

Abstract

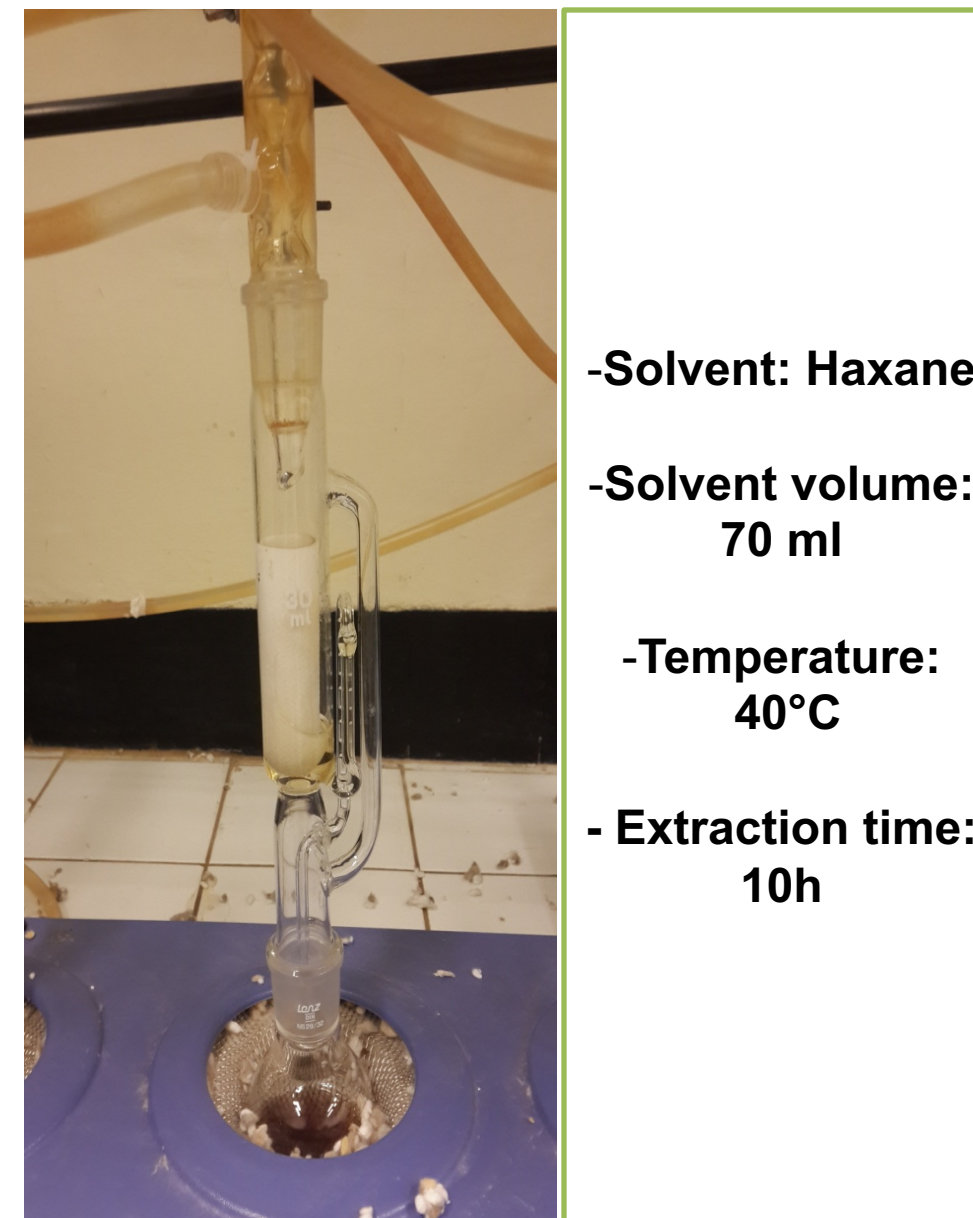
A better use of agricultural by-products is an interest for sustainable development in view of green chemistry. Wheat (Triticum) is one of the main cereals grown worldwide, its human use is primarily limited to the albumen and the by-products of milling including the germ are destined for animal feed. Moreover the germ is the part of grain which lipid concentration is higher and its oil is rich in polyunsaturated fatty acids, bioactive compounds and E vitamin. Therefore, the oil is an alternative to more value the wheat germ and for the development of this cereal grain resource.

