

Nutritional Value of milk and benefits of “Grass-Fed”

Dr Tom O’Callaghan

Pasture Summit

July 7th, 2021



School of Food and
Nutritional Sciences

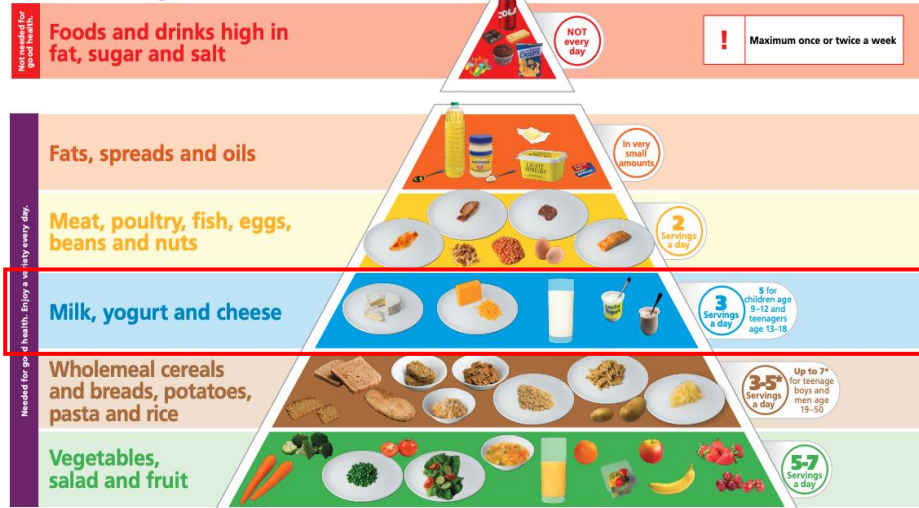


Department of Health Dietary Guidelines

Healthy Food for Life www.healthyireland.ie 

The Food Pyramid

For adults, teenagers and children aged five and over



3 servings per day
5 servings for those aged 9 – 18 years

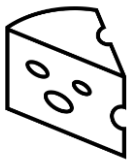


Milk is a naturally rich source of a wide range of nutrients beneficial to human health and development

