

The influence of pulsed electric field on antioxidant components and antioxidant capacity of virgin olive oil

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INTRODUCTION:

Pulsed electric field (PEF), a new non-thermal technology, is increasingly used in the food production. Researches have shown that applying PEF before malaxation in the virgin olive oil (VOO) production results in significant oil yield increase, as well as the increase in the concentration of tocopherols and polyphenols.

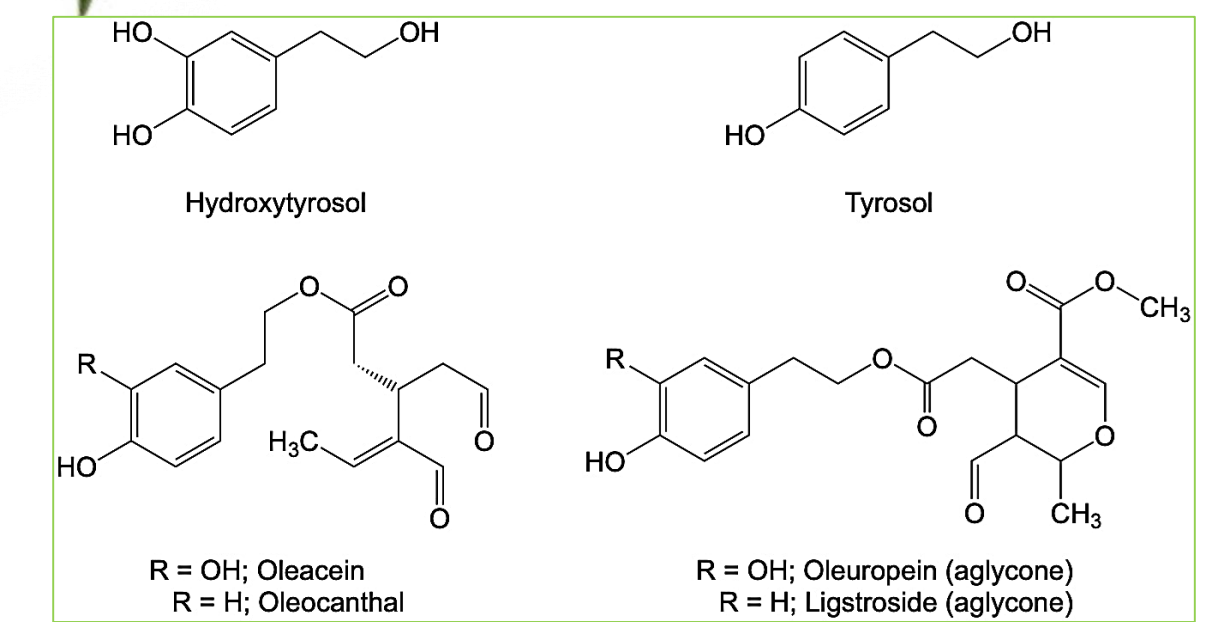
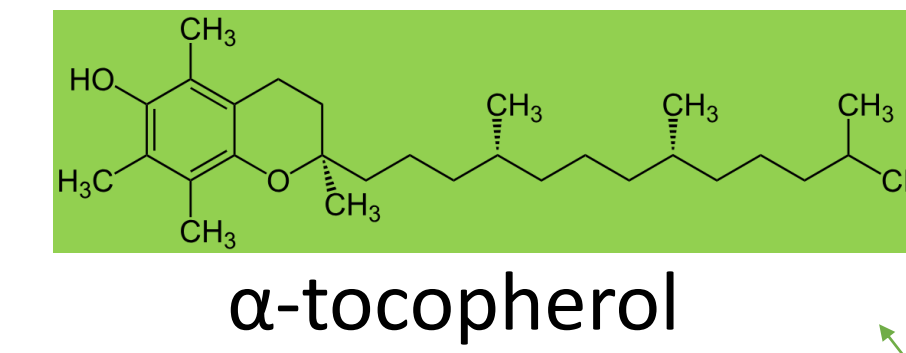
As results mostly differ according to the used olive variety, the aim of the present study was to determine the influence of PEF used as a pretreatment to malaxation on the concentrations of antioxidants and antioxidant capacity of VOO from four autochthonous Croatian varieties: *Istarska Bjelica* (I.B.), *Rosulja* (R), *Levantinka* (L) and *Oblica* (O).