A Soxhlet extraction was performed based on hexane solvent. In order to compare the performance and composition of this vegetable oil extracted from the whole grain and extracted only from the germ. Analysis by Gas Chromatography (GC) was subsequently performed to identify and quantify the fatty acids of the oil. The amount of oil in the germ is about 8%, it is four times larger than in the whole grain (2%). wheat germ oil, comprises polyunsaturated fatty acids: linoleic acid C18:2 (Omega 6) and gamma linoleic acid C18:3 respectively 58.31% and 4.2% and the mono acid -unsaturated: oleic acid C18:1 (24.52%) but also some saturated acids: palmitic acid C16:0 with (19.50%) and stearic acid C18:0 (1.34%) . For this variety of durum wheat, the wheat germ oil contains, in addition, 80.27 mg / 100g of α - tocopherols (E vitamin).

Materials and Methods



Photo 1: wheat germ and Forceps



-Solvent: Haxane
-Solvent volume: 70 ml
-Temperature: 40°C
- Extraction time: 10h

Figure 1 : Soxhlet



Photo 2: CPG



Photo 3 : HPLC)



Mechanical extraction of wheat germ



Extraction of wheat germ oil by the method Soxhlet



Fatty acids analysis by gaz chromatography



Tocopherol dosage by high performance liquid chromatography (HPLC)

