

Bioconversion of Capsaicin Using the Optimized Culture Broth of Lipase Producing Bacterium of *Stenotrophomonas maltophilia*

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Abstract : Introduction: Chili peppers and related plants in the family of capsicum produce a mixture of capsaicins represent anticarcinogenic, antimutagenic, and chemopreventive properties. Vanillylamine, the main product of capsaicin hydrolysis is applied as a precursor for manufacturing of natural vanillin (a famous flavor). It is also used in the production of synthetic capsaicins harboring a wide variety of physiological and biological activities such as antibacterial and anti-inflammatory effects as well as enhancing of adrenal catecholamine secretion, analgesic, and antioxidative activities. The ability of some lipases, such as Novozym 677 BG and Novozym 435 and also some proteases e.g. trypsin and penicillin acylase, in capsaicin hydrolysis and green synthesis of vanillylamine has been investigated. In the present study the optimized culture broth of a newly isolated lipase-producing bacterial strain (*Stenotrophomonas maltophilia*) applied for the hydrolysis of capsaicin. Materials and methods: In order to compare hydrolytic activity of optimized and basal culture broth through capsaicin 2 mL of each culture broth (as sources of lipase) was introduced to capsaicin solution (500 mg/L) and then the reaction mixture (total volume of 3 mL) was incubated at 40 °C and 120 rpm. Samples were taken every 2 h and analyzed for vanillylamine formation using HPLC. Same reaction mixture containing boiled supernatant (to inactivate lipase) designed as blank and each experiment was done in triplicate. Results: 215 mg/L of vanillylamine was produced after the treatment of capsaicin using the optimized medium for 18 h, while only 61 mg/L of vanillylamine was detected in presence of the basal medium under the same conditions. No capsaicin conversion was observed in the blank sample, in which lipase activity was suppressed by boiling of the sample for 10 min. Conclusion: The application of optimized broth culture for the hydrolysis of capsaicin led to a 43% conversion of that pungent compound to vanillylamine.

Keywords : Capsaicin, green synthesis, lipase, *stenotrophomonas maltophilia*

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