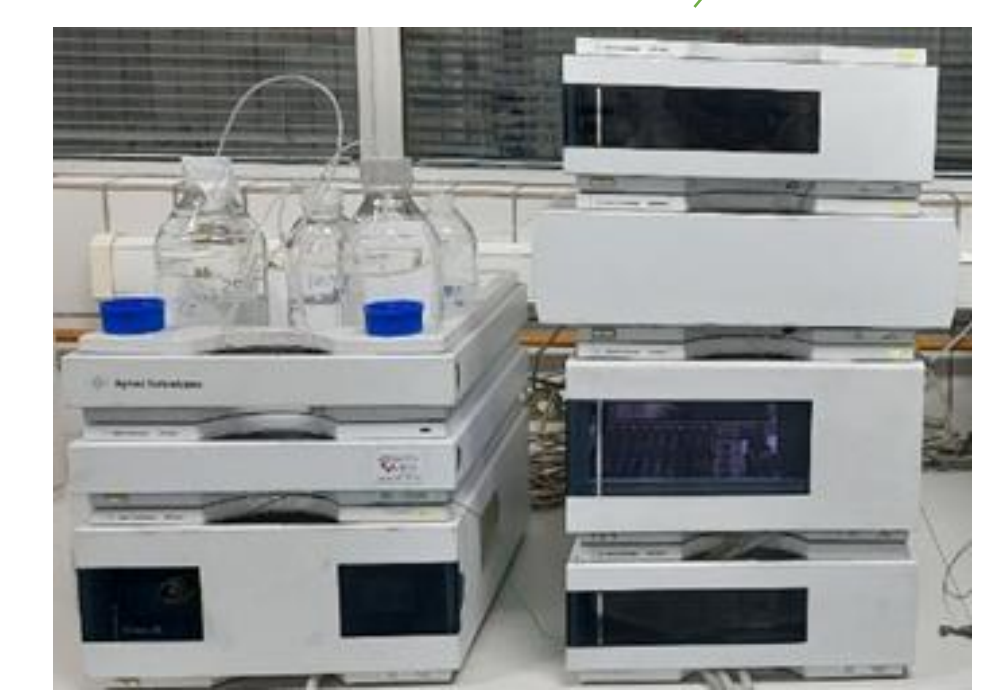
METHODS:



Electron paramagnetic resonance (EPR) instrument used for the antioxidant capacity analysis



Total polyphenol content



HPLC instrument used for the analysis of antioxidants

RESULTS:

