

Reviewer's report

Title: A randomised cross-over trial in healthy adults assessing the effect of emulsification on fatty acid and triacylglycerol absorption from an omega-3 rich oil mixture.

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Reviewer: Philip C Calder

Reviewer's report:

General

Here is my report on 'A randomised cross-over trial in healthy adults assessing the effect of emulsification on fatty acid and triacylglycerol absorption from an omega-3 rich oil mixture' by Iveta I Garaiova, Irina IA Guschina, Sue SF Plummer, James J Tang, Duolao D Wang and Nigel NT Plummer.

This is a manuscript reporting postprandial changes in total TAG, total NEFA and individual fatty acids following consumption of a single meal providing omega-3 fatty acids in an unemulsified or an emulsified form. Emulsification increased the postprandial TAG response and the appearance of EPA and DHA in plasma. This is interpreted as indicating improved bioavailability of these fatty acids from the emulsified oil. This may be so, but there are other interpretations such as impaired clearance and this is not recognised. Nor do the authors recognise that an enhanced postprandial TAG response is now seen as a cardiovascular risk factor. Thus emulsification could lead to a pro-atherogenic post prandial response.

In general I think that the study is an interesting one and is clearly timely from the point of view of industry. It appears to have been carefully done. The question posed by the authors is new and it is well defined. The methods used are appropriate and fairly well described; sufficient details are provided to replicate the work. The data appear sound and well controlled. Discussion and conclusions could be improved. The title and abstract are accurate. The writing is generally acceptable.

Major Compulsory Revisions:

1. When the authors use a term like "increased significantly", such as in the Results section of the abstract, do they mean "was higher than" compared to the other group or do they mean increased significantly over time within a group. This is not really clear and needs attention throughout the manuscript.
2. Last two words of the abstract suggest that "fish oils" are "fatty acids". They aren't - they contain fatty acids.
3. Background, line 5. Should state 200-500 mg per day.
4. Background. Does not mention pancreatic lipase.
5. What does "sufficient dietary intake of omega-3 fatty acids may be difficult to achieve" actually mean? What is sufficient? Please make this a sensible, scientific statement.
6. Methods. It is essential that the total carbohydrate, fat, protein and energy contents of the two meals are given.
7. How was intake of boiled rice, pasta and fruit controlled?
8. AUC does not represent "absorption of TAG or fatty acid" as stated on page 7. It represents the integration of absorption and clearance.
9. Page 7, 1st line of results. It is not characteristics that are reported in Table 2 but total plasma fatty acid concentrations.
10. Top of page 8. Has "poor absorption" of omega-3 PUFAs been reported before. It would seem that that would be the starting point for this study. If previous studies report high absorption, how could emulsification improve this? On the other hand if absorption is poor

11. Dietary TAG are normally emulsified in the intestine. Is this process not efficient or effective?

12. Page 9, line 9. But the "nature of the test meal" is controlled here.

13. I found the figures rather small and difficult to see. They will need to be improved for publication.

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.