

## Abstract

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# Palatability, absorption, compliance and usability of ready-to-drink compact ONS formulation containing functional dairy proteins: Programme of Research

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Malnutrition is a significant issue among older New Zealanders, with 24% malnourished and 35% at high risk<sup>(1)</sup>. Oral nutritional supplements (ONS) are prescribed to improve nutrient intake in malnourished or at-risk individuals. Evidence supports that ONS can enhance energy and protein intake<sup>(2)</sup>. However, efficacy depends on regular and adequate consumption. Fonterra Research and Development Centre sponsored a research programme of three interventions with the aim of assessing the liking, absorption, and compliance of ONS formulations (containing functional proteins at 9.6% and 14.4% w/v protein) versus commercial comparators. A feasibility study was also done to assess whether ONS could be used to fortify foods in a residential care setting. All trials received ethics approval. In study one (trial registration: NCT04397146), the palatability and satiating effects were evaluated in 104 participants. Fonterra's 14.4% protein ONS was well-received for sweetness, creaminess, and texture, while the 9.6% protein ONS had lower palatability. Satiety levels were similar across all products. Key drivers of overall liking included smooth texture, pleasant taste, and ease of drinking. In study two (ACTRN12621000127808), a randomized, double-blind crossover trial of 18 healthy adults, the post-prandial effects of Fonterra's formulation compared to energy and protein matched commercial products on amino acid (AA) appearance and gastric emptying were examined. Fonterra's 14.4% protein ONS significantly increased the incremental area under the curve and peak concentration of essential and branched-chain AA, including leucine, compared to control ( $p < 0.05$ ). These findings suggest potential benefits for muscle mass preservation in at-risk patients. In study three (ACTRN12622000842763), a randomized, single-blind crossover trial, 100 older adults completed compliance and tolerance assessments of Fonterra's formulation compared to energy and 9.6% protein matched commercial product. Compliance for all three ONS was high, with mean compliance rates of 96.1% for Fonterra 9.6%, 94.5% for Fonterra 14%, and 95.2% for comparator. Palatability scores were not significantly different. Adverse events were minimal and short-lived, mainly occurring on the first day; 30–50% of participants reported tolerance issues, such as flatulence, bloating, and burping, regardless of the product. No significant differences in satiety were observed between the interventions. Lastly, a pilot study assessed the feasibility of incorporating ONS into foods in a residential care setting. The chef found the ONS easy to work with and add to desserts, which subsequently increased the protein and calcium content of main meals. Residents found the fortified desserts palatable and acceptable. This research programme supports the use of ONS assisting older adults to meet their nutrient requirements and demonstrates that formulations containing Fonterra's functional proteins are well-accepted, effective in increasing amino acid appearance, and easily incorporated into institutional diets, with high consumption compliance and minimal adverse effects.

**Keywords:** malnutrition; older-adults; protein; oral-nutritional-supplements

**Ethics Declaration:** Yes

## References

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