

# Blending Different Cold-Pressed Oils to Improve their Health-Promoting Properties or Oxidative Stability

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## Introduction

In response to market demand, it seems advisable to compose oil blends for special applications (for cold consumption or for frying). A fairly new trend is the use of blending in preventive medicine - the creation of mixtures of oils with health-promoting properties, the consumption of which may reduce the risk of civilization diseases and those that could supplement the diet with valuable bioactive ingredients, intended for consumers with different nutritional needs, i.e. for children, the elderly, pregnant women or athletes.

## Objective

The aim of the study was to analyze the chemical composition, oxidative stability and quality of mixtures of selected cold-pressed oils. An attempt was made to optimize the share of individual oils in the blend in terms of their nutritional value and oxidative stability.

## Material & Methods

The research material consisted of cold-pressed oils: fenugreek oil, evening primrose oil, almond oil, linseed oil, black cumin oil, coriander oil, sunflower oil. In the tested and compared oils, the most important indicators of their quality were determined. The content of tocopherols HPLC (Siger et al.), sterols GC FID (Rudzińska et al.), carotenoids (BS 684:2020) and chlorophylls (AOCS Cc 13i-96) was determined, as well as. The oils and their mixes were subjected to fatty acid composition GC FID (ISO 5508:1996, ISO 5509:2001 and to oxidative stability analysis using the Rancimat test (3g, 20l/h, 110°C),(ISO 6886:1997). The oxidation degree of oils was determined by peroxide value (ISO 3960:2009), anisidine value (AOCS Cd 18-90), TOTOX index (ISO 6885:2001), specific extinction (conjugated dienes and trienes) (ISO 3656:2002).

