cost analysis of EPA and DHA from fish, supplements and foods

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Background

The importance of omega-3 fatty acids in healthy diets is evidenced by the Adequate Intake (AI) for alpha-linolenic acid (ALA) set by the Institute of Medicine. This recommendation is based on an intake that supports normal growth and neural development. Research interest has centered around two additional omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), due to the health benefits shown in randomized control trials. Evidence indicates that consumption of fish from species which are high in EPA and DHA can reduce the risk of cardiovascular disease by 36% (Mozaffarian and Rimm, 2006). Although there is currently no DRI for either EPA or DHA, the rationale for the 500 mg/day recommendation is based on the recommendation of consuming 3 oz of fatty fish twice a week (Kris-Etherton, 2007). Dietary sources of DHA and EPA include fish, fish and algal oil supplements, nervous tissue, DHA enriched eggs, and DHA fortified products.

Objectives

The objective of this study was to determine the most cost-effective food source of EPA and DHA, as well as considering the amount of fish and supplements to achieve a total of 500 mg per day.

Methods

This project is part of the project on Food Markets, Nutritional Standards and Minimum Cost Diets in Hawaii, which was approved by the University of Hawaii Committee on Human Studies. During the months of June and July 2010, seven grocery retail stores in Oahu were visited to collect data on pricing of seafood, fortified products, and nutritional supplements containing EPA and DHA, where specific nutrient data was available. A nutrient database comprising fourteen food composition databases, along with USDA nutrient database, and product nutrition labels were used for the nutrient analysis (Sioen, 2007). The method of processing as well as whether the seafood was wild or farm raised was taken into account as this can have an impact on EPA and DHA content. Species identification when needed was based on country of origin and most commonly consumed species.

Results

Data was collected on 220 items containing EPA and DHA, based on availability of nutrient analysis data.

Methods cont.

EPA and DHA, where specific nutrient data was available. The most economical sources (cost to consume 500 mg of EPA and DHA) were fish oil supplements ($0.09), canned salmon ($0.37), canned sardines ($0.39), DHA enriched eggs ($1.32), and pelagic marine fishes ($1.42). The most expensive food sources of EPA and DHA were demersal marine fishes (flatfish, cod, orange roughy) costing $10.69 and soymilk fortified with DHA costing $5.64 to consume 500 mg of EPA and DHA. Consuming fish oil supplements required the least amount to obtain the recommended 500 mg/day EPA and DHA at 0.4 oz per week. Omega-3 enriched eggs, algae and seaweed, along with fortified milk and milk alternatives are not practical as the sole food sources of EPA and DHA due to the amount required to meet the 500 mg recommendation. Strategies such as changing the fatty acid profile of farmed fish, food enrichment, and increased emphasis on consumption of fish are needed to increase dietary intake of omega-3 fatty acids. Consumer education is needed to differentiate between the different omega-3 fatty acids and their potential for health benefits.

Conclusion

The most economical sources (cost to consume 500 mg of EPA and DHA) were fish oil supplements ($0.09), canned salmon ($0.37), canned sardines ($0.39), DHA enriched eggs ($1.32), and pelagic marine fishes ($1.42). The most expensive food sources of EPA and DHA were demersal marine fishes (flatfish, cod, orange roughy) costing $10.69 and soymilk fortified with DHA costing $5.64 to consume 500 mg of EPA and DHA. Consuming fish oil supplements required the least amount to obtain the recommended 500 mg/day EPA and DHA at 0.4 oz per week. Omega-3 enriched eggs, algae and seaweed, along with fortified milk and milk alternatives are not practical as the sole food sources of EPA and DHA due to the amount required to meet the 500 mg recommendation. Strategies such as changing the fatty acid profile of farmed fish, food enrichment, and increased emphasis on consumption of fish are needed to increase dietary intake of omega-3 fatty acids. Consumer education is needed to differentiate between the different omega-3 fatty acids and their potential for health benefits.

References


USDA Nutrient Data Laboratory. Available at http://www.nal.usda.gov/fnic/foodcomp/

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