Product shelf life evaluation of an enriched yogurt drink containing an omega-3 nanoemulsion with enhanced bioavailability. By K.E. Lane[1], W. Li[2], C. Smith[2] and E. Derbyshire[2], [1]*Faculty of Education, Health & Community, Liverpool John Moores University, Liverpool, United Kingdom L17 6BD.* [2]*Manchester Metropolitan University, Hollings Faculty, Manchester, United Kingdom, M15 6BH*

Long chain omega-3 polyunsaturated fatty acids (LC3PUFA) have been linked to a range of health benefits, throughout the life cycle(1). Dietary surveys indicate that LC3PUFA are currently under consumed, particularly amongst vegetarians/vegans, adult men, pregnant/breast feeding women, infants, non-fish eaters and certain ethnic groups(2-4). New food vehicles such as micro algae oils have been developed to bridge this gap(5)

Nanoemulsions are systems with droplet sizes in range of 20 to 500nm(6). The incorporation of algae oil into foods using nanoemulsion has the potential to improve LC3PUFA bioavailability(7). However, nanoemulsion may also affect the shelf life of foods as increased droplet surface areas may lead to lipid oxidation(8).

The aim of the present single-blinded sensory evaluation study was to determine whether study participants (n=62) could detect differences when an algae oil nanoemulsion was integrated with a strawberry yogurt and tasted after storage over 2, 9 and 16 days at 4°C. All samples were prepared using breakfast drinking yogurt, natural sweetener and strawberry flavouring. Products were fortified with nanoemulsified high docosahexaenoic acid (DHA) algae oil to give a dose of 632mg DHA/100g yogurt. A full microbial analysis over 23 days established product safety.

To determine how shelf life may be affected, seven sensory attributes were chosen to assess consumer acceptability: 1) smell, 2) appearance, 3) flavour, 4) texture, 5) consistency, 6) aftertaste and 7) overall acceptability. Attributes were rated using a 9-point hedonic scale.

Sample	**Day 2^{B}**		**Day 9^{AB}**		**Day 16^{A}**	
Attribute	Mean	SD	Mean	SD	Mean	SD
Smell ***	5.19^{B}	2.16	5.97^{A}	1.47	6.29^{A}	1.65
Appearance	5.27	1.68	5.13	1.43	5.41	1.42
Flavour ***	3.54^{C}	2.07	4.27^{B}	2.10	4.90^{A}	1.99
Texture *	4.71^{B}	1.57	5.12^{AB}	1.56	5.35^{A}	1.74
Consistency	4.11	1.64	4.11	1.55	4.17	1.78
Aftertaste ***	3.79^{B}	2.12	4.35^{AB}	2.09	4.73^{A}	1.89
Overall acceptability ***	3.83^{B}	2.07	4.53^{A}	1.91	4.89^{A}	1.75

(Data are presented as means and standard deviations. Different letters in rows denote means that are significantly different to one another (*$P \leq 0.05$, ***$P \leq 0.001$).

Results were analysed using one and two-factor repeated measures ANOVA tests with Tukey and Duncan's tests and a Bonferroni correction at 5 per cent. No statistically significant differences were found within the 3 samples when the appearance and consistency was compared. The consistency of the day 16 sample was rated closest to 'just right' (midscale). However, refrigerated storage significantly improved the aroma, flavour, texture, aftertaste and acceptability of the enriched strawberry yogurt drink when compared at 3 intervals over a 16 day period. This may be due to the use of yogurt as a carrier vehicle, the strawberry flavouring and/or changes in nanoemulsion particle sizes over the storage period(9).

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