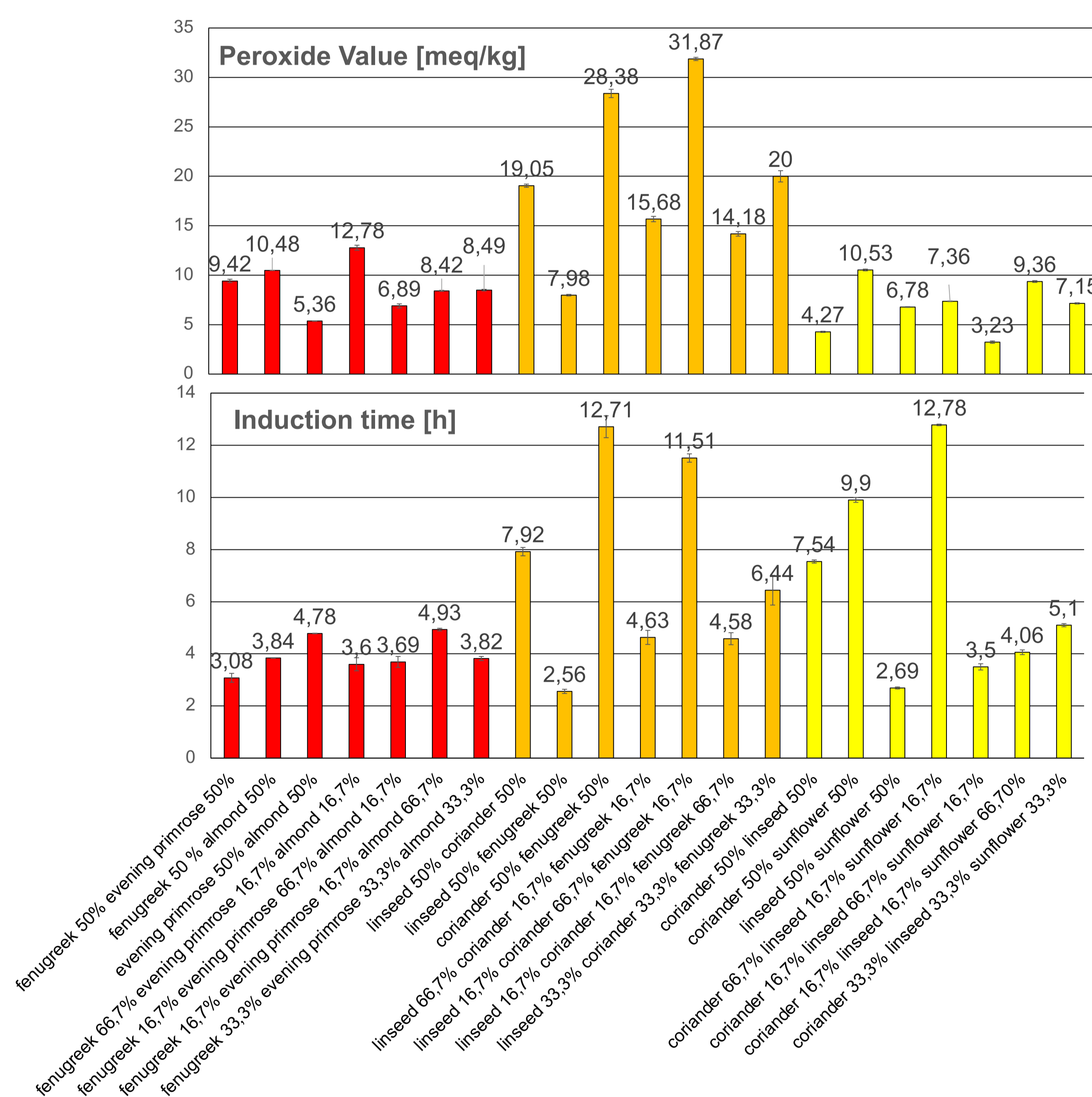


Figure 1. Peroxide value [meq/kg] and Induction Time [h] of the blended oils

## Conclusions

It has been shown that mixing oils rich in acids from the n-3 family ( $\alpha$ -linolenic acid) or n-6 ( $\gamma$ -linolenic acid) increases the nutritional value of blends, but at the same time reduces their oxidative stability.

On the other hand, the preparation of mixtures with equally valuable high-oleic oils positively improves their oxidative stability.

In order to supplement oils with vitamin E, the most beneficial is the use of fenugreek oil.

Unfortunately, mixing oils may cause a decrease in the quality of the resulting mix, due to the poor quality of the starting oils.

The optimization of the composition of oil mixtures proposed in the work using DOE experiment planning allows to combine oils in any proportions and predict their properties, and in this case the final content of individual fatty acids, tocopherols or oxidative stability.

