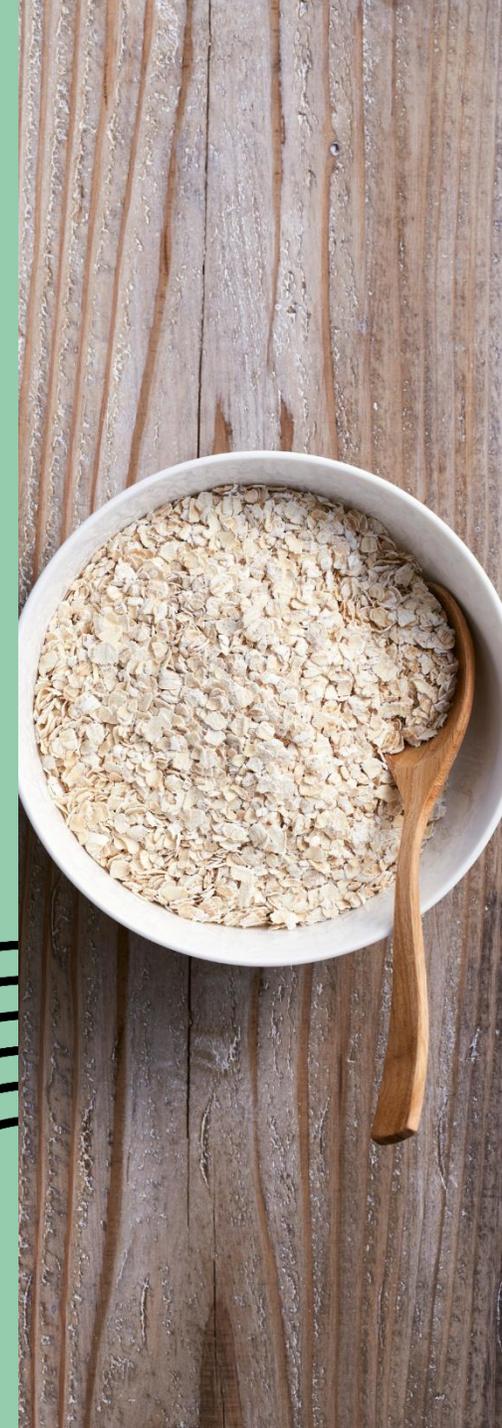


Riboflavin mg (1.1 - 1.3 mg)

milk	0.4 -0.5	250ml
soya mik	0.12	250ml
beet greens	0.4	250ml
liver	2.9 - 3.4	90 g
red meat	0.28 - 0.4	100g
egg	0.26	1
oats	0.15 - 0.6	125ml
almonds	0.3 - 0.33	30g

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Dairy replacements

8g Protein per cup

Equivalent alternatives

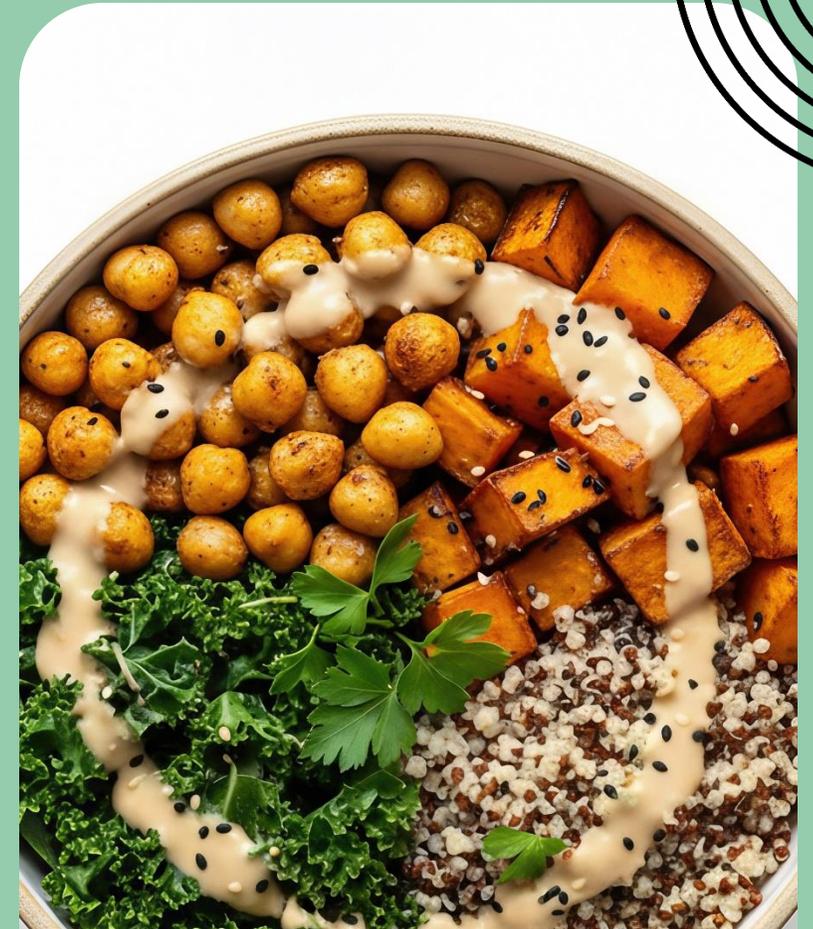
- ½ cup lentils → 9 g
- ½ cup soya beans → 16 g
- 2 tbsp peanut butter → 8 g
- ½ cup chickpeas → 7 g

To replace yoghurt (probiotics):

- 2–4 tbsp sauerkraut or kimchi
- 1 cup unsweetened soy yoghurt (with live cultures)
- 1 glass kombucha
- 1 cup miso soup

<https://www.hopkinsmedicine.org/bariatrics/nutrition-resources.html>

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Thank You



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