

IMPACT OF OZONIZATION ON QUALITY PARAMETERS, NUTRITIONAL ASPECTS AND INACTIVATION OF *Listeria innocua* IN BEANS

ALEXANDRE¹, A.P.S.; FUNDO², J.; MILLER³, F.; CALORI-DOMINGUES⁴, M.A.; SILVA⁵, C.L.M.; AUGUSTO⁶, P.E.D.

¹Department of Agri-food Industry, Food and Nutrition (LAN), Luiz de Queiroz College of Agriculture (ESALQ), University of São Paulo (USP), Piracicaba/SP, Brazil - e-mail: allana.santosalexandre@gmail.com

²Center for Biotechnology and Fine Chemistry (CBQF), School of Biotechnology, Catholic University of Portugal, Porto, Portugal - e-mail: jfundo@porto.ucp.pt

³CBQF, Porto, Portugal - e-mail: fmiller@porto.ucp.pt

⁴LAN/ESALQ/USP São Paulo - e-mail: macdomin@usp.br

⁵CBQF, Porto, Portugal - e-mail: clsilva@porto.ucp.pt

⁶LAN/ESALQ/USP São Paulo - e-mail: pedro.ed.augusto@usp.br

ABSTRACT: Beans are one of the most consumed legumes, due to their high content of proteins, complex carbohydrates, fibers, vitamins and also antioxidant substances, such as polyphenols. Antioxidants are substances that can slow down or inhibit oxidative damage by playing a role in preventing chronic diseases. However, the bean quality can be affected by microbial contamination or the methods used to avoid it. Ozone (O₃) is a gas with high oxidizing potential, considered a “green chemical process” and recognized as GRAS (Generally Recognized As Safe). It can be used for microbial inactivation in different agricultural products, as well as for mycotoxins degradation in grains and derivate. However, it can also negatively impact the product quality due to oxidative processes. Consequently, the objective of this study was to evaluate the effect of processing beans with ozone on their phenolic compounds and antioxidant capacity, as well as their impact on the physical properties (water activity, color) and inactivation of *Listeria innocua*, as a target microorganism. Three different beans were evaluated: *black*, *red* and *catarino* beans with 10 and 40% moisture content. The samples were processed, in a reactor using a gas flow of 5 g/h with ozone concentration of 37.06 g/L, for up to 240 min. The total phenolic content was evaluated through the method of Folin–Ciocalteu, while the antioxidant capacity was evaluated through the method of ABTS. The results demonstrates that it was possible to reduce 2.0 Log cycles of *Listeria innocua* after 240 min of processing. The *catarino* bean was affected in the phenolic content when moistened. On the other hand, the ozone processing did not affected ($p \leq 0.05$) the total phenolic content, antioxidant capacity, and color of the beans. Therefore, the present study demonstrated that the ozonation can reduce the microbiology content in beans, without impact its nutritional quality.

Keywords: beans, ozone, quality