Results

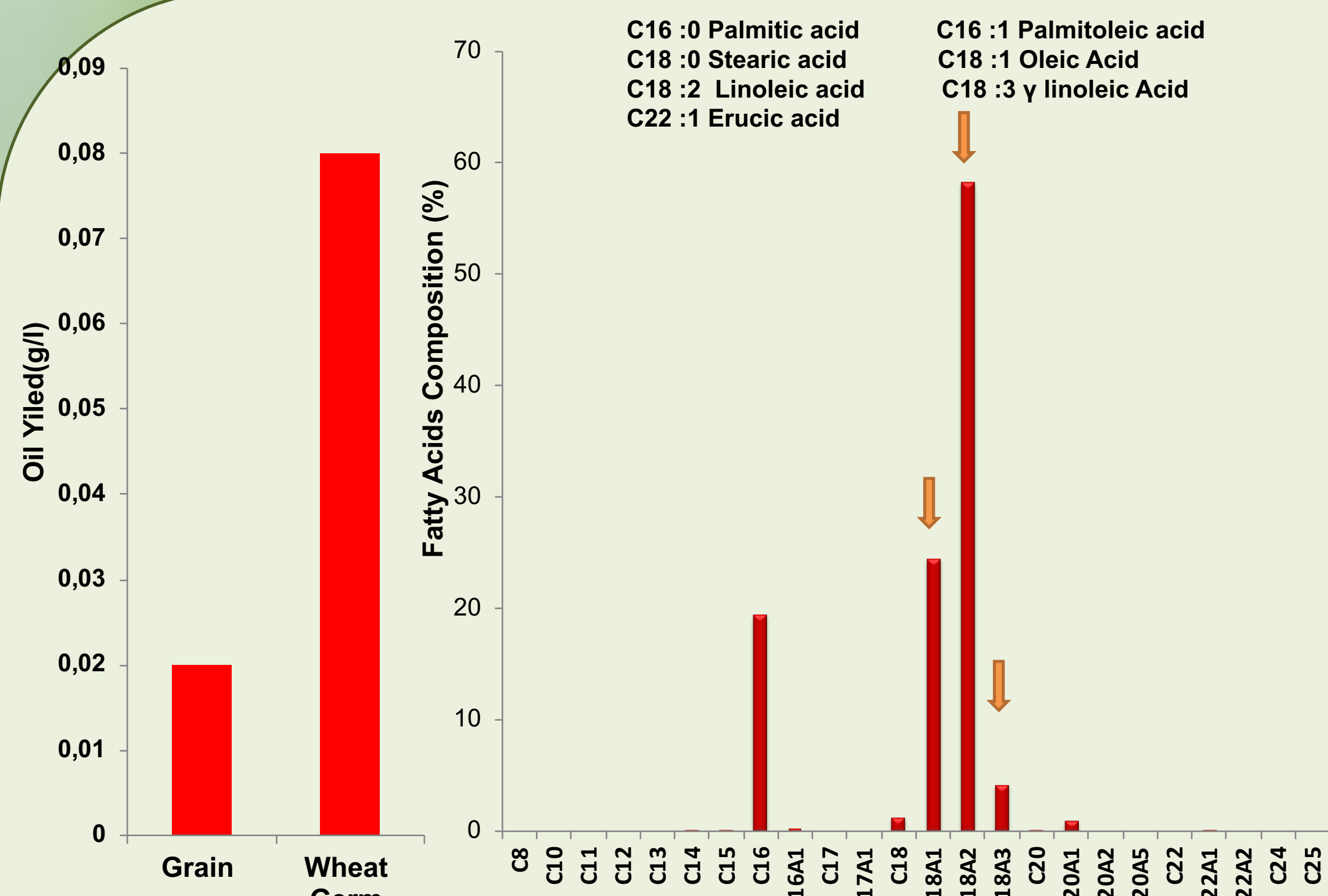


Figure 1: Vegetable oil yield of total grain and of the wheat germ

Fatty acids' amount in germ > F A in grain

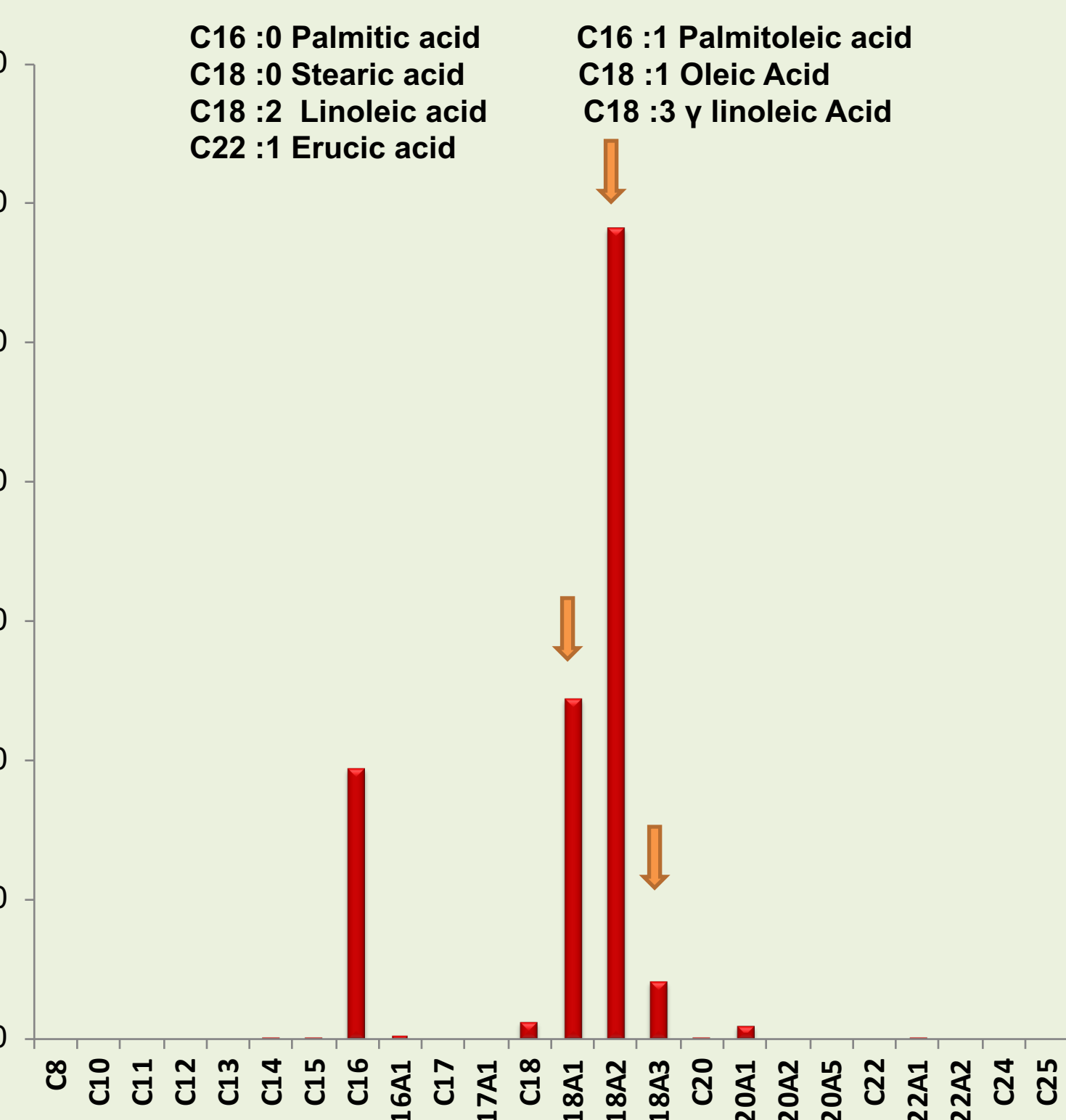