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The composition of milk



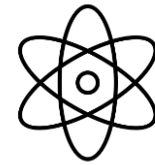
Protein
~3.2 – 4%



Fat
~3.5 – 5%



Lactose
~4.5 – 5%

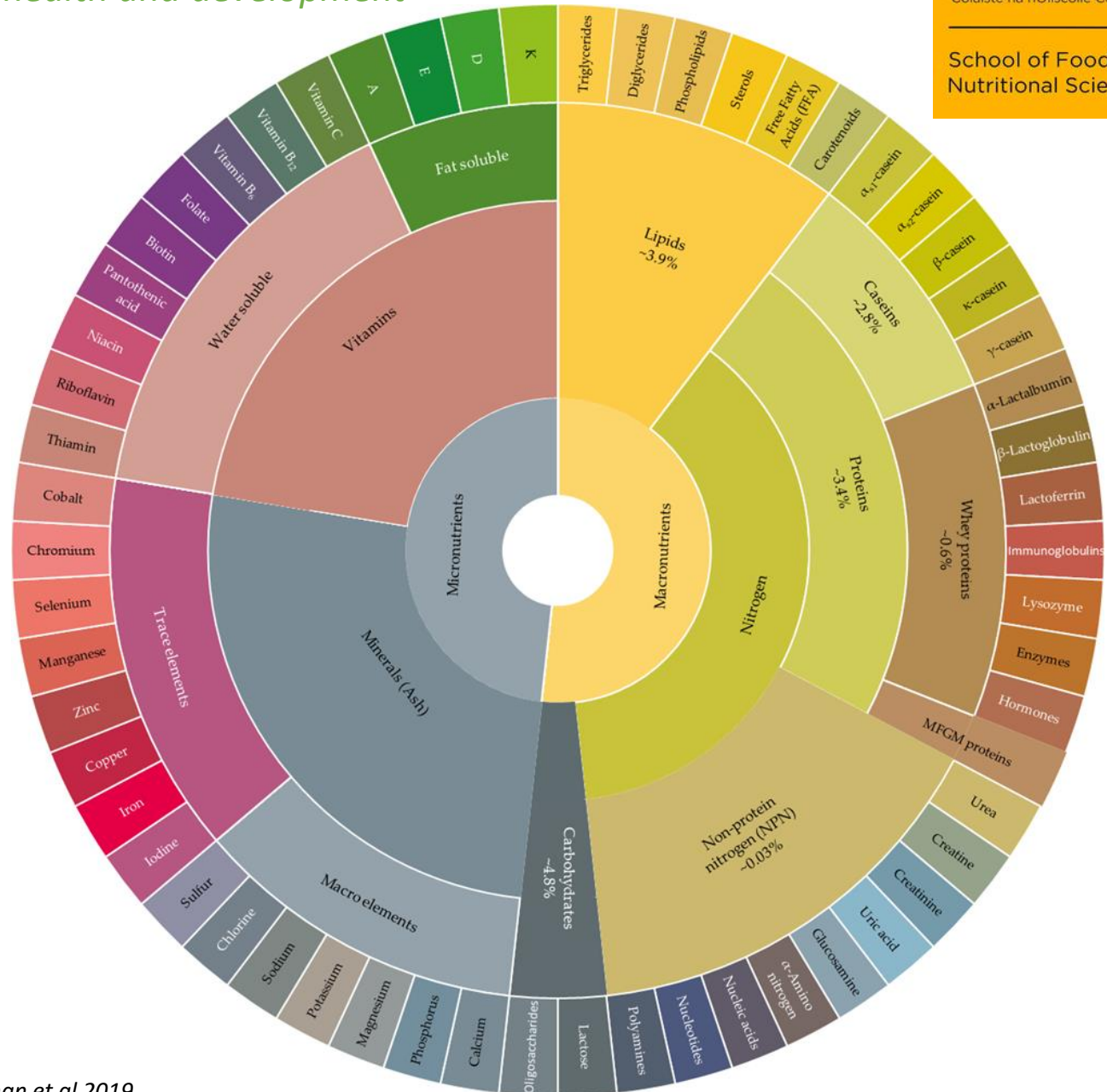


Minerals & Vitamins

Milk is a naturally rich source of a wide range of nutrients beneficial to human health and development



