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<特別講演要旨>

Microbial Production of Nucleic Acid Related Substances

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In Japan, extracts of dried seaweed(kombu) and fish (katuobushi) are used widely as flavour-enhancing substances. It was clarified by Ikeda and Kodama that the good flavour of the former came from monosodium glutamate (MSG) and that of latter came from a compound of inosinic acid. Microbial production of MSG was established in 1957.

On the other hand, at one time only small amounts of 5′-IMP were produced from the juice of boiled fresh fish and squid muscle, but in 1962, several factories began a large scale production of 5′-IMP and 5′-GMP by the hydrolysis of RNA with microbial enzymes(hydrolyzing method). Then, a wide range of researches on the industrial production of nucleotides and their related substances has been made and it was established by many researchers that biochemical mutants of microorganisms were capable of accumulating appreciable quantities of these substances in cultured media (fermentation method).

At the present day, the industrial production of nucleotides, especially 5′-IMP and 5′-GMP, more than 3000 tons per year is established by the several methods as follows:

1. Hydrolyzing method
2. Fermentation method
   1) Inosine fermentation and chemical phosphorylation
   2) 5′-IMP fermentation
   3) AICAR fermentation and chemical synthesis of 5′-GMP from AICAR

Furthermore, the current development of the 5′-nucleotides fermentation industry together with the technical progress of chemical synthesis have made it possible to supply various bases, nucleosides and nucleotides at a moderate price on an industrial scale. Consequently, extensive studies have been undertaken on the preparation of various nucleotide derivatives from these compounds by microorganisms as follows:

1) Formation of nucleoside triphosphates
2) Formation of sugar nucleotides
   1. GDP-Mannose
   2. UDP-Glucose
   3. UDP-Galactose
   4. UDP-N-Aceytlglucosamine
   5. GDP-Glucose
3) Fofmation of cytidine derivatives
   1. CDP-Choline
   2. CDP-Ethanolamine
4) Formation of coenzyme A

This lecuture will deal with the survey on the above items from the view point of microbial production.

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