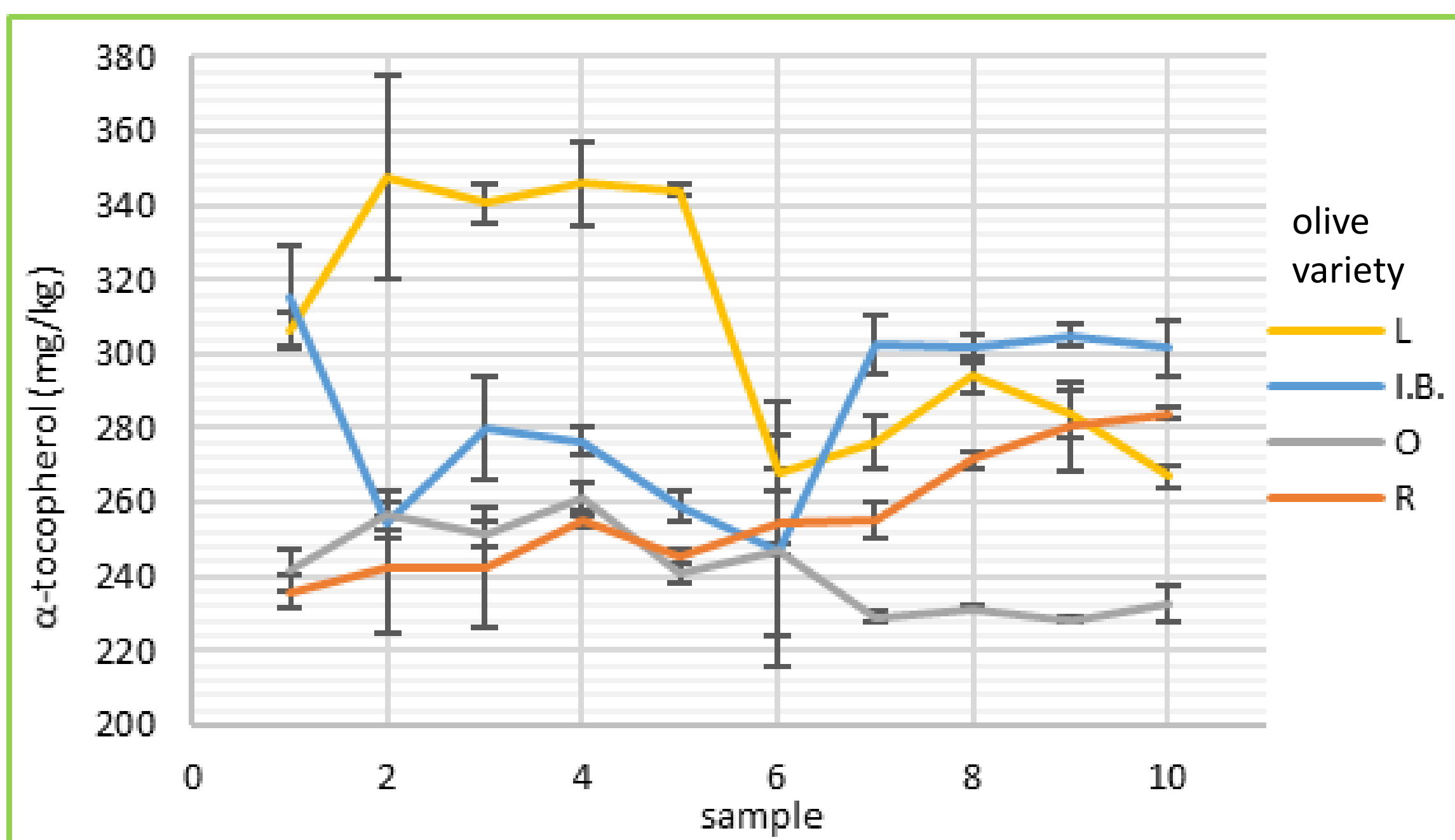


Fig 1 α -tocopherol concentration in VOOs in dependence of the applied PEF treatment