The composition of milk...
Is far more complex

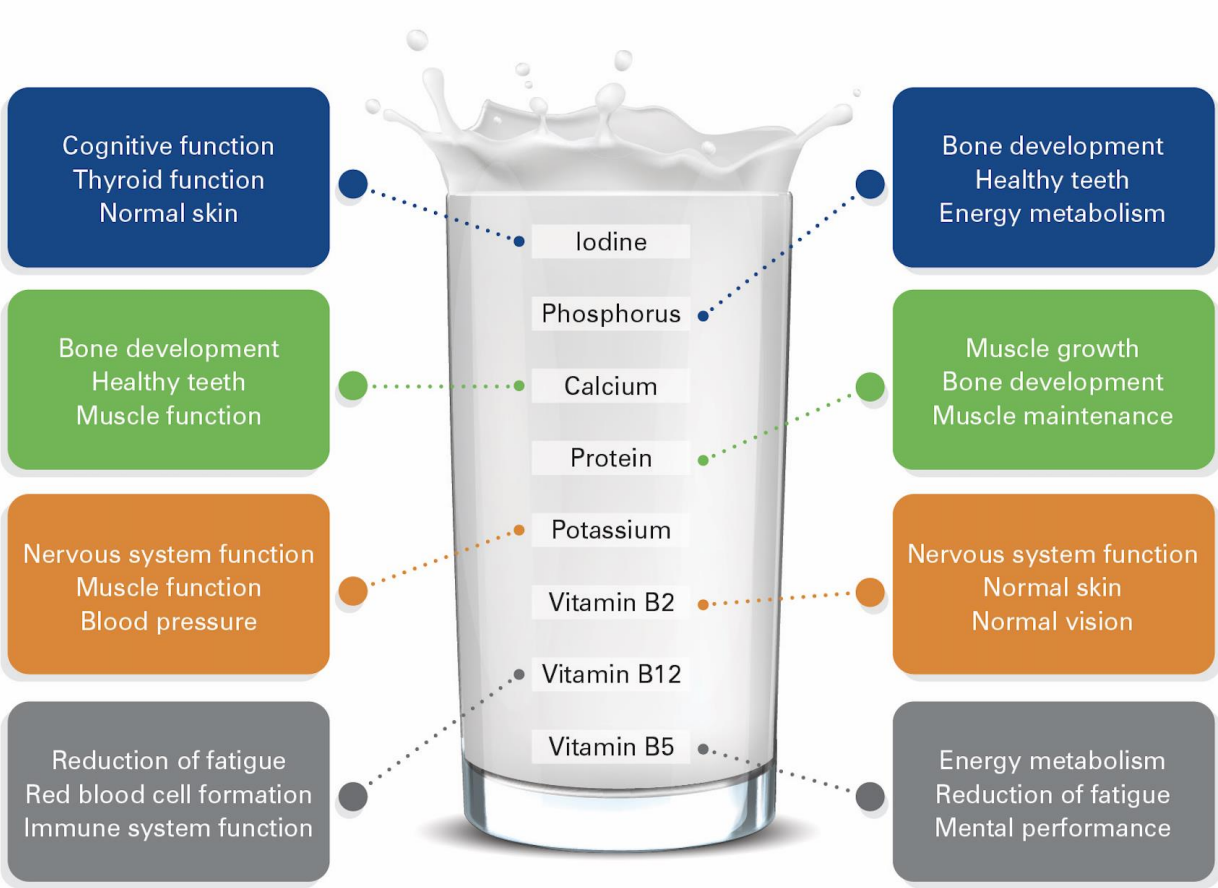


Source: The "Grass-Fed" Milk Story..., Alotman et al 2019

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The composition of milk

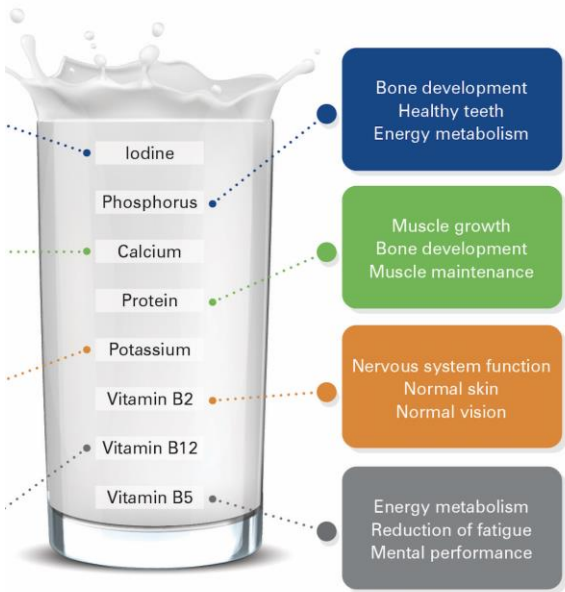


Source: EU Register of Nutrition and Health Claims made on foods

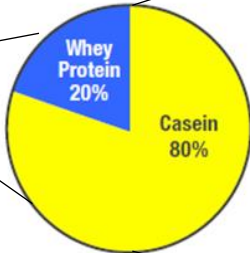
Milk is a naturally rich source of a wide range of nutrients beneficial to human health and development



The composition of milk



