Gastric stable emulsions provide increased bioavailability of long chain omega-3 fatty acids

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Objective

The present study comprises the design of as well as the effect of pre-emulsification of omega-3 fatty acids on the bioavailability of docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA).

In vitro studies have shown that long-term steric stabilization of an oil and water emulsion is obtained by arresting the oil droplets in a gelatin continuous gel matrix. The emulsion was also stable upon dissolution of the gel matrix at physiological conditions in vitro and is hence referred to as a gastric stable emulsion (GSE).

Procedure

In the bioavailability study, healthy young students were recruited and presented two different single-dose treatments of fish oil containing 5 grams of ?-3 fatty acids; one group receiving the fatty acids in traditional soft gel capsules, whereas the other group received the fatty acids using the GSE technology.

Time resolved (two to 26 hours) blood plasma analysis after intake of this single dose omega-3 fatty acids revealed significantly increased AUC0-26h and Cmax of EPA (45 and 100 percent, respectively) and EPA + DHA (43 and 106 percent, respectively) when administered as GSE compared to traditional soft gel capsules.

Results

In vitro results indicated that the fish oil presented in soft gel capsules may not have been as effectively emulsified in the stomach compared to fish oil in a GSE formulation, which in turn would have led to a reduced conversion rate (per unit time) of the pancreatic lipases.

Conclusion

The overall conclusion hence becomes that omega-3 fatty acids, such as docosahexaenoic acid and eicosapentaenoic acid, will exhibit improved bioavailability and absorption in blood plasma by being pre-emulsified into an acid stable emulsion prior to oral ingestion.

References

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