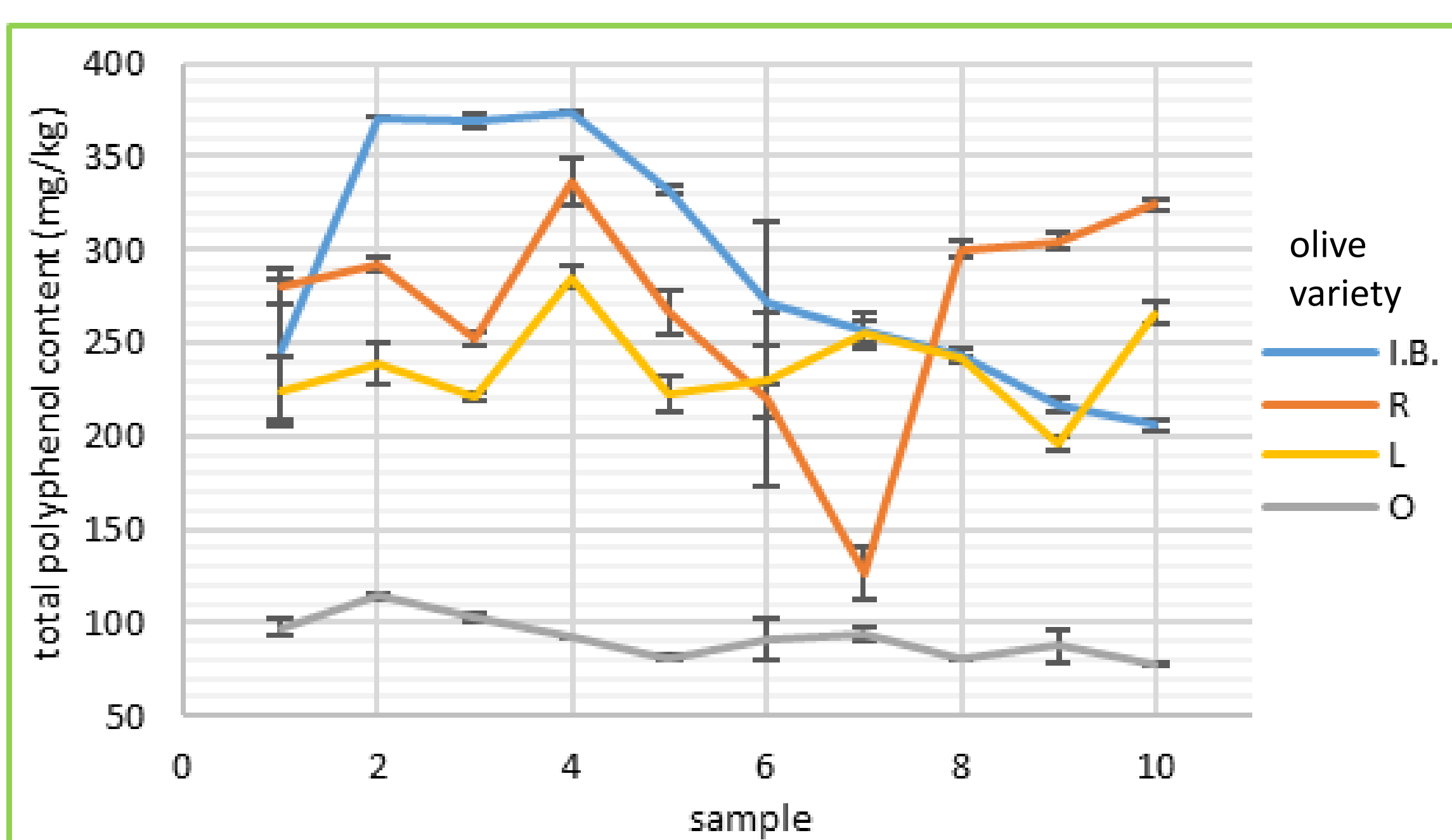


Fig 2 Total polyphenol content (TPC) in VOOs in dependence of the applied PEF treatment