COMPOSITION OF MILK PROTEIN



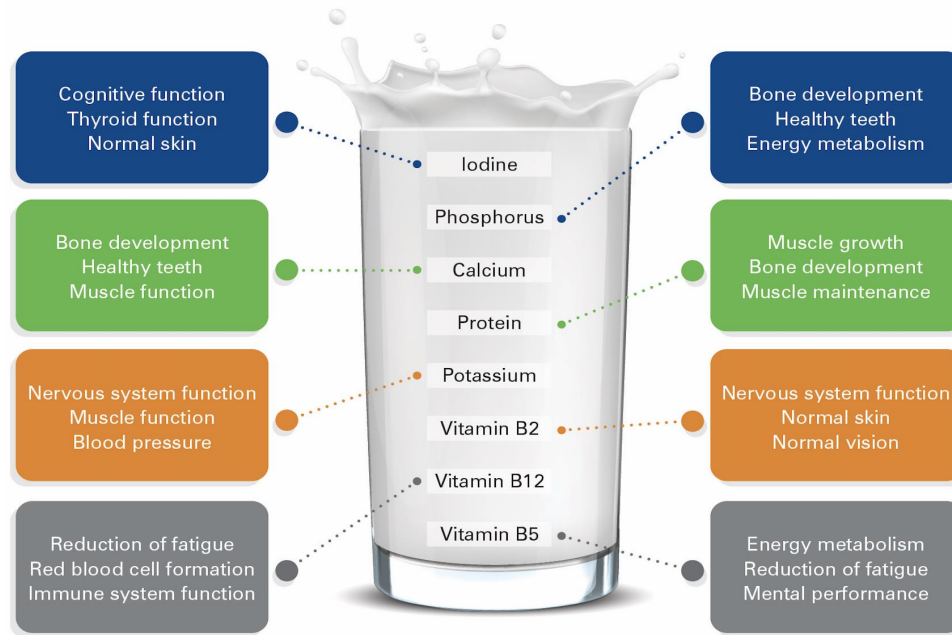
| Essential Amino Acids | Non-Essential Amino Acids |
|-----------------------|---------------------------|
| Histidine | Alanine |
| Isoleucine* | Arginine** |
| Leucine* | Asparagine |
| Lysine | Aspartic acid |
| Methionine | Cysteine** |
| Phenylalanine | Glutamic acid |
| Threonine | Glutamine** |
| Tryptophan | Glycine** |
| Valine* | Proline** |
| | Selenocysteine** |
| | Serine |
| | Taurine** |
| | Tyrosine** |

