



Investigation of the sensory characteristics and acceptability of vitamin D₃ fortified semi-skimmed milk

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In the absence of endogenous synthesis during the winter months, the population is reliant on the few natural dietary sources of vitamin D, as well as fortified foods to maintain their vitamin D status. Vitamin D fortification is already implemented in everyday food stuffs such as milk and margarine in several countries including the US and Canada⁽¹⁾, but despite the more northerly latitude and high levels of cloud cover, milk fortification generally does not take place in the UK and Ireland. Whilst the benefits of fortification are well known, little literature exists on the impact of such methods on the sensory qualities of cow's milk. Therefore, the aim of this study was to investigate the sensory characteristics and acceptability of vitamin D₃ fortified semi-skimmed milk compared to unfortified shop-bought semi-skimmed milk.

The milk used in this study included two batches of fortified semi-skimmed cow's milk; one containing a vitamin D₃ premix in a lactose carrier (Fortified L), and the other in a dextrose carrier (Fortified D) (LycorEd Ltd, Kent, UK). Unfortified semi-skimmed cow's milk was used as a control. Regular consumers of pasteurised semi-skimmed cow's milk (aged between 20–40 years) consented to take part in the study (*n* 54). Analysis of the milk was carried out within the Sensory Analysis Suite following a double-blinded procedure. Participants were seated in individual test booths and asked to rate the samples on their appearance, aroma, taste and general acceptance using a hedonic descriptive scale (1 = excellent to 5 = terrible) within the Compusense 5 software (Compusense Inc., Ontario, Canada).

Milk	General Acceptance					Willing to consume as part of habitual intake*	
	Excellent	Good	Fair	Poor	Terrible	Yes	No
Control	51.9	42.6	3.7	1.9	0.0	90.7	9.3
Fortified D	50.0	35.2	13.0	1.9	0.0	83.3	16.7
Fortified L	44.4	33.3	13.0	9.3	0.0	72.2	27.8

Data used is % of total participants (total *n* 54).

* Significant difference between responses ($P < 0.05$, assessed by Chi-Squared test).

Despite the majority being able to correctly identify the fortified milks compared to the control ($P = 0.026$) there was no significant difference in the level of acceptability between the three types of milks ($P = 0.190$). These results suggest that there is a high acceptance of vitamin D fortified milk, irrespective of the carrier used (lactose or dextrose). Furthermore participants would be willing to consume both samples as part of their habitual diet.

Whilst further consumer testing is required, these results do suggest a high consumer acceptability of vitamin D₃ fortified milk and highlight the possibility of using milk fortification as a method to improve the vitamin D status of the population.

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1. Calvo MS, Whiting SJ, Barton SN (2005). *J Nutr* 135, 310–6.