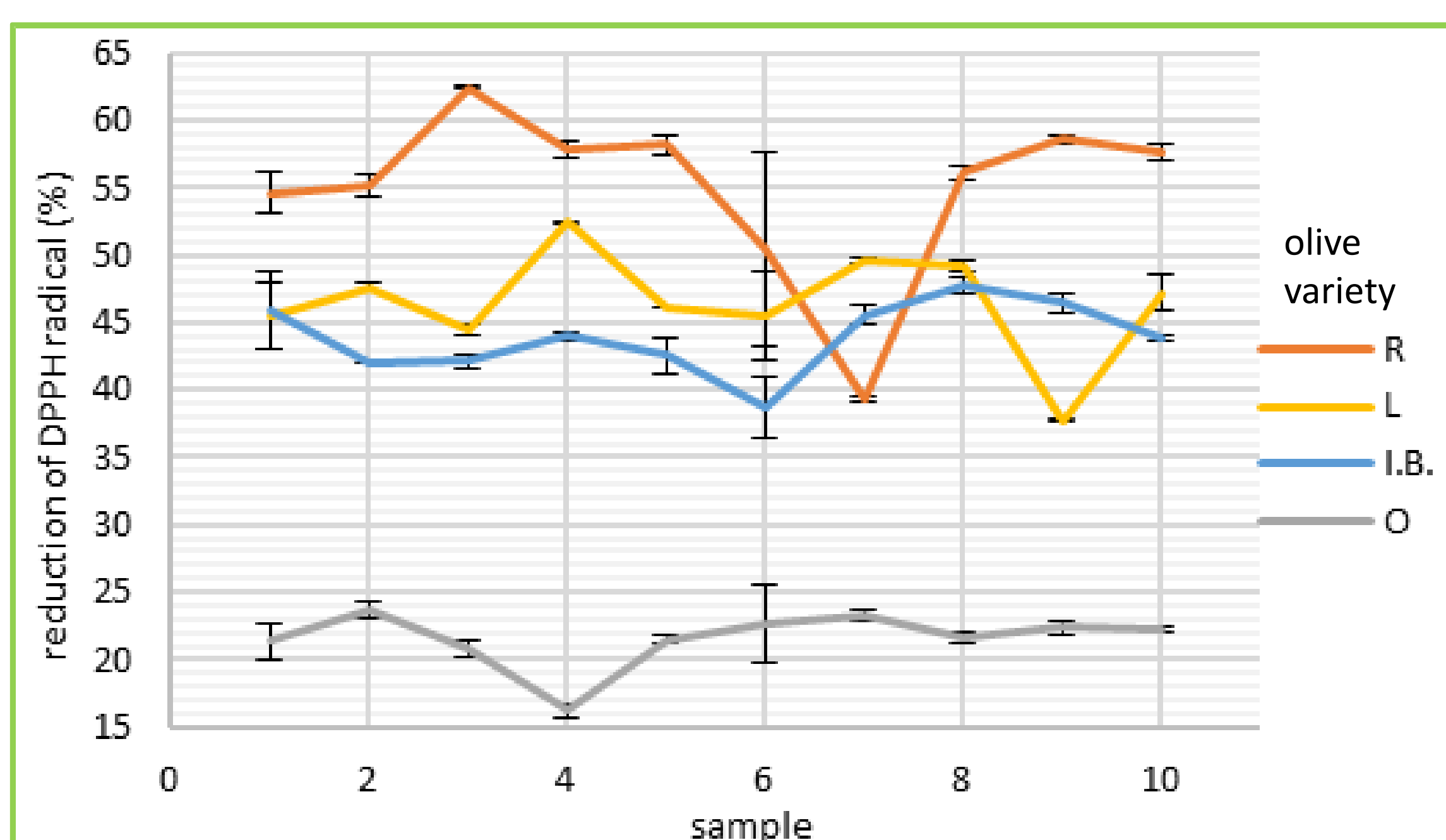


Fig 3 Antioxidant capacity (AC) expressed as the percentage of DPPH radical reduction in VOOs in dependence of the applied PEF treatment

