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Physicochemical and functional value of lettuce: effect of mulching technique used during production on postharvest storage

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INTRODUCTION & AIM

Lettuce (*Lactuca sativa* L.) is one of the most important vegetable crops cultivated and the most popular green vegetable worldwide. Lettuce quality can be affected by different factors, such as preharvest factors, postharvest processing, storage time, and environmental conditions. There are several techniques to increase yield and improve product quality, as well as reduce the environmental effects on cropping, that can be used. Mulch or mulching is an ancient horticultural technique, the objective of which is to protect the soil surface, create a physical barrier, and provide a more suitable environment for the crop.

The objectives of our work were to evaluate the effect of different mulching techniques on the morphophysiological performance,and nutritive value of iceberg-type lettuce and study their changes during postharvest storage.

Keywords: *Lactuca sativa* L., mulching, yield, functional food, bioactive compounds

METHODS

Iceberg-type lettuce seeds were germinated on commercial substrate, and after three true leaves had grown, they were transplanted into the field using a complete randomized design.

The mulching soil treatments consisted of two mulching films, dry alfalfa added on top of the grown bed and bare ground as a control.

After harvest, the lettuce heads were stored under cold storage at 4 °C for 8 days.

Figure 1. Mulching soil treatment. **A**: white plastic foil. **B**: dry alfalfa. **C**: black plastic foil

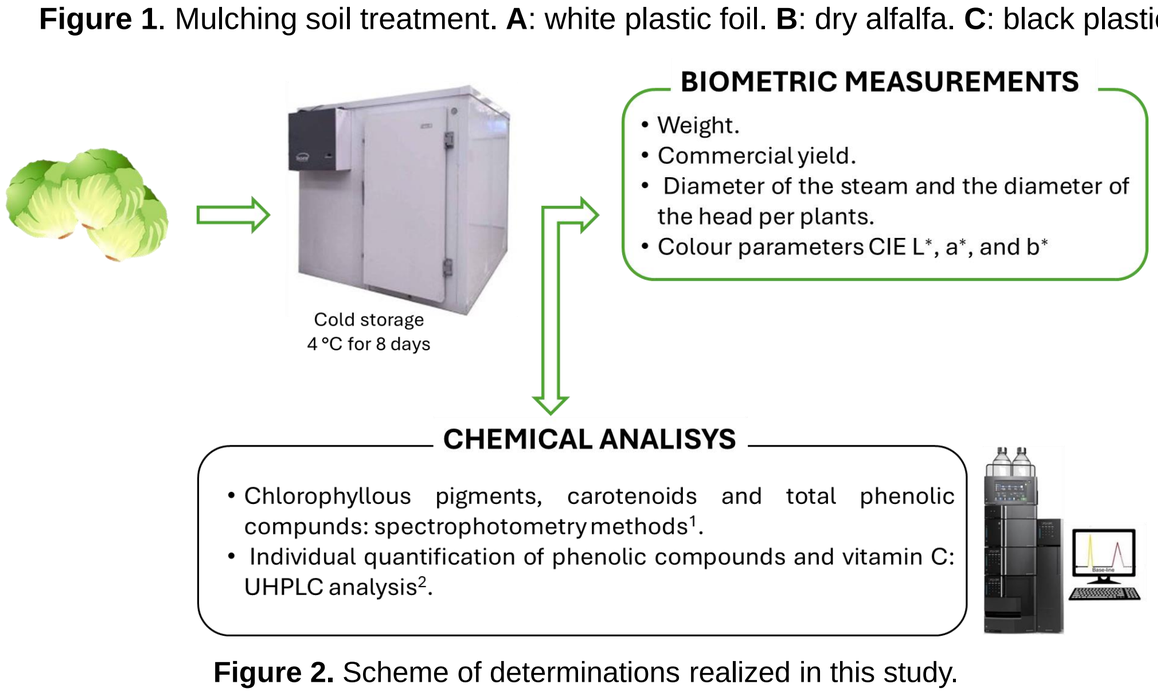

Figure 2. Scheme of determinations realized in this study.

References

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RESULTS & DISCUSSION

Mulching soil treatments had a significant impact on biometric measurements such as yield, physicochemical values, and functional value in lettuce heads.

Mulch treatment x days after harvest interaction was significant ($p < 0.05$) for chlorophyllous pigments and carotenoids, individual and total phenolic compounds, and vitamin C.

The highest levels of pigments were registered at 4 days after harvest with black plastic foil (Figure 3). Meanwhile, the largest number of individuals, final amount of total phenolic compounds, and highest vitamin C levels were reached at 4 and 8 days after harvest with dry alfalfa added to the grown bed (Figure 4).

