

# APPLIED MICROBIOLOGY

## Microbial Production of Amino Acids

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# Amino acids

Amino acid market is more than \$7 billion and affects mainly the food, pharmaceutical, and cosmetics industries.

Fermentative production of amino acids has started by the discovery of **glutamic acid** producing bacterium, *Corynebacterium glutamicum* (*Micrococcus glutamicum*), by **Kinoshita** et al. (1957).

# Amino acids

Amino acid producing strains of *Corynebacterium glutamicum*, and of *Escherichia coli* are continuously improved using metabolic engineering approaches.

# Amino acids

Through microbial fermentation desired L-isomers of amino acids are produced.

Substrates used for fermentation are - carbohydrates/ cane molasses/ glucose.

Ammonia or urea are added in the medium as a nitrogen source.

Amino acid	Microorganism	Substrate
L- Glutamic acid &	<i>Corynebacterium glutamicum</i> , <i>Brevibacterium flavum</i> , <i>Arthrobacter paraffineus</i>	Glucose Acetate
L- Lysine	<i>Brevibacterium flavum</i> <i>B. lactofermentum</i>	Glucose Acetate
L- Tryptophan	<i>Klebsiella aerogenes</i> <i>E. coli</i>	Glucose
L- Threonine	<i>E. coli</i>	Sucrose

# Aspartame

Aspartame which is made up of phenylalanine and L-aspartic acid is used as low-calorie sweetener in soft drinks.

# Application of amino acids in industry:

Amino acids are used as

- animal feed additives,
- flavour enhancers and
- ingredients in cosmetic
- specialty nutrients in pharmaceutical and medical fields.