ABSTRACT

The main purpose of this research was to isolate, screen and identify the bacteria producing methionine amino acid. Further, the isolated stain was improved through the chemical mutagenesis. As for the methionine production there is no commercial process available, different parameters of fermentation process was optimized to develop a feasible process for the methionine production. Soil samples were collected from different cities of Pakistan and screened for the methionine-producing bacteria using methionine screening medium. There were 64 samples out of 93, which showed growth of methionine producing bacteria. These sixty four bacterial isolates were subjected to secondary screening by submerged fermentation. The paper chromatography and thin layer chromatography were performed for qualitative analysis of methionine and its production was estimated through the calorimetric method. The maximum methionine producing isolate NPIIB-15 (1.394±0.007) was further subjected to potent chemical mutagens (Sodium Azide, Ethidium Bromide and MNNG) for enhancing the methionine production. All the three mutagens resulted in the development of mutant strains producing significant amount of methionine. The MNNG was proved as a strong mutagen among all and resulted in the development of a mutant strain MNNG-M3 (NPIIB-15) capable of producing 2.719±0.008 mg/ml methionine. Different cultural conditions (medium, incubation time, temperature, time, carbon sources and their concentration, nitrogen sources and their concentration and inoculum size) were optimized to improve the methionine production. The maximum methionine production by mutant strain (4.559±0.07) was observed using M3 media having pH 7 at 30°C when incubated for 72 h having mannitol as a carbon and ammonium chloride as nitrogen sources.