## Blend 1\* – fenugreek oil, evening primrose oil, almond oil

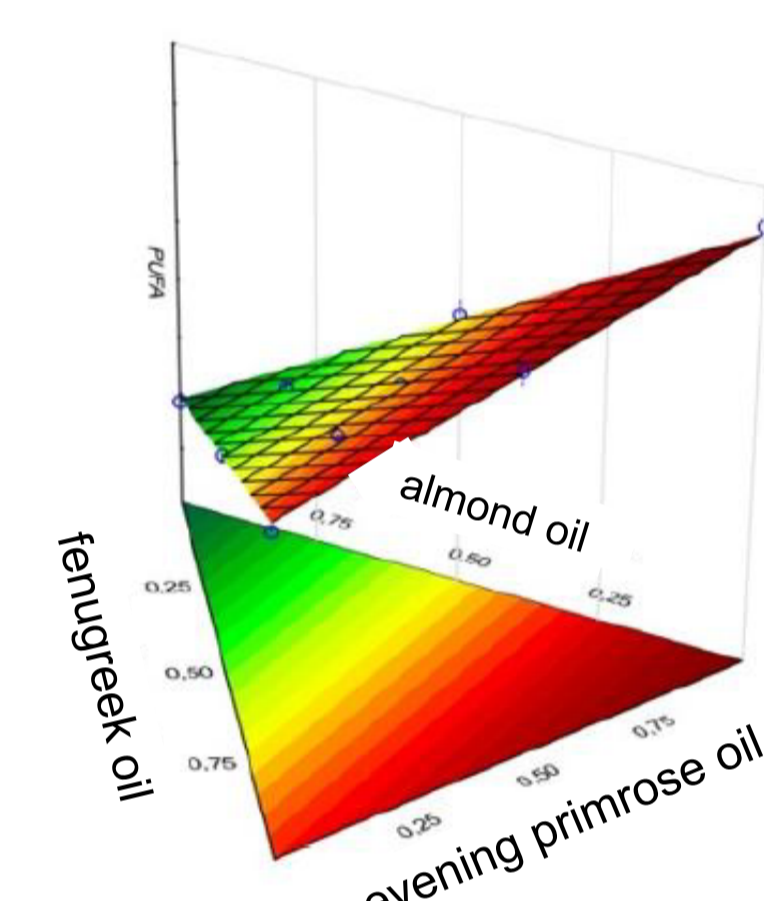


Figure 2. PUFA content [%] in mix no. 1

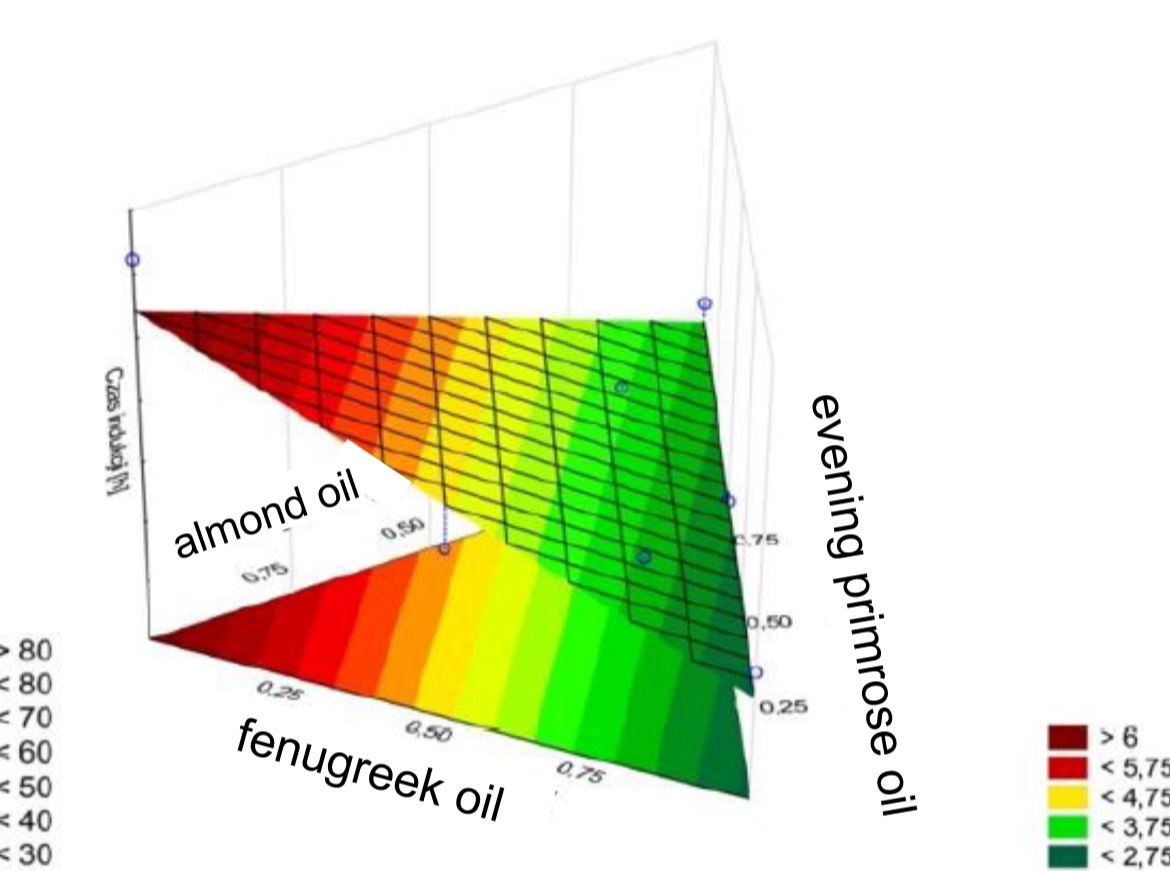


Figure 3. Mix 1 induction time [h]