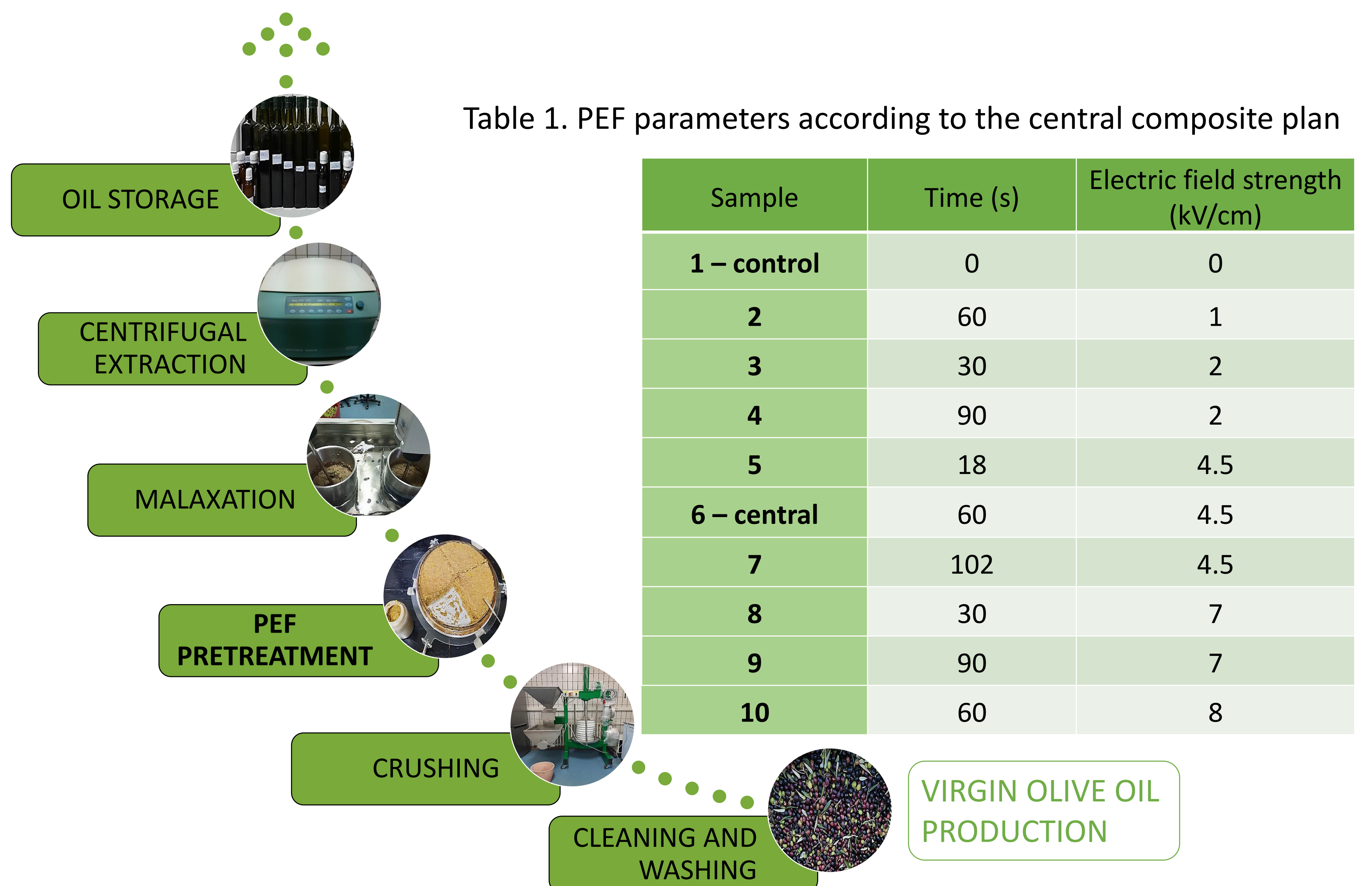


Table 1. PEF parameters according to the central composite plan

Sample	Time (s)	Electric field strength (kV/cm)
1 – control	0	0
2	60	1
3	30	2
4	90	2
5	18	4.5
6 – central	60	4.5
7	102	4.5
8	30	7
9	90	7
10	60	8

CONCLUSIONS:

- Variety had the greatest effect on the concentration of antioxidants.
 - α -tocopherol concentration was the highest in Levantinka and Istarska Bjelica
 - Significantly higher TPC and therefore significantly higher AC had Istarska Bjelica, Rosulja, and Levantinka compared to Oblica VOOs
- PEF parameters significantly affected TPC and AC of the produced VOOs, except Oblica.
 - The highest TPC for Rosulja, Levantinka and Istarska Bjelica was obtained at lower electric field strength and longer time
 - The highest AC Rosulja and Levantinka showed at the same parameters, while Istarska Bjelica at longer time and higher electric field strength
 - The highest α -tocopherol concentration Levantinka and Oblica showed at lower electric field strength and shorter time, while Rosulja and Istarska Bjelica at the opposite parameters