The epoch making discovery of L-glutamic acid producing microorganism has opened the way of microbial production of other amino acids. Nowadays, all essential amino acids except L-methionine have been successfully produced on an industrial scale by microbial means. Microbial process potentially produces the biologically active L-isomer of the amino acid. In the diet of common people all essential amino acids are mainly derived from vegetable or plant proteins, which are frequently limiting in L-methionine. Biochemical studies in animal system have already indicated that L-methionine occupies a cardinal position in the central metabolism. Malnutrition of L-methionine, therefore, causes several pathological syndrome. Recently, L-methionine is required in some pharmaceutical formulations. These facts have stimulated the present investigator to start the studies on microbial production of L-methionine. Microorganisms can produce L-methionine but not in excess due to strict and fine feedback regulations in a highly branched biosynthetic pathway. However, proper selection of parent strain and its improvement with the aid of appropriate analogs may lead to overproduction of required amino acid in a precisely formulated fermentation medium. L-Methionine biosynthetic pathway and its regulation are well studied in bacteria. Therefore, a bacterial strain instead of a fungal strain has been selected for stepwise improvement.

Preface

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The subject matters of this thesis are arranged in five chapters. Chapter I presents a brief historical background of amino acid fermentation in relation to a possibility of microbial production of L-methionine. Chapter II contains the process of isolation of parent bacterial strain from soil, together with morphological studies and biochemical tests performed for its identification. Chapter III deals with the development of multi-analog resistant mutants for enhancement of extracellular L-methionine production. Chapter IV describes the adjustment of physical parameters of fermentation process and formulation of suitable chemical composition of fermentation medium for optimum yield of L-methionine. Chapter V concludes with the process of extraction and purification of L-methionine from the fermented broth.

The report for L-methionine production by microorganisms is still very rare. The experimental findings presented here may therefore be significant to the interested researchers related to this field.