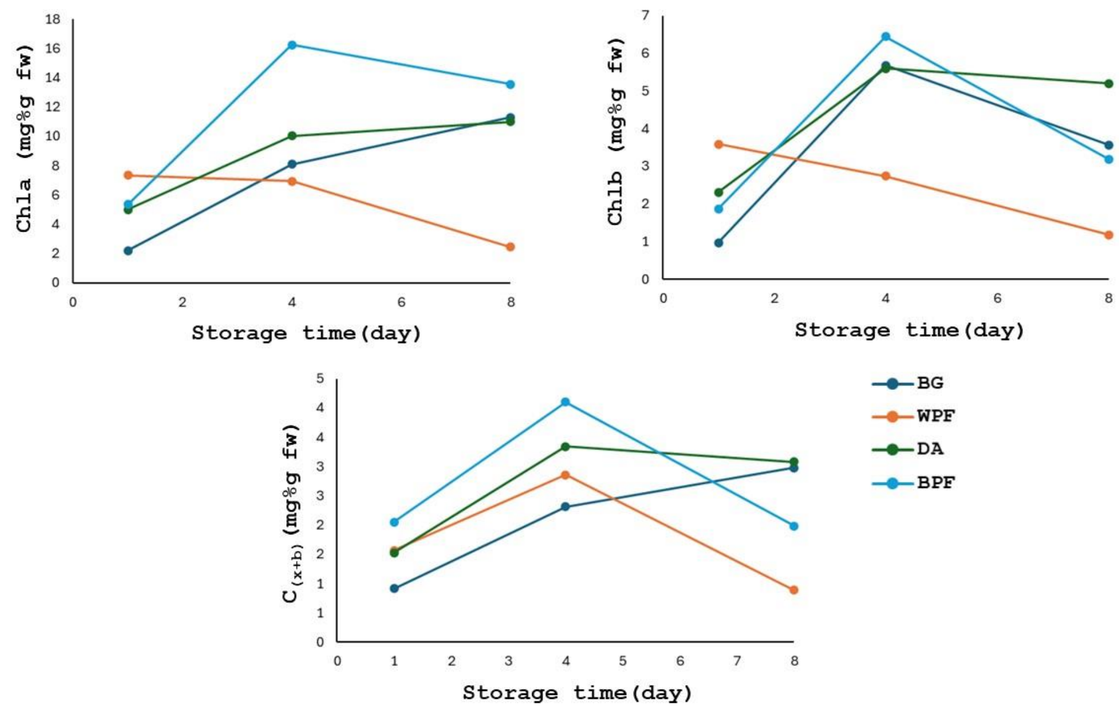

Figure 3. Time-course variation for mean pigments and carotenoids content during cold storage at 4 °C. **Chla:** chlorophylls a. **Chlb:** chlorophylls b. **$C_{(x+b)}$:** carotenoids. **BG:** bare ground. **WPF:** white plastic foil. **DA:** dry alfalfa. **BPF:** black plastic foil.

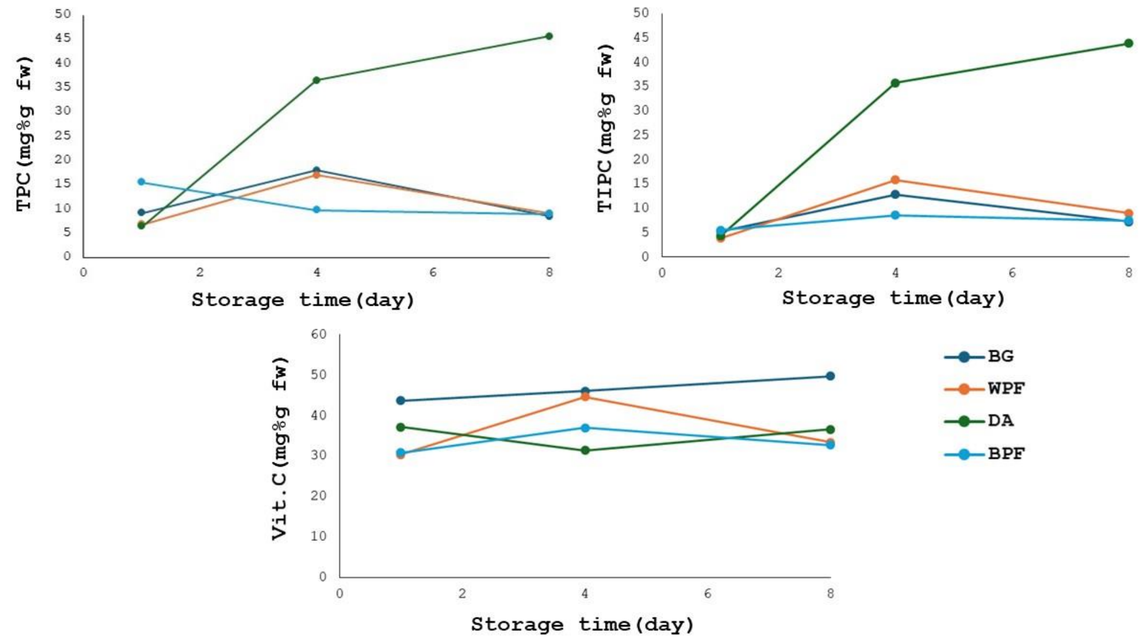

Figure 4. Time-course variation for mean pigments and carotenoids content during cold storage at 4 °C. **Chla:** chlorophylls a. **Chlb:** chlorophylls b. **$C_{(x+b)}$:** carotenoids. **BG:** bare ground. **WPF:** white plastic foil. **DA:** dry alfalfa. **BPF:** black plastic foil.

CONCLUSION

Organic mulch had the best result, improving the bioactive compounds in lettuce.