Simultaneously detoxification and allergen inactivation of castor bean cake by calcium compounds treatment

Fernandes, K.V.¹, Deus-de-Oliveira, N¹, Godoy, M.G.², Nascimento, V.V.¹, de Melo, E.J.T.¹, Freire, D.M.G.², Machado, O.L.T.¹

¹ Universidade Estadual do Norte Fluminense.
² Universidade Federal do Rio de Janeiro.

*Ricinus communis* has a great economical importance due to the extracted oil of its seeds that is used for the biodiesel synthesis. After oil extraction, a castor meal containing high protein level is obtained, however, it can not be used for animal consumption due to toxic (ricin) and allergenic (2S albumin) proteins. Two processes for castor meal detoxification and allergens inactivation were proposed. In addition, for detection of ricin, a biological test was introduced. In this test, Vero cells were treated with ricin and cell death was measured by cell counting and by measuring LDH activity. The minimum amount of ricin needed to kill 1.6 x 10⁵ cells was 10 ng/mL. As a cake detoxification treatments, solid-state fermentation (SSF) and treatment with calcium compounds were used. For SSF, *Aspergillus niger* was grown on castor mea, and this meal was analysed after 24, 48, 72 and 96. The ricin was eliminated after 24 hours of fermentation and after treatments with 4% and 8% of CaCO₃, Ca(OH)₂ and CaO. During SSF, lipases was also produced adding value to castor meal. By the other hand, after calcium treatment, the allergenic properties of castor cake, was totally abolished and a safe by-product was obtained.

Keywords: Ricin, solid-state fermentation, 2S albumins, calcium treatment