PHOTOACTIVE PHYTOSTEROOLS AND FATTY ACIDS PROFILE OF TRADITIONAL FOODS FROM BLACK SEA AREA COUNTRIES

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INTRODUCTION/AIM

Phytosterols (PS) are abundant in foods of plant origin and vegetable oils. These compounds have received particular attention due to their capability to lower serum cholesterol levels, resulting in significant reduction of the risk of heart disease [1]. Also, the consumption of fatty acids (FA) is important because it can be associated with both negative and beneficial health effects, depending on the FA. This work was performed within the collective research program Sustainable exploitation of bioactive components from the Black Sea Area traditional foods (BaSeFood), funded by the European Commission [2]. Traditional foods from Black sea region are presently being studied for their potential positive effects on human health, especially focusing on its bioactives compounds. The aim of this study was to analyse the bioactive PS, total fat and FA profile of 33 Traditional Foods from six Black Sea Area countries (BSAC) (Figure 1).

METHODS AND RESULTS

TOTAL FAT

0.2 – 10 g of sample
75 mL ultra-pure water + 45 mL HCl (37%)
Boiled for 20 min
Filtered with a filter paper (Whitman G40, 150 mm G) (Figure 2 A)
Extracted using a Soxhlet, with petroleum ether (Figure 2 B)
Residue was dried for 1 h 30 min at 101 °C ± 2 °C, until constant weight

FATTY ACIDS

0.2 – 0.5 g of sample
2 mL of toluene + 3 mL of methanolic HCl (5:95, v/v) (Figure 2 C)
Water bath (70 °C for 2 h)
5 mL of K2CO3 (6%) + 1 mL of toluene
Centrifugation at 1100 rpm (5 min)
Organic phase was dried with Na2SO4
Filtration with a 0.45 µm PTFE syringe filter

Chromatographic conditions

Equipment: HP 6890 N (Figure 2 D)
Column: HP-88 column (150 m x 0.25 mm i.d., 0.25 µm)
Detector: MS
Injection volume: 1.0 µL
Carrier gas: Helium

The applied method for fatty acids determination in the 33 selected traditional foods, allowed the identification of 51 different fatty acids, including 11 trans fatty acids isomers

Mustard oil and flax oil had the highest content of fat (99.9 g/100 g of edible portion) (Figure 3)
Uzvar had a low content of fat (0.138 g/100 g of edible portion) (Figure 3)
30% of the analysed traditional foods had fat contents lower than the limit of quantification (<0.1 g/100 g of edible portion)

CONCLUSIONS

Our results show that some of the traditional foods from BSAC are a good source of polysaturated fatty acids to the diet, especially y-linolenic n-3 and linolenic n-6 fatty acids which are related to health benefits, namely regarding cardiovascular diseases. With respect to total fat content, a great variability was found and the highest content was found in the oilseeds group. The method developed for phytoestrols analysis, is rapid, easy to handle and allows the determination of 11 sterols and α-tocopherol, simultaneously (Figure 5).

REFERENCES

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The methods and results are presented with detailed scientific data, including chromatographic conditions and the identification of fatty acids. The conclusions highlight the health benefits of the traditional foods studied, particularly their high content of beneficial fatty acids.