*Branched-chain amino acid
**Conditionally essential amino acid



A complete protein food

Milk is a naturally rich source of a wide range of nutrients beneficial to human health and development



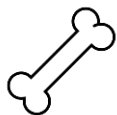
Source: EU Register of Nutrition and Health Claims made on foods

The unique combination of nutrients and bioactive factors, and how they interact with each other in the dairy matrix combine to produce an overall health effect.

Linked to a number of potential health benefits in areas such as:



Blood Pressure



Bone Health



Weight Control



Type 2 diabetes



Cardiovascular disease



Sports Nutrition



Maintaining elderly muscle mass and function



Marketing and promotion of Grass-Fed



School of Food and Nutritional Sciences



Ornua
THE HOME OF IRISH DAIRY

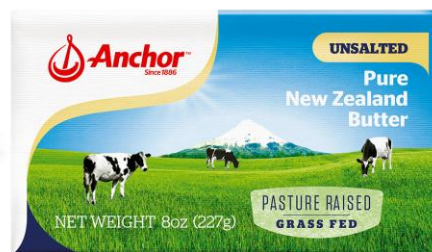
Our Group What we c



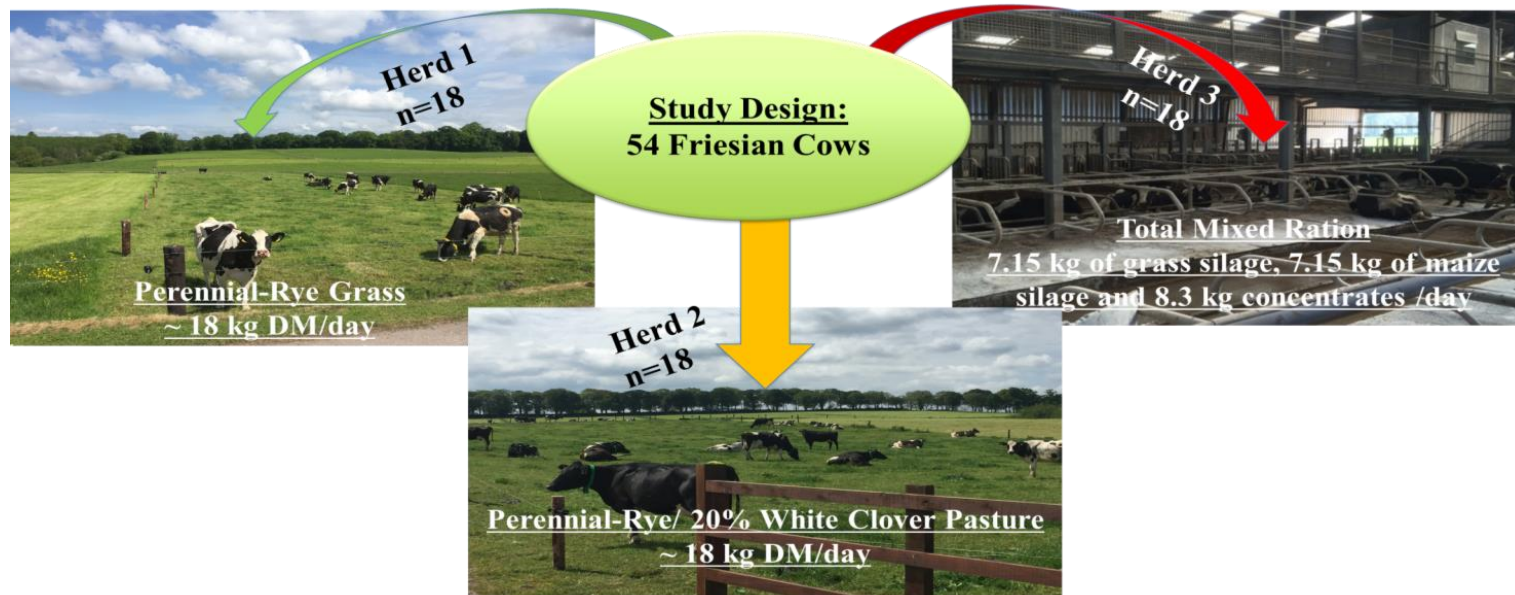
IT'S A NEW DAWN FOR IRELAND'S DAIRY INDUSTRY



