

# Evaluation of natural extracts as potential enzymatic browning inhibitors



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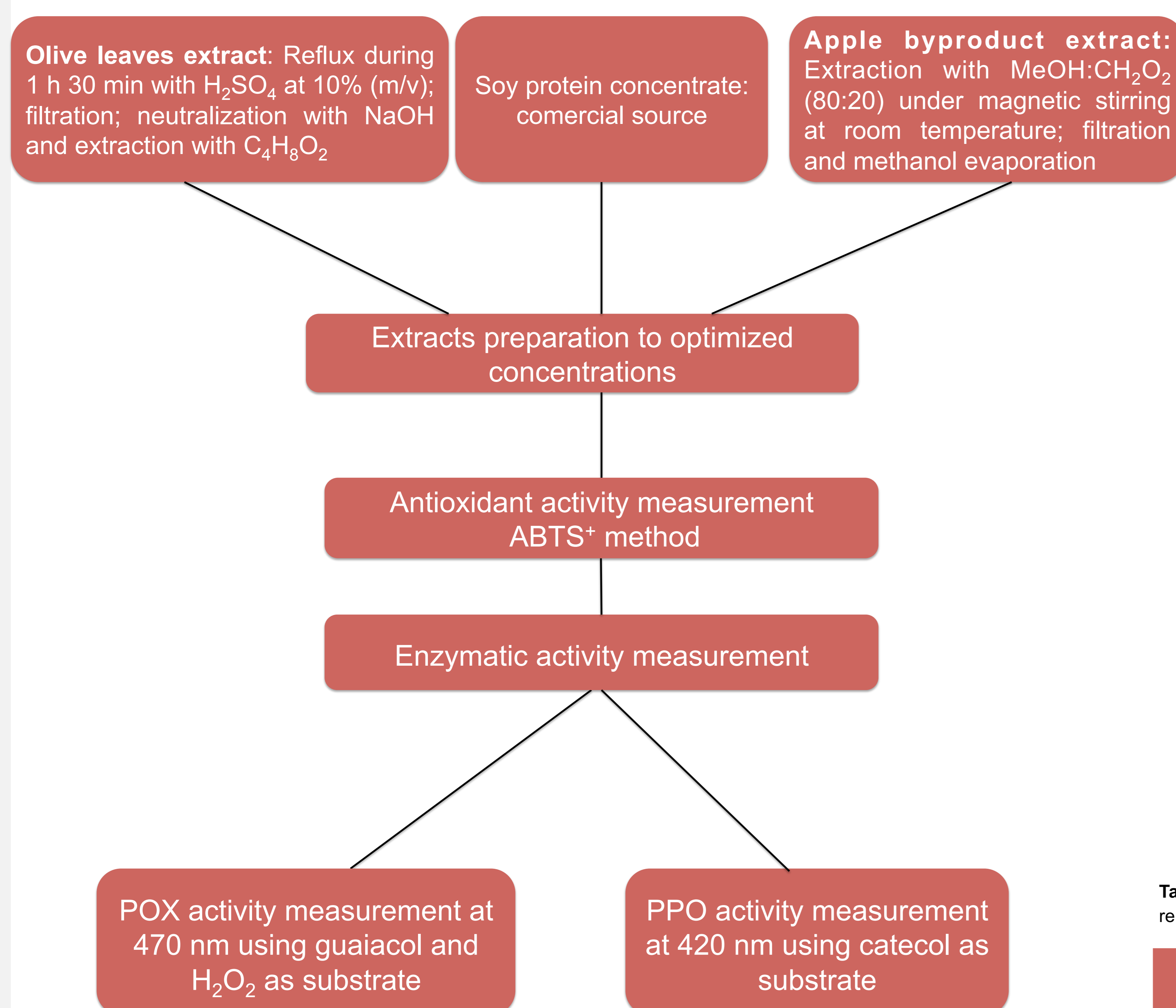
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## Introduction/Resume

Enzymatic browning in fruits represents a difficult problem for Food Industry, especially with recent restrictions in the use of some antioxidants. It is often associated with undesirable off-flavors and negative effects on taste and nutritional value. This physiological disorder is mainly due to the oxidation of natural phenolic compounds into quinones that are polymerized to brown pigments by polyphenol oxidase (PPO). Peroxidase (POX) is also alleged to be related to browning development, by inducing H<sub>2</sub>O<sub>2</sub> oxidation of phenolic compounds. Prevention of browning reactions, catalyzed by these enzymes, has traditionally been accomplished by various chemicals, as ascorbic and citric acids. Partial control of this disorder can be obtained with the application of natural antioxidants, which compete with common substrates for the enzymatic activity. In this study, the potential antioxidant and enzyme inhibitory activities of natural extracts, apple byproduct and olive leaves, soy protein concentrate, rich not only in phenolic compounds but also in triterpenic acids and amine groups, were investigated and validated as potential novel enzymatic browning inhibitors.

## Methods



Observing the results, olive leaves extract revealed the most antioxidant capacity, followed by soy protein and apple byproduct extract. Regarding the influence of the extract and soy protein on oxidative enzymes activity, it is notable the potential of apple byproduct extract on inhibit both enzymes at the concentration tested. It is also noteworthy the ineffectiveness of olive leaves and soy protein in inhibiting PPO activity despite being capable of POX restriction.

