ANTIOXIDANT EFFECT OF MAQUI (*Aristotelia chilensis)* AND MURTILLA (*Ugni molinae*) LEAVES IN THE ELABORATION OF PROCESSED MEAT PRODUCTS.

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I. INTRODUCTION

The meat industry is currently facing the challenge of creating products with healthier ingredients, without losing their safety and sensory characteristics, and without affecting their shelf life. Plant polyphenols play an important role in this respect, as they can act as antioxidants and antimicrobials in meat matrices (1). In Chile there are several native species of great biotechnological interest due to their high concentrations of polyphenols. Maqui (Aristotelia chilensis) and murtilla (Ugni molinae Turcz.) are two of the Chilean endemic species with the ability to retard lipid oxidation and inhibit the growth of microorganisms. According to several studies, maqui and murtilla leaves show higher concentrations of polyphenols and a higher antioxidant capacity than fruits and leaves (2,3). So far, there is no evidence showing the behavior of these compounds in processed meats and meat products. This study investigated the effectiveness of polyphenols from maqui (Aristotelia chilensis) and murtilla (Ugni molinae Turcz.) leaves in enhancing the quality of processed meat products.

II. MATERIALS AND METHODS

Maqui and murtilla leaves were sampled and processed to obtain a fine powder (particle size: 80 µm). Subsequently, a characterization of the chemical composition of the leaves was carried out, including proximal composition, polyphenolic characterization, antioxidant, and antimicrobial activity. Two prototype meat products (sausages and hamburgers) were developed with three inclusion levels of maqui or murtilla leaf powders (500; 1000 and 1500 mg/kg). Subsequently, a study of the effect of the powders on the physicochemical, microbiological, and organoleptic properties of the prototypes was carried out. Analysis of the obtained data employed ANOVA and post-hoc Turkey tests to identify significant differences between prototypes.

III. RESULTS AND DISCUSSION

The maqui and murtilla leaf extracts have a high content of total polyphenols (136.97 and 791.77 mg AGE/g, respectively) and strongantioxidant capaciy. In general, maqui extracts showed higher antioxidant capacity than murtilla extracts (Figure1, 2). Both extracts showed a high inhibitory power against Gram (+) Staphylococcus aureus and Bacillus cereus microorganisms. On the other hand, they did not show inhibition for Gram (-) Escherichia coli and Pseudomona aeruginosa. On the other hand, the inclusion of maqui and murtilla leaf powders did not alter the proximal composition of any of the prototypes studied (sausages and hamburgers). While a slight color change (redness) was observed due to chlorophyll in the powders, this did not negatively impact overall acceptability based on sensory panel scores. In burgers with maqui powder polys, lipid oxidation had been inhibited by approximately 44.5% compared to the control, showing a higher antioxidant power than the synthetic antioxidant. Similar results were observed in the other prototypes studied. In addition, the sausages formulation with maqui leaf powder, the profile of volatile compounds showed a correlation between the increase in the concentration of the powder and the decrease in the aldehyde content on day 21 of storage, corroborating the antioxidant power of the maqui leaves. Regarding the fatty acid profile,

no significant differences were observed between tratments neither in the profiles, nor nutritional indices studied n6/n3; atherogenic index, thrombogenic index and trans fatty acid content. The sensory attributes of the hamburgers treated with maqui and murtilla leaf powders and the sausages with maqui leaf powders were acceptable. Finally, the antimicrobial efficacy of maqui and murtilla leaves was confirmed in the prototype sausages and hamburgers.

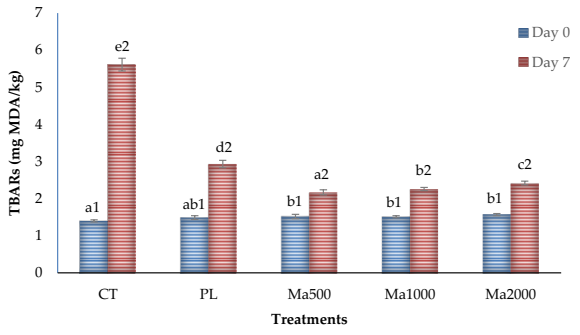

Figure 1. Effect maqui leaf power (MaLP) on lipid oxidation (TBAR value) of beef burgers. CT: no antioxidants; PL: synthetic antioxidant Plus color®; Ma500: 500 mg/kg of MLP; Ma1000: with 1000 mg/kg of MLP; Ma2000: with 2000 mg/kg of MLP.

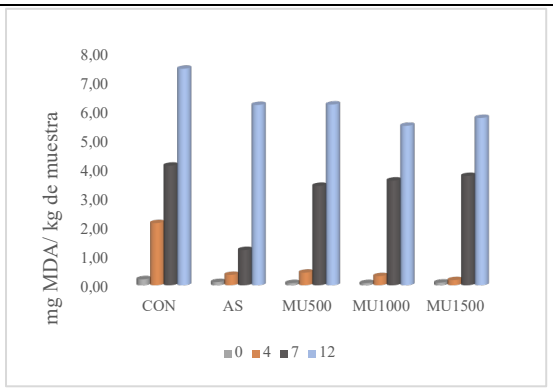

Figure 2. Effect murtilla leaf power (MuLP) on lipid oxidation (TBAR value) of beef burgers. CT: no antioxidants; PL: synthetic antioxidant Plus color®; Ma500: 500 mg/kg of MuLP; Ma1000: with 1000 mg/kg of MuLP; Ma2000: with 2000 mg/kg of MuLP.

IV. CONCLUSION

Maqui and murtilla leaves have high concentrations of natural antioxidants and high antioxidant activity "in vitro" and showed high inhibitory power against Staphylococcus aureus and Bacillus cereus microorganisms. The general acceptability was not affected by the inclusion of maqui and murtilla powders in the prototypes of sausage and hamburgers. The addition of 500 mg/kg of powders of maqui leaves and murtilla to sausage and hamburgers provides a good antioxidant and antimicrobial effect on these fresh meat products.

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