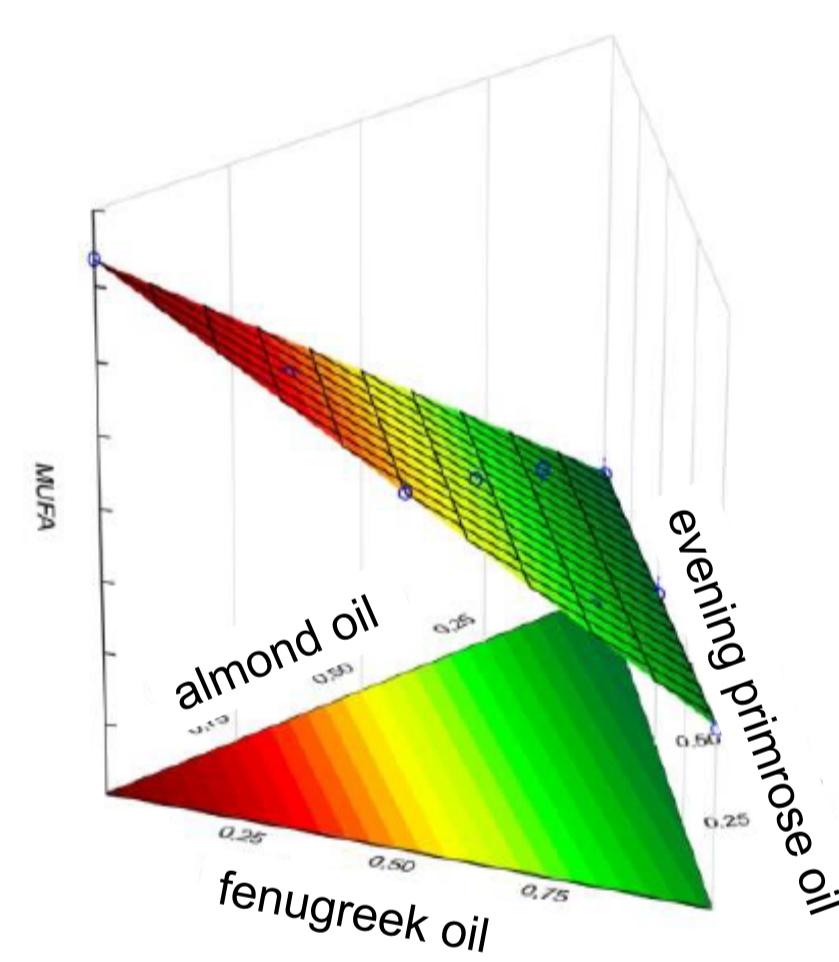


Figure 4. MUFA content [%] in mix no. 1

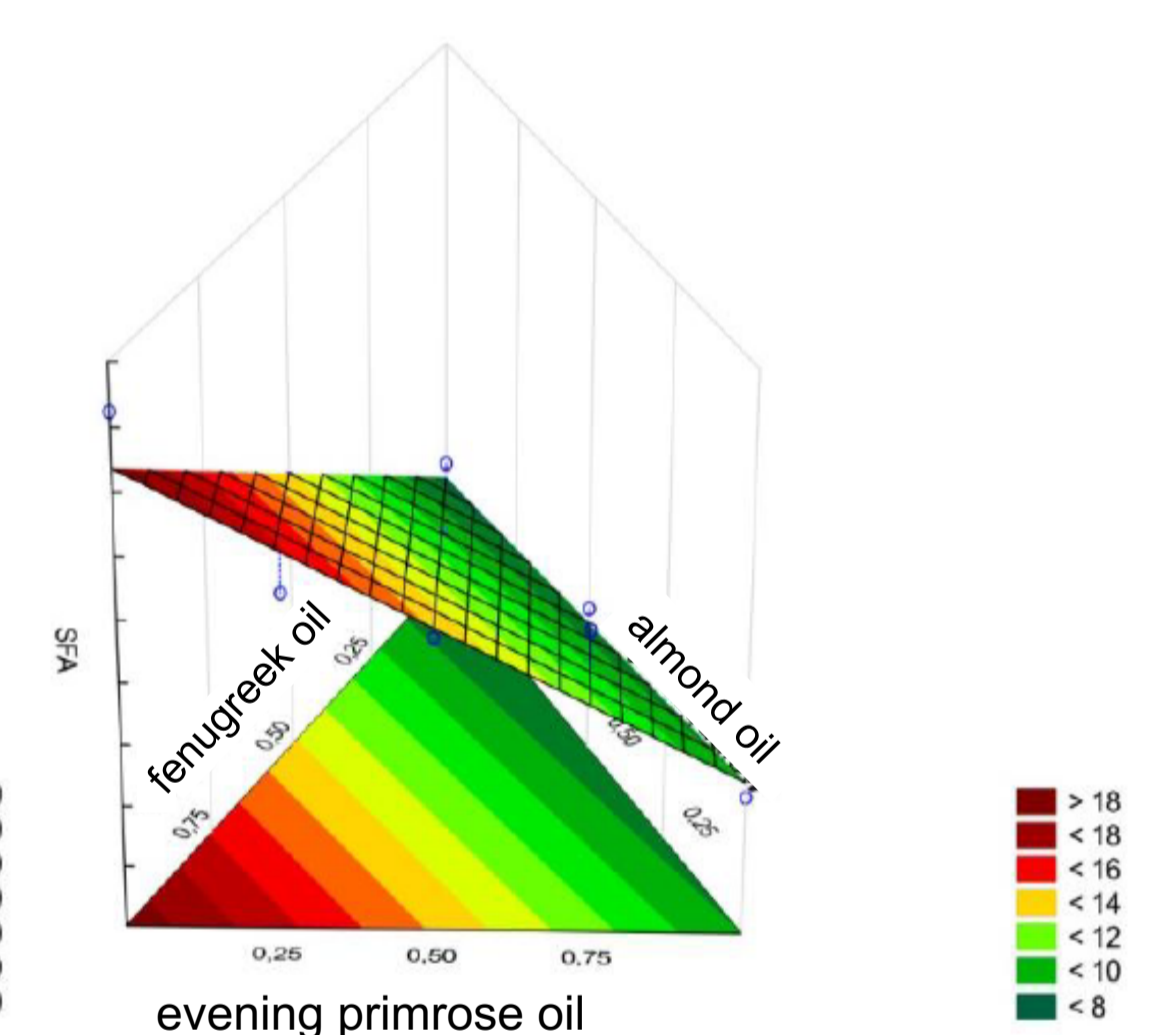


