

FATTY ACID COMPOSITION OF A VARIETY OF PLANT OILS USED AS FOOD



Introduction

- ❖ The most exploited raw plant materials for oil production in food industry are sunflower seeds and olives, but a variety of oils produced from other plants has been offered on the market, usually by small and medium enterprises, most often obtained using cold pressing in order to preserve sensitive oil components.
- ❖ The main common characteristic of all of these oils is that they are sources of fatty acids.

Objectives

- ❖ To screen various plant oils available to the consumers in Serbia, in terms of their identity, by investigation of fatty acid (FA) composition and to evaluate content of characteristic groups of FA.
- ❖ Oils' fatty acid composition provides an insight into its potential to contribute to the dietary intake of nutritionally beneficial fatty acids.

Material and Method

- ❖ A collection of 36 plant oils obtained during 2020–2021 provided a good representation of sunflower and olive oils available to the Serbian consumers (12 and 11 brands, respectively), and additionally included 13 samples of different less used plant oils, all categorized as food, with one sample of black cumin oil labeled as food supplement.
- ❖ GC-MS profiling of fatty acids (37 FA in total) was enabled by their esterification to methyl esters.

Results

- ❖ Composition of most abundant individual fatty acids and characteristic groups of fatty acids in plant oils, presented in Figure 1 (A) and (B), respectively, showed expected variability, depending on the oil source.
- ❖ According to the content of fatty acids, all investigated samples were in the agreement with relevant regulations (flax seed, sesame, coconut, palm, pumpkin and all samples of sun flower and olive oils) or literature data, thus contributing to the confirmation of their identity.
- ❖ The majority of the oils showed dominant content of oleic (C18:1 *cis*-9; ω 9) or linoleic fatty acid (C18:2 *cis*-9,12; ω 6). Exceptions were coconut oil with high content of middle-chain SFA, and flax seed oil, rich in alpha-linolenic acid (C18:3 *cis*-9,12,15; ω 3), found also in lower quantity in sea buckthorn seed oil.

Conclusion

- ❖ Fatty acid composition is a valuable indicator of identity of various plant oils. It is encouraging that market screening indicates correct labeling of oil sources. Only flax seed oil is a rich source of ω 3 alpha-linolenic acid, whereas ω 6 fatty acids are much more abundant in numerous plant oils.
- ❖ To enable nutritional utilization of mono- and polyunsaturated fatty acids, their sensitive structure has to be preserved.

SFA – saturated ω 3FA – omega 3
 MUFA – monounsaturated ω 6FA – omega 6
 PUFA – polyunsaturated ω 9FA – omega 9

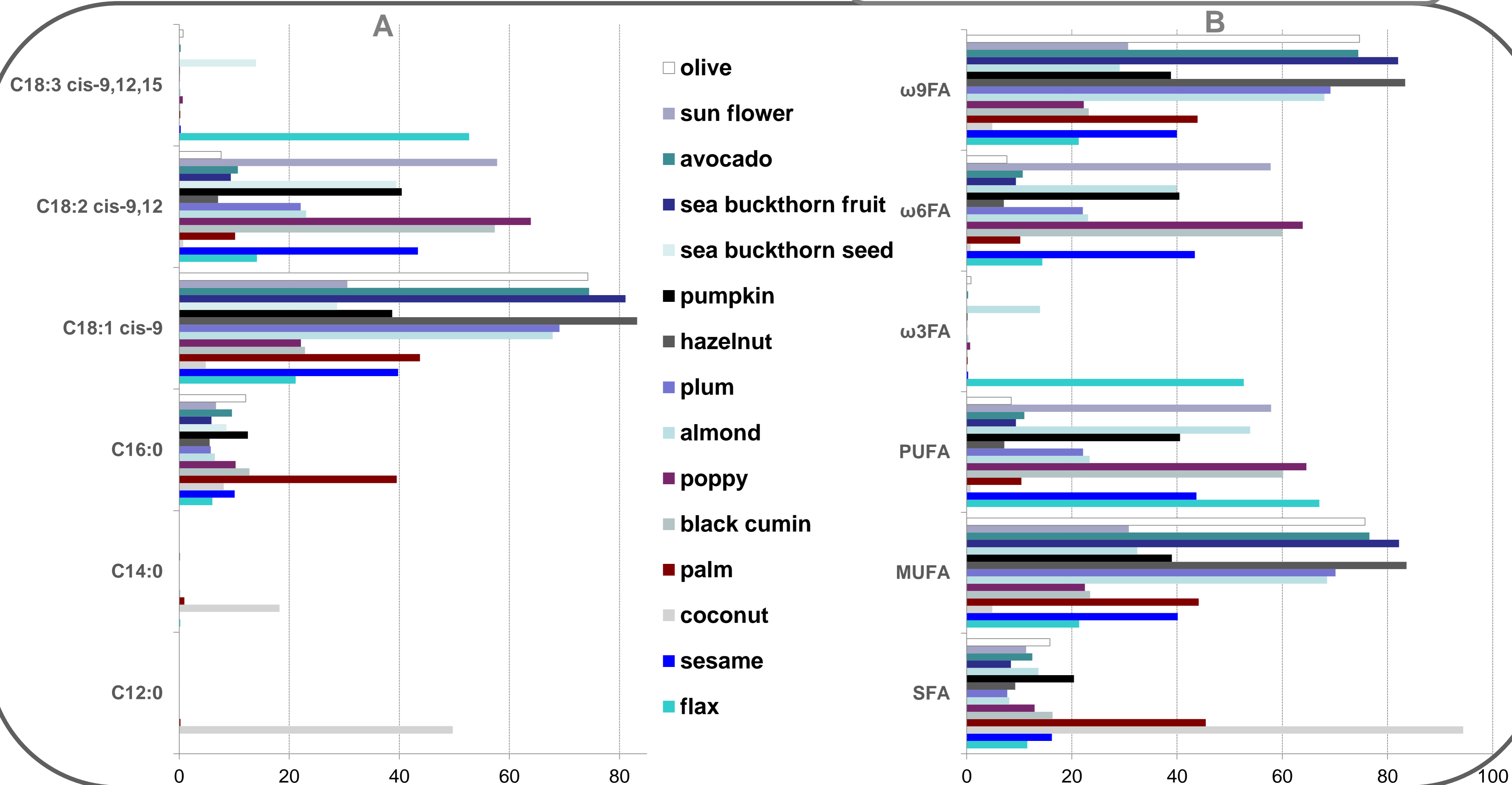


Figure 1. Composition of most abundant individual fatty acids (A) and characteristic groups of fatty acids (B) in plant oils