



# **Fight the light:** Shielding milk from nutrient loss

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### Overview:

Milk is a natural food that forms a vital part of the daily diet for most consumers. It effectively provides many of the essential nutrients including vitamins, protein and minerals. Essential nutrients are compounds that the body can't make and must be obtained from the diet<sup>(1)</sup>. They are vital for disease prevention, growth and good health.

Consumption data indicates that on average adults over 18 years of age drink approximately 1.45 litres of milk a week. Health professionals recommend that children over 12 months drink approximately 240 – 360 millilitres of whole milk per day, rising to 500 millilitres a day after 2 years of age<sup>(2)</sup>. It helps parents give their children the best start in life so that they can grow and thrive. Two to three glasses of milk per day (120mL each), help provide a high proportion of protein and other essential nutrients to keep a body healthy and reduce the risk of developing a range of diseases and developmental disorders.

## What essential nutrients does milk contain?

Essential Nutrient <sup>(3)</sup>	Why the body requires this nutrient	Percentage of RDA in 1 glass of milk <sup>(4)</sup>
Calcium	Maintains strong teeth and bones	27.6
Protein	Builds muscle and maintains strength	45.0
Vitamin B <sub>2</sub> (Riboflavin)	Turns carbohydrates, fats and protein into fuel for the body	34.4
Vitamin B <sub>3</sub> (Niacin)	Maintains and controls energy	1.6
Vitamin B <sub>5</sub> (Pantothenic acid)	Helps optimise protein, fats and carbohydrates	17.7
Vitamin B <sub>12</sub> (Cobalamin)	Helps blood cells and nervous system development	44.6
Vitamin A	Maintains growth and keeps eyes and skin healthy	7.6
Vitamin D	The sunshine vitamin: Helps maintain teeth and bones	49.0
Magnesium	Controls how your muscles and nerves work. It helps to keep your bones strong, heart healthy and blood sugar levels normal	6.0
Potassium	Regulate fluid balance, muscle contractions and helps nerve signals	7.4
Phosphorus	Works with calcium to help build strong bones. Helps the body's energy production and maintains cell membranes	31.7
Zinc	Helps the immune system fight off invading bacteria and viruses. Needed to grow and develop properly. Also helps wounds heal and is important for senses of taste and smell.	8.9

**Milk also contains all the essential amino acids required for optimum growth. Amino acids are the building blocks for proteins.**

**RDA: Recommended Daily Allowance.**

## Why are nutrients important in the daily diet?

Milk and other dairy products can help consumers meet their daily requirements for protein and calcium that, along with vitamins and trace minerals, can help maintain strong teeth and bones. Children grow very rapidly during the first 5 years of life and without sufficient quantities of these nutrients, growth and development may be compromised. Inadequate intake of these nutrients can contribute to disorders such as anaemia, poor muscle development and weakened bones (rickets).

## The importance of product labelling

Consumers increasingly rely on accurate information on product labels so that they can make informed purchasing decisions for health or lifestyle reasons. Nutrient content on pack labels is required by law in the UK and Europe and misleading claims can lead to complaints and possible legal action.

**The bottom line is that consumers must have confidence that labelling information for the products that they purchase is accurate and trustworthy.**

## Effects of light exposure in milk

Exposure to any kind of light rapidly reduces a range of essential nutrients and vitamins in milk. Independent scientific testing<sup>(5)</sup> has shown that some nutrients, in particular protein and vitamin B<sub>2</sub> (riboflavin) can decrease by 28% after just 20 minutes of light exposure. This light may be from sunlight (indoors or outdoors), retail lighting systems, kitchen lights or even refrigerator light. This light exposure can have detrimental effects on taste, producing off-flavours and odours, decreased freshness, shortened shelf-life, reduced vitamins and overall impaired nutritional value. With this in mind, consumers often do not get the required nutrients that they expect daily from milk.

A recent report by WRAP (2018), indicates that 490 million pints of milk are wasted by households in the UK at a cost of £25 million each year, some of this waste could be prevented by light-protective packaging of milk<sup>(6)</sup>.

## Milk Packaging

Over 3 billion milk bottles are produced each year in the UK, with the major supermarkets supplying around 62% of all milk sold. The container used is usually made of PET or HDPE, in a translucent or solid white colour. Milk is usually stored refrigerated, kept in well-lit display cabinets that use LED or fluorescence light sources.

## Light Damage

Research has shown that LED and fluorescence lights in retail and home settings cause light damage to taste, freshness, nutrients and specifically cause vitamin degradation.

Consumers are becoming more aware of the detrimental effects of light on the nutritional and sensory quality of milk and they want to choose products that they can have confidence in.

New technology incorporated into the materials that bottles are made from has been developed by independent scientists that significantly protects the delicate light-sensitive nutrients in milk products<sup>(7)</sup>. A glass bottle has no protection at all from taste and nutrient decline due to light degradation. Nevertheless, any white bottle claiming light protection simply is not the case. There are degrees of light protection just like there are degrees of sun protection. Extensive taste testing by sensory panellists at Virginia Tech in the USA<sup>(8)</sup> has shown that the natural flavour of milk is retained when stored in the new bottle design and that shelf-life and freshness can be extended, which also reduces wastage and saves money.

## Assurance of Certification for Light Protection

In order to ensure light protection claims are valid, Noluma™ International LLC uses state-of-the-art patented technology that can assess, measure and verify the light protection capacity of packaging. Noluma™ advises manufacturers on technical design features that can ensure optimum light protection. This certification scheme is increasingly recognised as a marque of quality and assurance that consumers are looking for and can have confidence in.

## Sources of information:

- 1: <https://www.who.int/elena/nutrient/en/>
- 2: <https://www.nhs.uk/live-well/eat-well/milk-and-dairy-nutrition/>
- 3: <https://dairygood.org/content/2018/the-importance-of-milks-9-essential-nutrients>
- 4: <http://www.milkfacts.info/Nutrition%20Facts/Nutrient%20Content.htm#Tab1>
- 5: <http://news.cornell.edu/stories/2018/01/bright-led-dairy-cases-speed-flavors-skim-milk>
- 6: <http://www.wrap.org.uk/blog/2018/11/farm-fridge-how-we-can-all-play-our-part-reducing-milk-waste>
- 7: <https://www.dairyreporter.com/Article/2018/01/08/Study-says-protective-packaging-may-be-needed-to-prevent-milk-from-LED-light-damage>
- 8: <https://www.hillphoenix.com/milk-flavor-profile-influenced-retail-lighting-packaging/>

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