Figure 5. SFA content [%] in mix no. 1

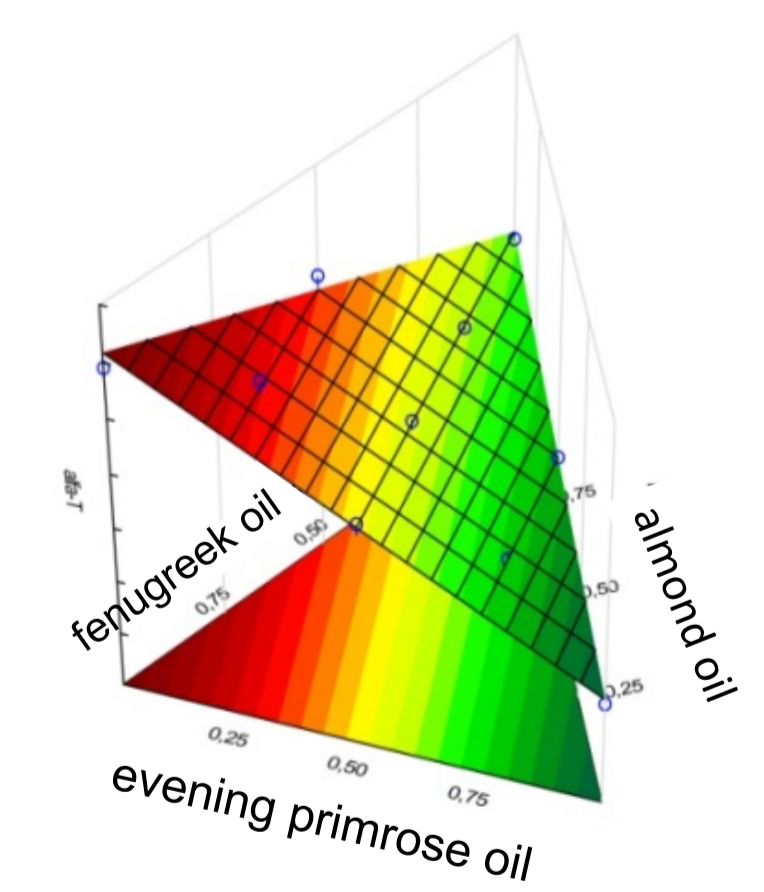


Figure 6. The content of  $\alpha$ -tocopherol [mg/100g] in mix no. 1

