

Oxidative and hydrolytic stability and composition of flaxseed oil ethyl ester and milk thistle oil blends during storage



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INTRODUCTION & AIM

Milk thistle (*Silybum marianum*) is a rich source of nutrients and biologically active compounds, most notably **silymarin**, which exhibits strong hepatoprotective and antioxidant properties.

The oil extracted from milk thistle seeds is characterized by a high content of **unsaturated fatty acids**, mainly linoleic and oleic acids, which contribute to cardiovascular health and overall well-being.

Fatty acid ethyl esters derived from flaxseed oil are abundant in **omega-3 fatty acids** and show enhanced oxidative stability compared to the native oil, due to lower oxygen solubility and the absence of pro-oxidant components.

Combining milk thistle oil with fatty acid ethyl esters offers a promising approach to develop lipid formulations with improved nutritional and functional properties.

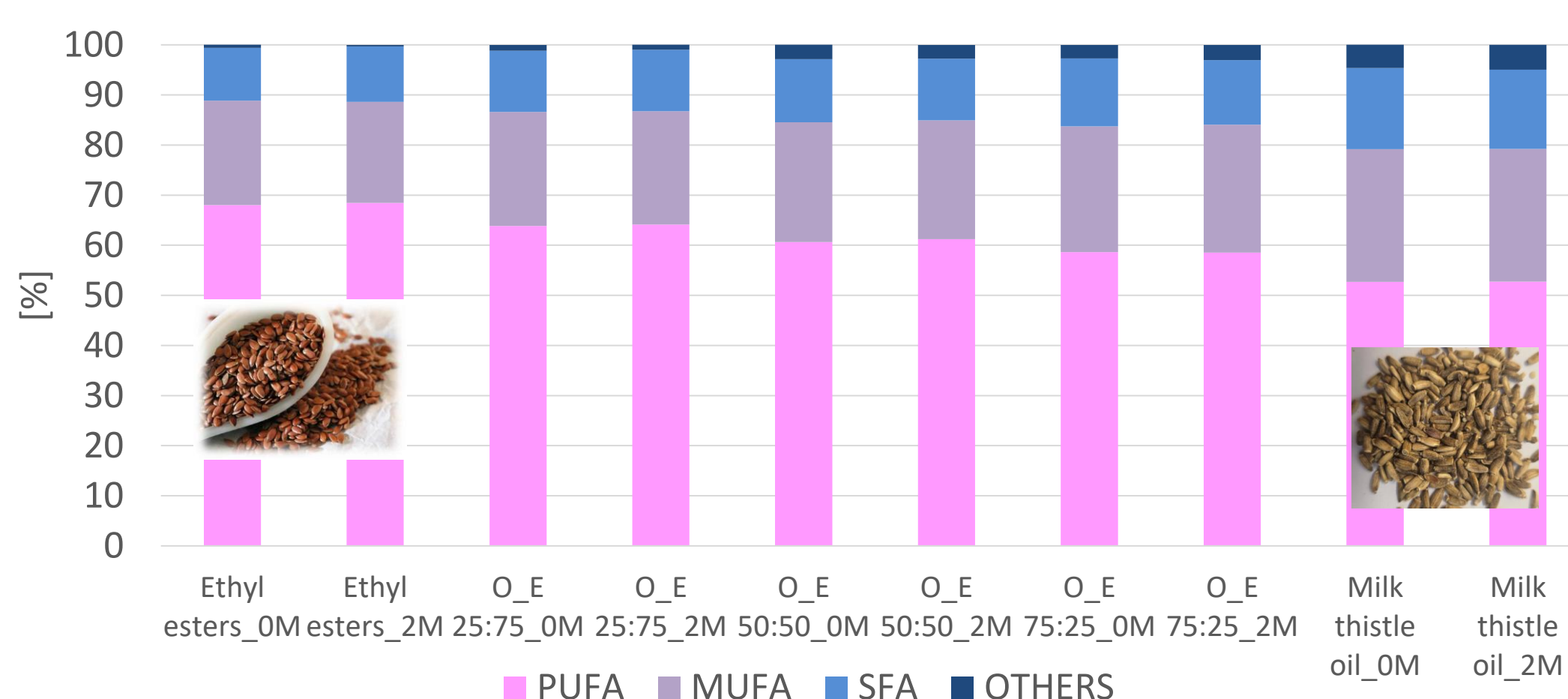
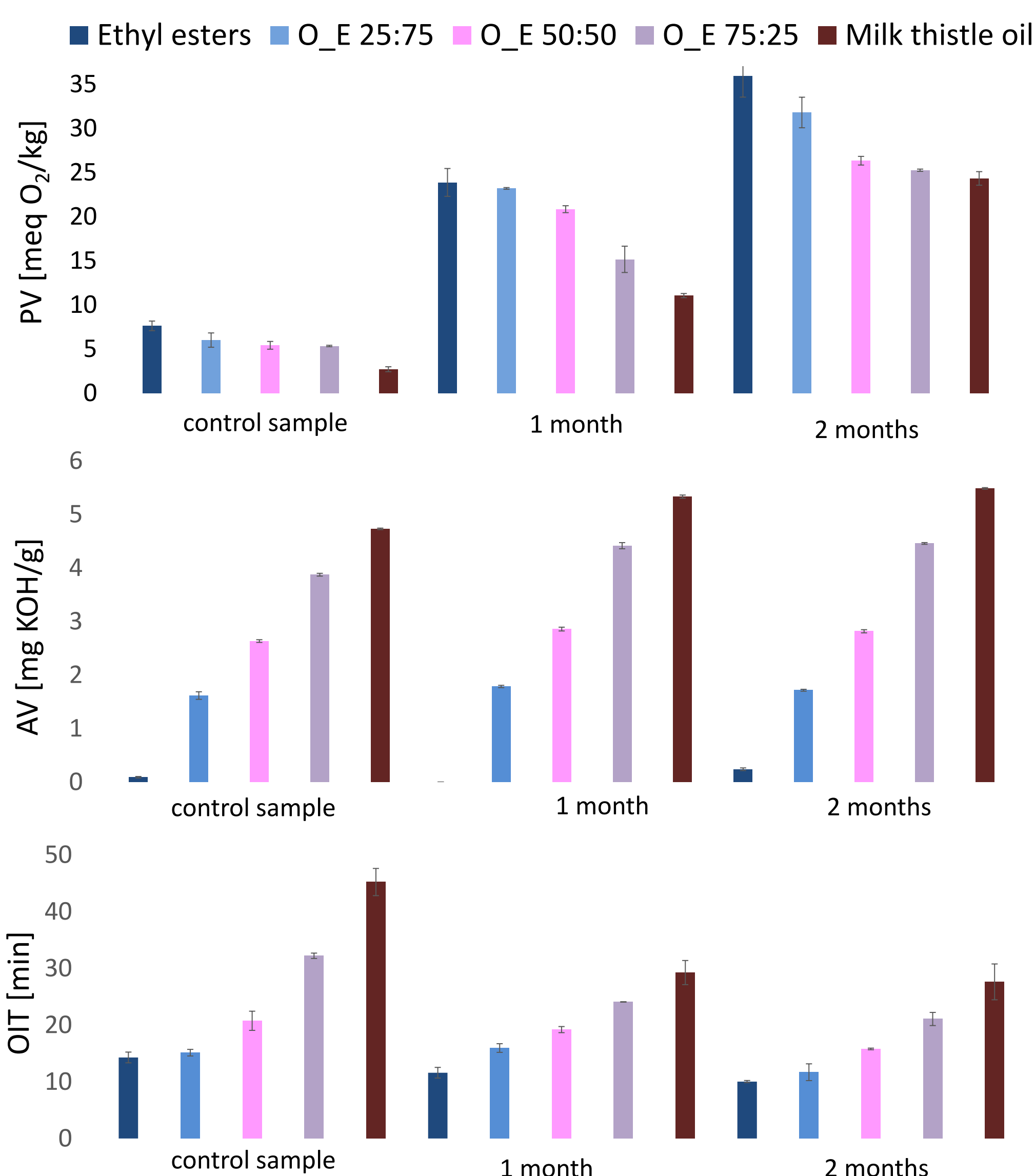
METHOD

Blends of milk thistle oil and flaxseed fatty acid ethyl esters were prepared in three volumetric ratios: **25:75**, **50:50**, and **75:25**. All samples were stored in dark glass bottles at room temperature.

Analyses were conducted after preparation (control), after 1 month, and after 2 months of storage.

- **Acid value (AV)** and **peroxide value (PV)** were determined using standard titration methods. These parameters provided information on hydrolytic and primary oxidative changes in the lipid samples.
- **Oxidative stability** was evaluated using **Pressure Differential Scanning Calorimetry** (PDSC). The oxidation induction time (OIT) was recorded as a measure of resistance to oxidation.
- The **fatty acid composition** of the samples was analyzed by **Gas Chromatography** (GC). Based on these data, the proportion of saturated (SFA), monounsaturated (MUFA), and polyunsaturated fatty acids (PUFA) was calculated.

RESULTS & DISCUSSION



CONCLUSION

Fatty acid composition remained stable during storage. Acid and peroxide values increased over time, with the highest AV observed in milk thistle oil and its blends containing lower proportions of esters. OIT decreased in all samples during storage but was highest in blends rich in milk thistle oil. Incorporating milk thistle oil enhanced oxidative resistance and may extend the shelf life of lipid formulations.