

Antioxidant properties of 'Algarrobo blanco' (*Prosopis alba* Griseb.) extracts and their applications to lamb burgers preservation.

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Introduction: Ready-to-eat patties are subjected to several successive processing stages such as mincing, heating, cold storage, or reheating, which are responsible for the increased susceptibility of meat components to suffer oxidative degradation. Due to growing consumer concern about food safety and health, the food industry aims to reduce the use of classic antioxidant additives in meat products. For these reasons, compounds derived from plant sources have been studied extensively with respect to their antioxidant properties. The *Gran Chaco* is a semiarid lowland natural region of the *Río de la Plata* basin and is the largest dry forest in South America. One of the key taxa of this biome is the genus *Prosopis* (Fabaceae) which contains several economical important tree species. According to preliminary studies, the *Prosopis alba* is a highly available and promising source of bioactive natural products (Astudillo et al. 2000). The present study was carried out to (i) optimize an extraction procedure of phenolic compounds of *P. alba* leaves, (ii) characterize such extract in terms of phenolic content, composition, and *in vitro* antioxidant activity, and (iii) analyse the extract showing the most intense *in vitro* antioxidant activity for their ability to inhibit lipid oxidation during refrigerated storage of cooked lamb burgers.

Material and methods: *P. alba* leaves were collected from Santiago del Estero, Argentina. Legs of Merino lambs were obtained from a commercial cold store from Cáceres, Spain. Two different *P. alba* leaf extracts (acetone:water and ethanol:water 70:30) were prepared. Total phenolic content (TFC) and the antioxidant activity by using the DPPH assays were performed as reported by Ganhão et al. 2000. Phenolics composition and tocopherol content were performed using an HPLC method described by Arcanjo et al. 2019 and Rodríguez-Carpena et al. 2012, respectively. Two different types of burger patties were prepared. Control burgers (n=16) consisted of a basic recipe with lamb, water and ClNa. Treated counterparts (n=16) were prepared with acetone *P. alba* leaf extracts in replacement of distilled water. Before extract addition, organic solvent was completely removed by vacuum. Patties were formed by using a semiautomatic burger moulding machine. After cooking in a conventional oven (170 °C/16 min), burgers were subsequently stored for 9 days at 3°C. Burgers were analysed at 0, 6 and 9 days for the instrumental colour and TBA according to Ganhão et al. 2000.

Results: Acetone extracts from *P. alba* leaves showed a significantly higher TFC content (83.0 vs 49.0mg GAE/g) and a higher antioxidant activity than ethanolic extracts (46.0 vs 33.0mM trolox/100g). According to these results, the acetone extract was chosen for its inclusion in lamb patties. In addition, *P. alba* leaves had high phenolic (mainly procyanidins) and tocopherols contents, which makes it an interesting source of natural antioxidants. No significant differences were found throughout the refrigeration between control and treated burgers for CIELAB parameters. These results imply that the addition of *P. alba* leaf extracts does not modify the colour during cooking and subsequent storage of lamb burgers. The TBARS values in Treated burgers were significantly lower than in the Control counterparts in all sampling days (e.g.: 0.63mg vs 0.94mg MDA/kg sample at day 9), confirming that the antioxidant properties displayed by *P. alba* extracts *in vitro*, are also applicable in a real meat product.

Conclusion: *P. alba* leaf extract displayed intense antioxidant activity against lipid oxidation and could play an important role as a natural antioxidant ingredient in lamb burger patties by improving their oxidative stability and quality.

Acknowledgements and Financial support statement: The financial support from 1. "FEDER/Ministerio de Ciencia, Innovación y Universidades-Agencia Estatal de Investigación" through the Project: AGL2017-84586-R, 2."Gobierno de Extremadura (Consejería de Economía e Infraestructuras)" and "FEDER (Fondo Europeo de Desarrollo Regional, Una manera de hacer Europa)" through the grants a) GR18104- and b) IB20103 is acknowledged.

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