Foods



The Teagasc “Profiling milk from grass project”



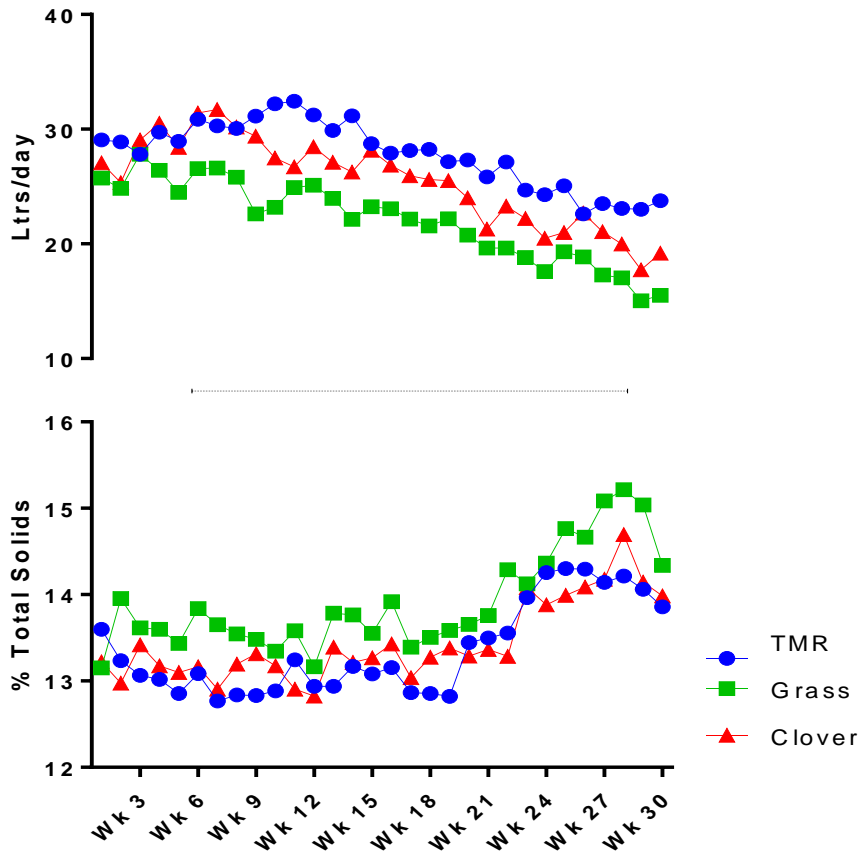
- Milk production, composition and quality
- Butter characteristics and quality
- Cheese composition, quality and characteristics
- Milk and Rumen Metabolome
- Tools for the prediction and verification of pasture derived milk



The Teagasc “Profiling milk from grass project”