## Results

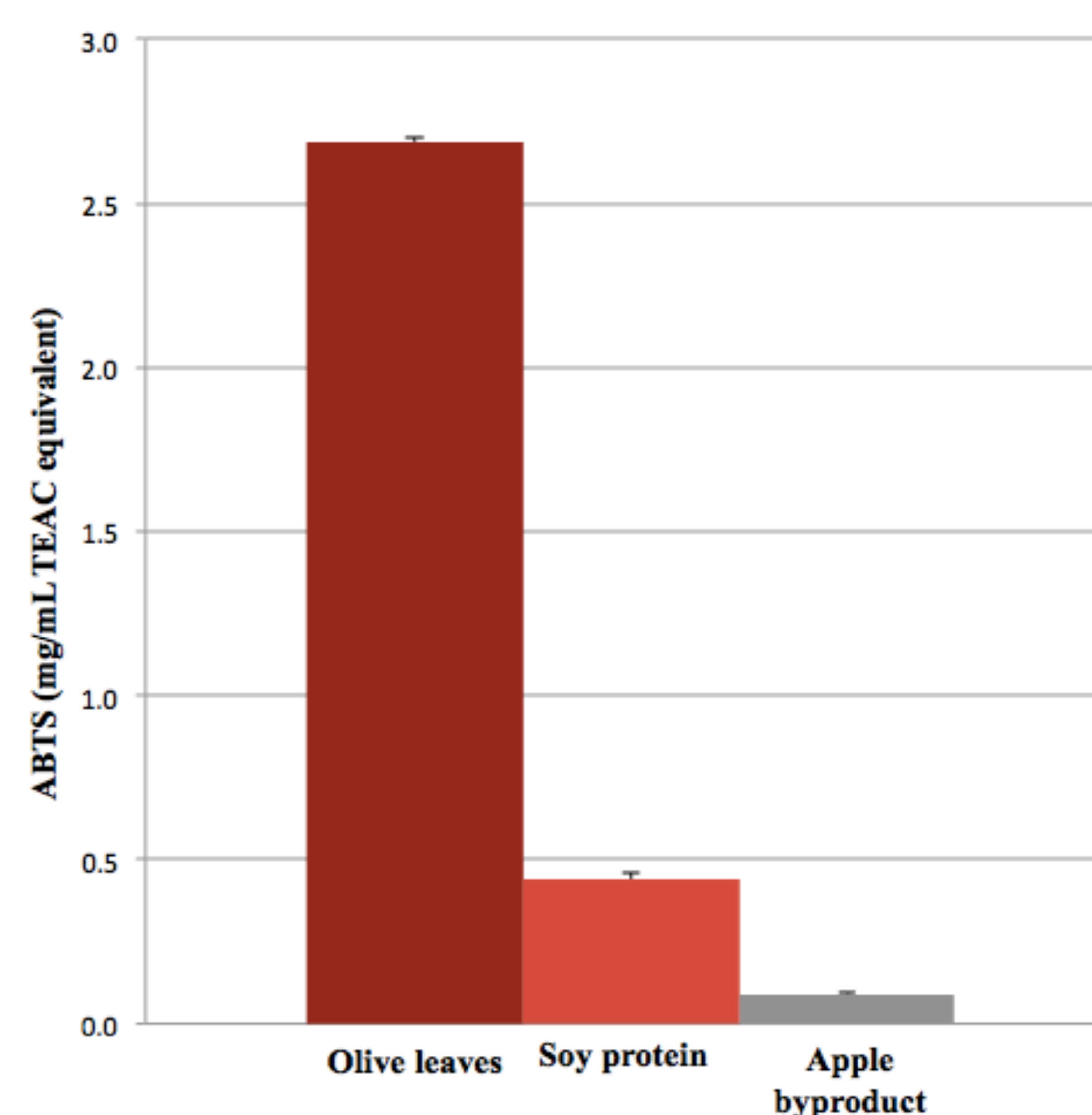


Figure 1. Antioxidant activity of natural extracts and soy protein through the ABTS<sup>+</sup> method. Values are expressed in mg.mL<sup>-1</sup> ascorbic acid and represent an average of three analytical replicates.

Table 1. Different extracts and soy protein % of inhibition relatively to the control. Results are shown in mean of three replicates ± SD

Enzyme	Ascorbic acid	Olive leaves	Soy protein	Apple byproduct
PPO	100 ± 2.57	0	0	11.6 ± 3.12
POX	63.53 ± 0.75	44.81 ± 1.48	21.49 ± 2.34	60 ± 1.16

## Conclusions

The present study demonstrated that, within the natural extracts, leaves from olive tree showed the highest values of antioxidant activity (2.688 ± 0.006 mg.mL<sup>-1</sup> TEAC equivalent). However, it is important to highlight the inhibitory effect of apple byproduct extract on both oxidative enzymes, despite its low antioxidant activity. This report has practical implications in generating novel natural extracts with potential application as anti-browning agents.

### References

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