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## Colorimetric Detection of Biogenic Amine Formation by Various *Bacillus* Strains Isolated from Tarhana

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### Abstract

Biogenic amines are nitrogenous substances produced through the decarboxylation of amino acids by the action of substrate-specific amino acid decarboxylases. They are health-threatening substances, and excess consumption can cause health problems such as nausea, respiratory distress, hot flush, sweating, heart palpitations, headache, hyper/hypotension, etc. Various groups of microorganisms, including lactic acid bacteria, *Enterococcus*, *Bacillus*, and *Pseudomonas*, have been reported to have amino acid decarboxylase activities. The risk of biogenic amine formation is especially high in fermented foods. Moreover, it can also be found in some raw foods. Amongst the biogenic amines, cadaverine, histamine, putrescine, and tyramine are the most common, which are formed by the decarboxylation of lysine, histidine, ornithine, and tyrosine, respectively. In this study, biogenic amine formation abilities of various *Bacillus* strains isolated from tarhana samples were detected. For this purpose, a colorimetric method was applied, which is based on the pH shift (increase) upon the formation of biogenic amines in the presence of a pH indicator dye (bromocresol purple). The bacteria were cultivated in Luria Bertani broth at an initial pH of 5.0 containing precursor amino acids, namely lysine, histidine, ornithine, and tyrosine. At the end of 24 h incubations at 37 °C with agitation at 60 rpm, absorbances of the cell-free supernatants were measured at 590 nm. The highest absorbance values were recorded as higher biogenic amine formation. Control samples without precursor amino acids were also prepared. The percent increase in the absorbance was the rate of biogenic amine formations. Ninety-five *Bacillus* isolates were tested for four biogenic amine formations. The results showed that the type and the amount of biogenic amine production in *Bacillus* were directly related to the organisms.

**Key Words:** Biogenic amine, *Bacillus*, Cadaverine, Putrescine, Histamine, Ornithine

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