- Milk production, composition and quality

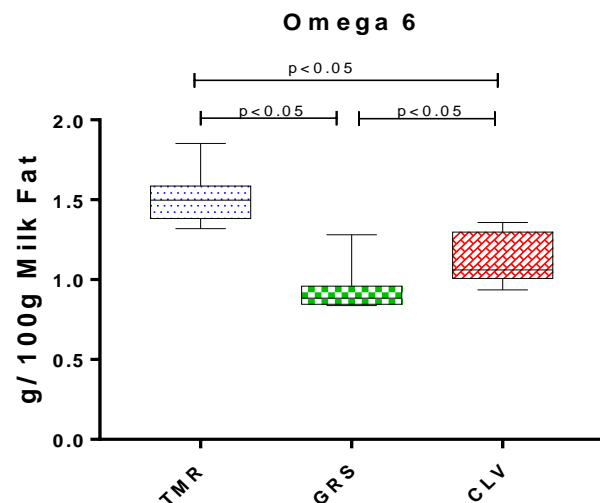
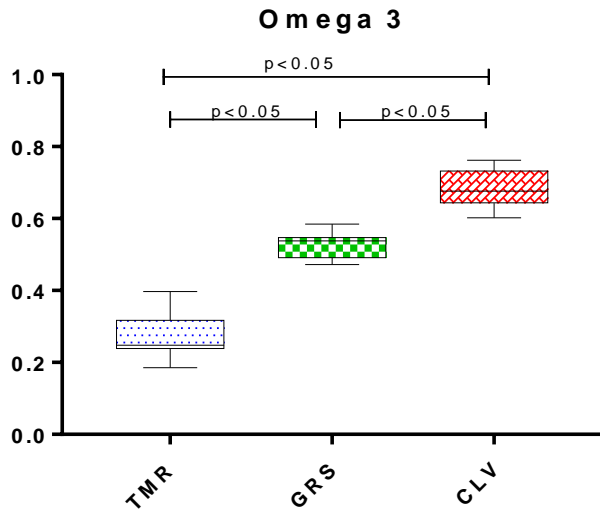
Production and Solids



- Increased total solids overall for lactation
 - Driven by increased levels of fat and protein in pasture milk.
 - No difference in lactose concentrations
 - Increased levels of beneficial fatty acids particularly CLA in pasture derived milks
 - Increased levels of palmitic acid (saturated fatty acid)



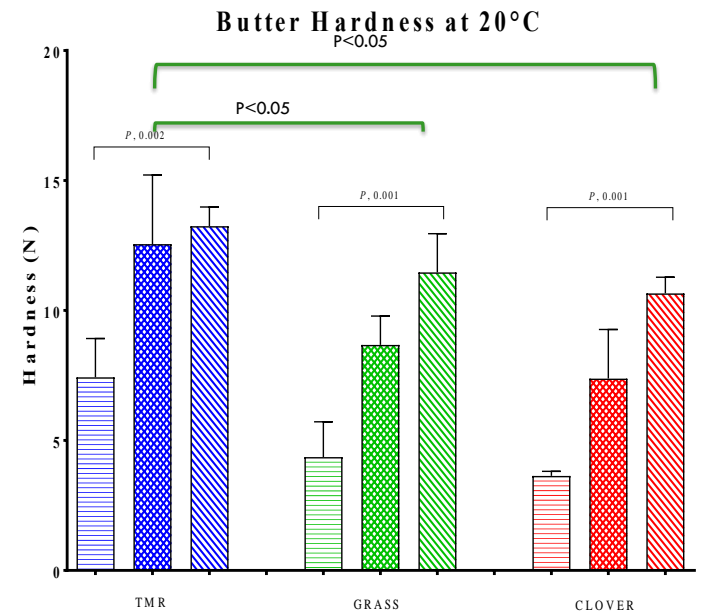
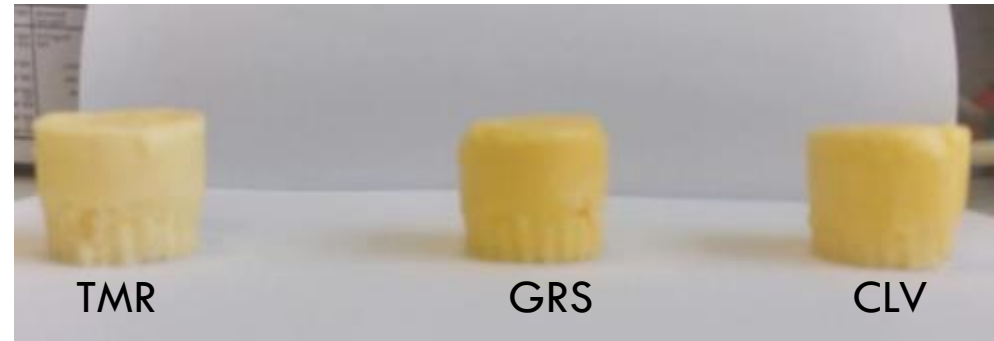
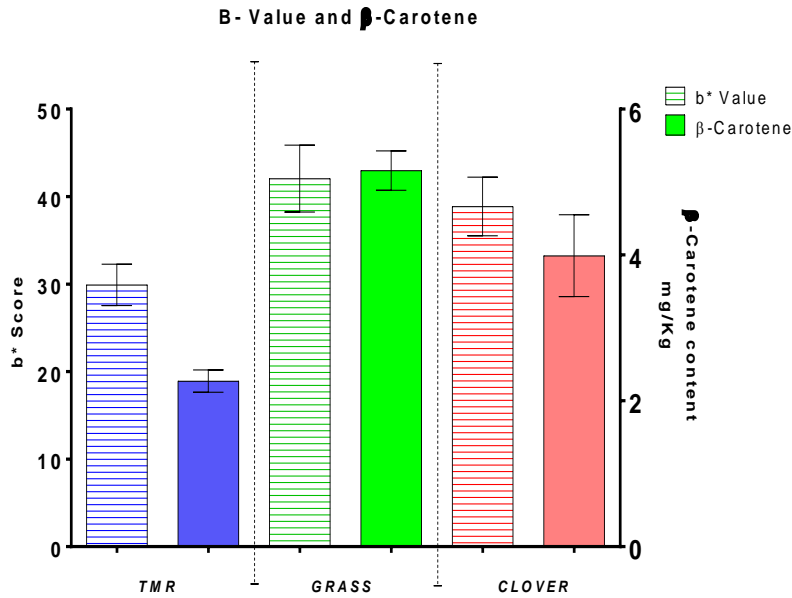
The Teagasc “Profiling milk from grass project”