Figure 2 : Fatty acid composition for durum wheat germ oil

Linoleic Acid (Oméga6) => 58,31%
Oleic Acid =>24,52 %

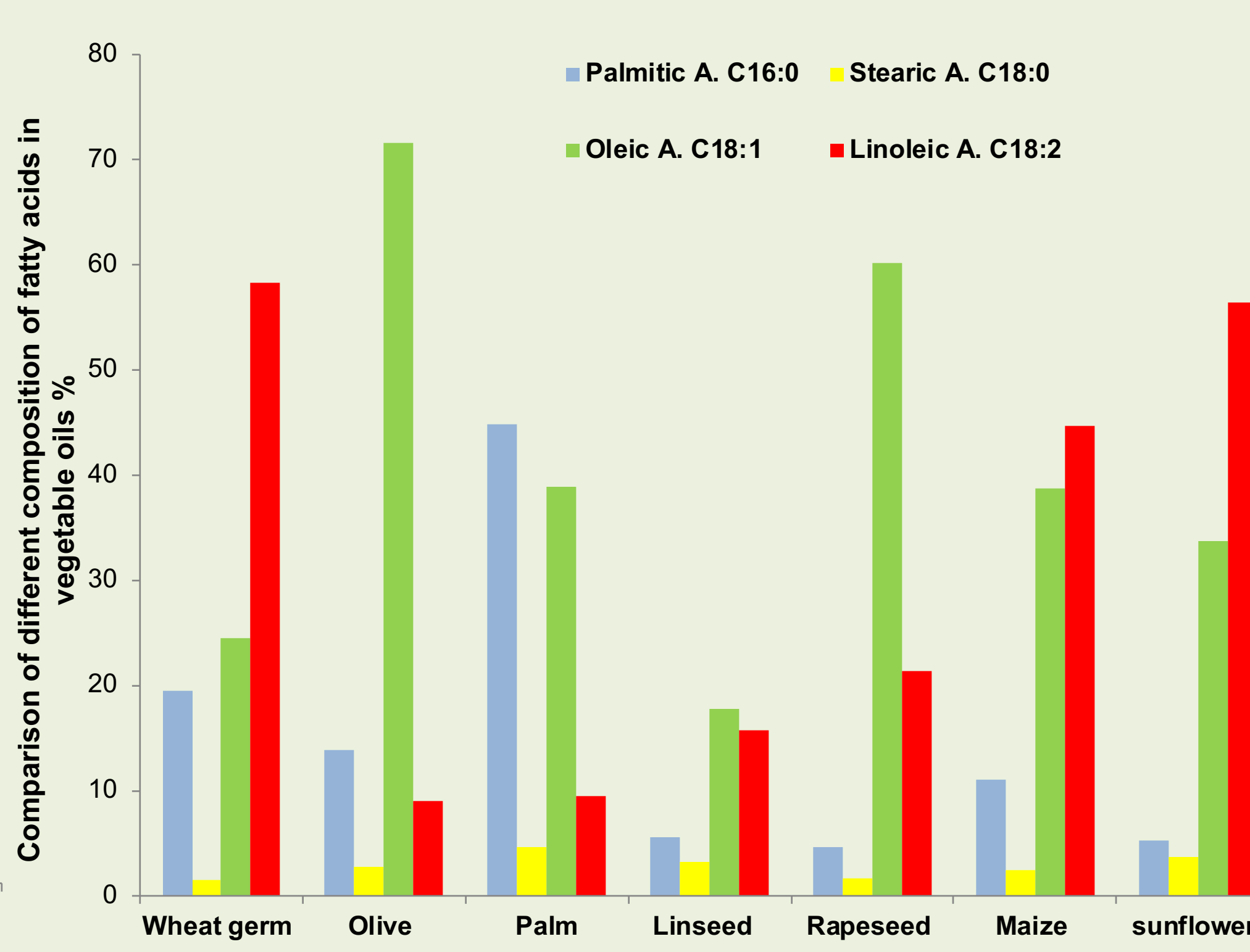


Figure 3: Comparison of fatty acids composition in different vegetable oils

% d'Oméga 6:
Wheat germ > Sunflower > Maize > Rapeseed > Olive

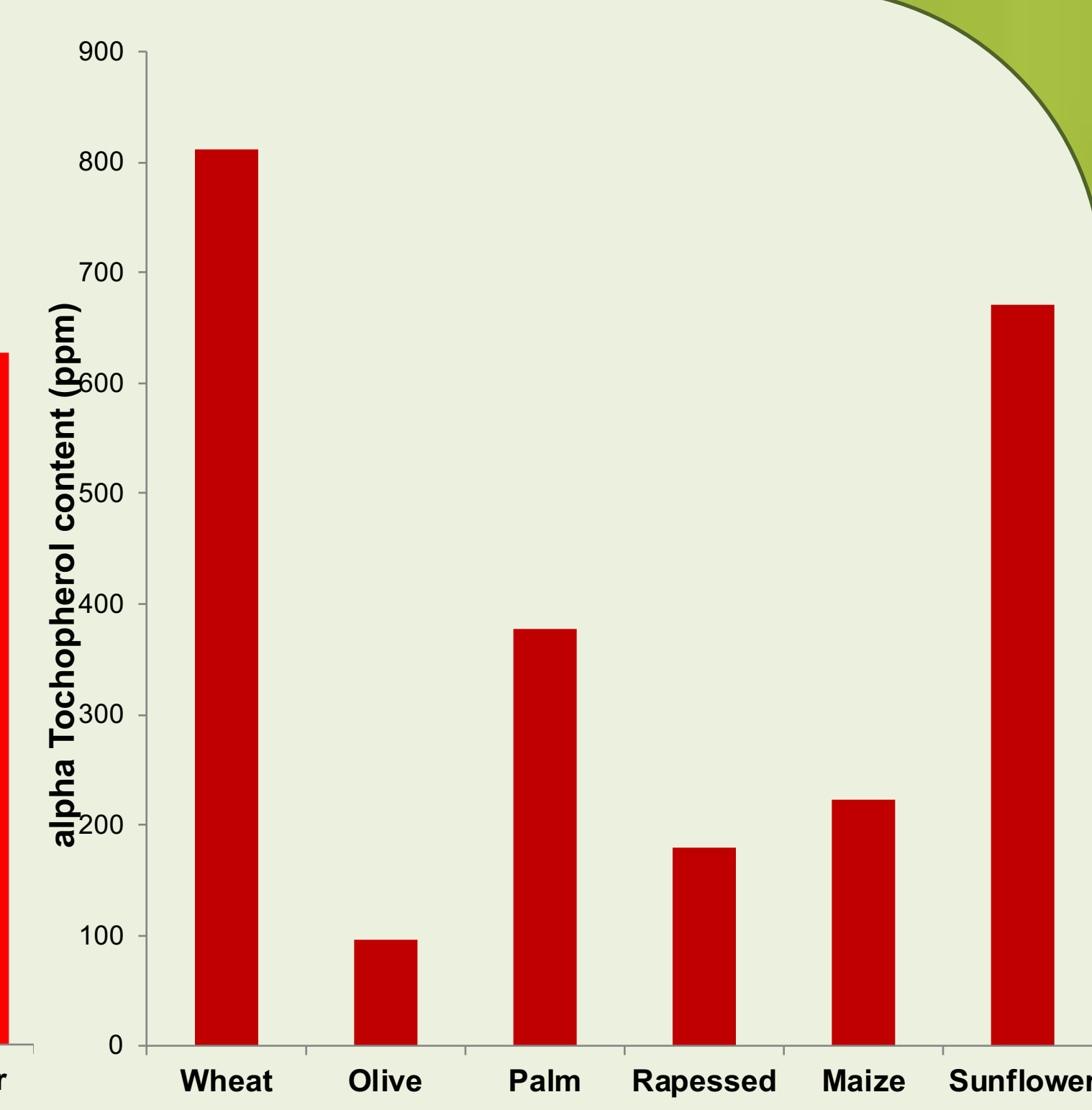


Figure 4: the levels of α -Tocopherol in durum wheat germ compared to other vegetable oils

α - Tocopherol :
Wheat germ oil >> Other vegetable oils

Conclusion

