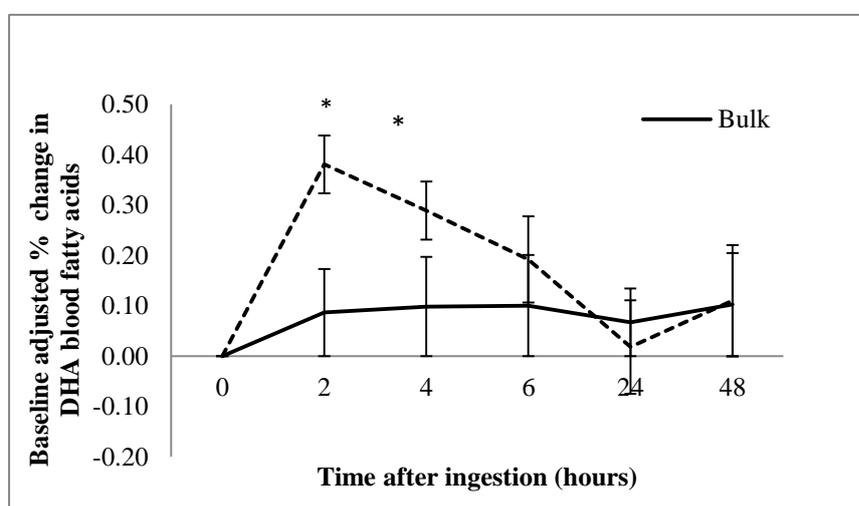


Nanoemulsion of high DHA vegetarian algal oil enhances DHA bioavailability – a randomised crossover trial. By K.E. Lane¹, W. Li², C. Smith² and E.J. Derbyshire³,
¹Faculty of Education, Health & Community, Centre for Tourism, Events & Food Studies, Liverpool John Moores University, Liverpool, United Kingdom L17 6BD. ²Department of Food and Tourism Management, Manchester Metropolitan University (MMU), Manchester, M15 6BG. ³School of Healthcare Science, MMU, Manchester M1 5DG.

Research has identified that vegetarians/vegans, non-fish eaters and pregnant women may not consume adequate quantities of long chain omega-3 polyunsaturated fatty acids (LC3PUFA)⁽¹⁻³⁾. Food-based oil in water nanoemulsion systems may offer a potential vehicle to improve LC3PUFA intakes when used to create enriched food products, especially for populations who do not consume oily fish or have restricted intakes. The use of nanoemulsions has been found to improve the bioavailability of lipophilic compounds such as curcumin and delta tocopherol^(4, 5) but its application to vegetarian sources of LC3PUFA has not been studied widely.

In a randomised crossover study, eleven volunteers (mean age 33.6 years SD 10.3; BMI 23.8 SD 2.1) were recruited and asked to ingest a: 1) Yogurt drink containing algae oil and water nanoemulsion, providing 1264mg docosahexaenoic acid (DHA), or 2) Formulated yogurt drink containing bulk algae oil providing the same amount of DHA (control).



Fatty acid analysis was completed by fingertip blood sampling at 2, 4, 6, 24 and 48 hours with the validated ‘Omega Blood Count™’ test kit⁽⁶⁾. Percentage blood fatty acid increases were based on incremental area under the curve (iAUC) of baseline adjusted values.

Key: Mean baseline adjusted DHA values. Error bars represent the standard error (SE). Asterisks denote statistical significance (paired t-test $P=0.001$ and $P=0.040$ 0 to 2 and 2 to 4 hours respectively).

Results indicate that the absorption of DHA peaked 2 hours after ingestion for the nanoemulsion, with the iAUC being significantly higher for the nanoemulsion compared with the bulk oil 2 and 4 hours following ingestion ($P=0.001$ and $P=0.04$ respectively). Larger and longer trials are now needed but this preliminary trial indicates that nanoemulsion of high DHA vegetarian algal oil may help to improve DHA status in groups with low intakes.

This research was conducted in adherence to the Helsinki Declaration. Thanks go to John Dobson at DSM UK and Martek Biosciences Corporation, Columbia for the donation of the 35 per cent DHA S algae oil.

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