



## **Isolation and optimization of L-asparaginase producing bacteria from Maragheh traditional dairy products**

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### **ABSTRACT**

L-asparaginase is an anti-tumor enzyme and widely accepted as chemotherapeutic agent which has activity against acute lymphoblastic leukemia. L-asparaginase catalyzes the deamination of l-asparagine in to L-aspartate and ammonia, and exists in various organisms including animals, plants, yeast, fungi, bacteria, and archaea except humans. Moreover, this enzyme is used in food industry to prevent the acrylamide formation and preserve the quality of the food. Probiotic products contain beneficial bacteria that have beneficial effects on health and the most important biological properties of probiotics is the elimination of mutagenic and carcinogenic agents. The aim of this study is isolation and optimization of L-asparaginase producing isolates from Maragheh traditional dairy products. The isolates were characterized based on their morphological, biochemical and probiotic properties and asparaginase production in both solid and liquid media by qualitative and quantitative methods. The lactobacillus from whey-water was selected due to a proved promising ability to produce L-asparaginase and optimized. The conditions of enzyme production were standardized according to a one-factor-at-a-time experimental design. Eight variables (glucose, inoculum size, incubation time,  $K_2HPO_4$ , L-asparagine, peptone, sucrose and yeast extract) were screened using response surface methodology (RSM). Among the 95 identified isolates, 35 of them had probiotic potential. According to the results of RSM, maximum asparaginase activity was achievable at glucose (2 % V/V), yeast extract (1.25 % V/V) and L-asparagine (1.75 % V/V). The maximum amount of enzyme production was recorded as 127.16 U/mg. The isolated lactobacillus as a noticeable source of this drug enzyme could be considered.

**Key words:** Drug enzyme – L-Asparagine – Nitrogen metabolism, optimization, probiotic