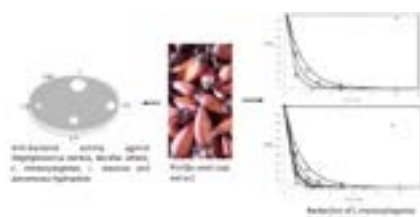


**Antimicrobial activity of *Araucaria angustifolia* seed (pinhao) coat extract and its synergism with thermal treatment to inactivate *Listeria monocytogenes***

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The objective of the present work is to evaluate the antimicrobial activity of aqueous extract from solid waste of *Araucaria angustifolia* seed (pinhao) and its synergism with heat treatment against *Listeria monocytogenes*. A broad spectrum of bacteria and fungi were confronted with pinhao coat extract at concentration of 10 g/L and for the synergism test *L. monocytogenes* was exposed to temperatures of 55°C, 60°C or 70°C for up to 10 min in the presence of the extract water. Results showed that pinhao coat extract inhibited *Staphylococcus aureus*, *Bacillus cereus*, *L. monocytogenes*, *L. innocua* and *Aeromonas hydrophila* growth, but did not inhibit the fungi evaluated. Kinetic modeling showed that *L. monocytogenes* inactivation followed the first order model. Results showed that the inactivation rate constant increased 105% when *L. monocytogenes* was treated at 55°C in the presence of pinhao coat extract. Meanwhile, there was an increase of 58% and 42% at 60°C and 70°C, respectively, indicating clear a synergism of the heat treatment with the aqueous extract obtained from the food residue. Thus, pinhao coat extract present antibacterial activity against important foodborne bacteria and its combination with heat processing implies in reduction of the thermal stability of *L. monocytogenes*, indicating that the combination of both techniques can be an interesting tool to be used in food preservation.



**Figure 1.** Graphical abstract: antibacterial activity of pinhao seed coat extract and its synergism with heat treatment against *Listeria monocytogenes*

**Recent Publications:**

1. Sant'Anna V, Biondo E, Kolchinski EM, Silva LFS, Corrêa APF, Bach E, Brandelli A (2017) Total polyphenols, antioxidant, antimicrobial and allelopathic activities of spend coffee ground extract. Waste and Biomass Valorization 8:439-442.
2. Klein B, Biondo E, Kolchinski EM, Sant'Anna V (2017) Evaluation of aqueous extracts from agro-industrial residues of pecan nut and pinhao as allelochemical agents. Revista Eletrônica Científica da UERGS 3:495-500.
3. Caxambú S, Kolchinski EM, Biondo E, Padilha RL, Brandelli A, Sant'Anna V (2016) Evaluation of the antimicrobial activity of pecan nut [*Carya illinoensis* (Wangenh) C. Koch] shell aqueous extract on minimally processed lettuce leaves. Food Science and Technology (Campinas) 36:42-45.
4. Evaluation of the effect of chlorine dioxide on strawberries to control spoilage micro-organisms. Latin American Applied Research. Accepted for publication in 2017.
5. Polesi RG, Rolim R, Zanetti C, Sant'Anna V, Biondo E (2017) Agrobiodiversidade e Segurança Alimentar no Vale do Taquari, RS: plantas alimentícias não convencionais e frutas nativas. Revista Científica Rural 19:118-135.

**Biography**

Elaine Biondo is graduated in biology from Federal University of Santa Maria (RS, Brazil) and completed his PhD in Botany from Federal University of Rio Grande do Sul. She has published more than 30 papers dealing with on biodiversity and non-conventional edible plants. in reputed journals. Currently, also she has worked at State University of Rio Grande do Sul food microbiology for food and agrochemical applications.

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