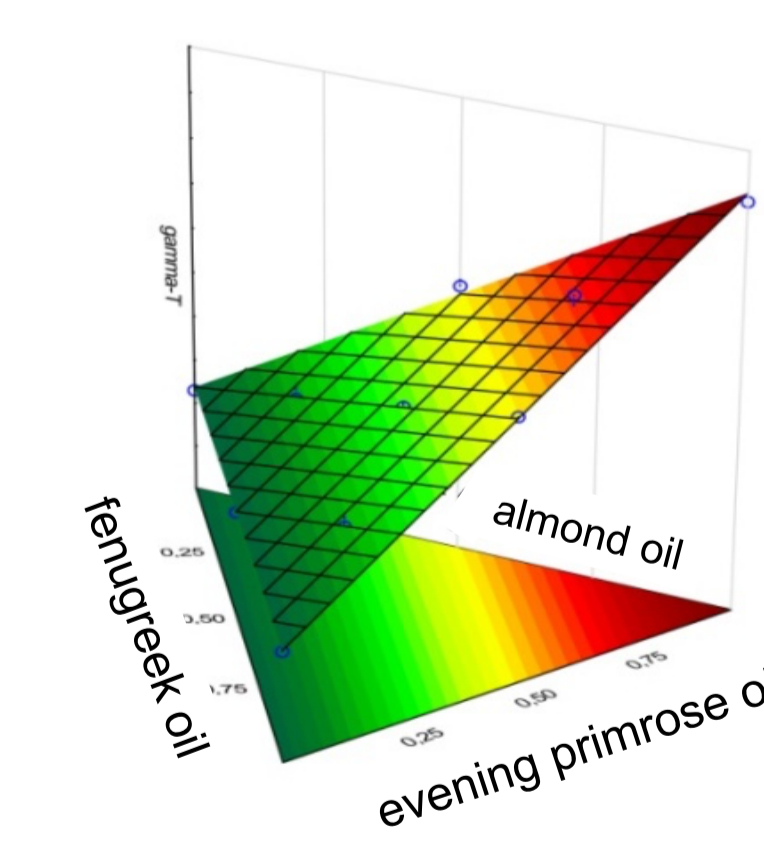


Figure 7. The content of  $\gamma$ -tocopherol [mg/100g] in mix no. 1

\*only selected results