- Essential fatty acids.
- Precursors to compounds with roles in inflammation
 - Omega 3 derivatives possess anti-inflammatory properties
 - Omega 6 derivatives possess pro-inflammatory properties (Patterson et al., 2012)
- Western diet has resulted in ↑ Omega 6 fatty acid (Molendini-Coste et al., 2010)
- Concomitant increases in chronic inflammatory diseases (Patterson et al., 2012)
 - non-alcoholic fatty liver disease, cardiovascular disease,
 - obesity,
 - inflammatory bowel disease, rheumatoid arthritis and Alzheimer’s disease
- Foods rich in Omega 3 FA could be beneficial in reducing risk of such diseases (Benbrook et al., 2013)

The Teagasc “Profiling milk from grass project”

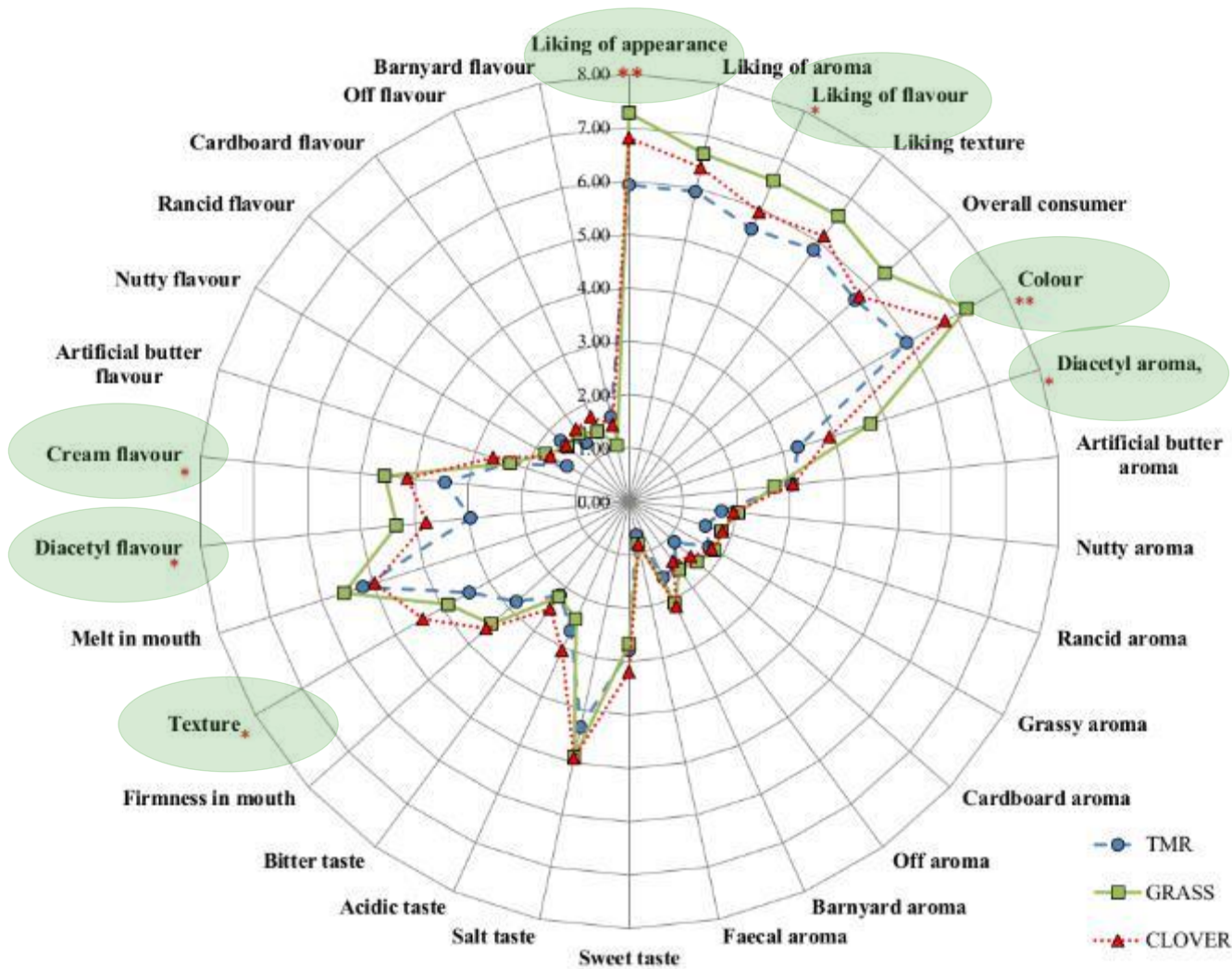
Naturally soft textured golden butter





The Teagasc “Profiling milk from grass project”

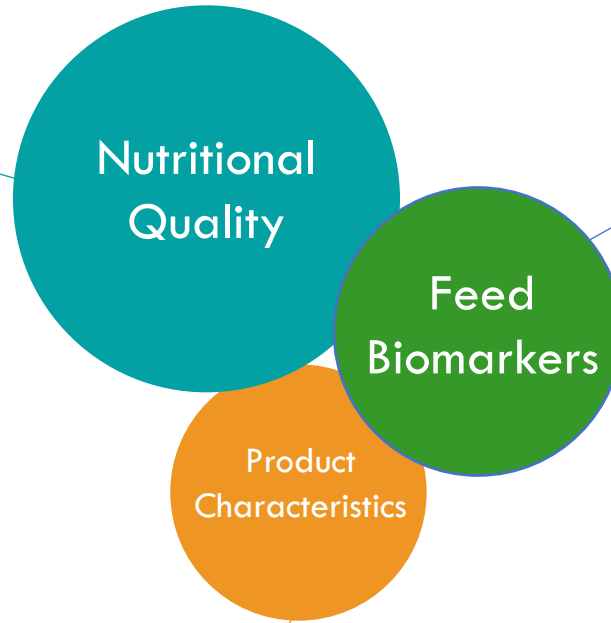
Naturally soft textured golden butter





Summary

- Milk is a natural highly nutritious food product
- Pasture feeding increased concentrations of Omega 3, CLA, VA
- TMR Feeding increased concentrations of Omega 6 fatty acids, palmitic acid



Several compounds have been identified as being significantly higher in pasture derived products and show potential to be biomarkers, including; CLA, β -carotene (characteristic yellow colour), toluene, dimethyl sulfone and hippuric acid.

Diet induced alterations to milk has a significant effect on product textural, volatile, sensory and colour properties





Thank You

Tom_ocalaghan@ucc.ie

Acknowledgements

Dr Marianne Walsh – Irish National Dairy Council