

FOOD PROCESSING FACTOR TO GLYPHOSATE IN BEAN AFTER APPLICATION OF DIFFERENT PROCESSING TECHNIQUES

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Type selection

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Abstract text

Text: Beans are a valuable source of vegetable protein and essential nutrients. Brazil is one of the world's largest producers of beans, with a significant portion of the national production earmarked for domestic consumption, owing to the high demand for this food in the Brazilian diet. The food processing factor is an important consideration in managing risks associated with consuming contaminated foods. It refers to the reduction or concentration of pesticide residues during food processing, such as washing, peeling, cooking, and other culinary techniques. In this study, a method was developed for the analysis of polar compounds (glyphosate, glufosinate, AMPA, fosetyl-Al, maleic hydrazine, and ethephon) in bean samples using UPLC-MS/MS and an Acclaim Trinity Q1 column (2.1 x 100 mm, 3 µm) for chromatographic separation (One Pot Extraction Method for Multiresidue and Polar Pesticides Analysis). Furthermore, an investigation was conducted to assess whether different soaking conditions (no soaking, soaking in water, and soaking in water with 1% vinegar) – Factor A, and cooking methods (conventional pot, microwave, and pressure cooker) – Factor B, affect the glyphosate concentration in naturally contaminated bean samples through a 3² factorial analysis. There was no difference in variance between the samples, and in the ANOVA test, Factor A (type of soak) showed no significant difference, while Factor B (type of pot) had a significant effect on glyphosate loss. The experiment involving cooking beans in a pressure cooker with a 12-hour soak resulted in a 77.1% loss of glyphosate. Conversely, beans cooked in a regular pot (90 min) with a 1% vinegar soak experienced a 52.7% glyphosate loss in sample beans. The research findings confirmed that cooking processes significantly reduced the concentration of glyphosate in beans. However, soaking them did not affect the reduction. The food processing factor ranged from 0.23 to 0.47, with the pressure cooker experiment showing the lowest values and the highest glyphosate degradation under high pressure and temperature, within the shortest cooking time (40 min) among the treatments.

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