

ABSTRACTS

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The oxidative degradation of glucose by *coli-aerogenes* bacteria was investigated: a remarkable yield (more than 0.5 mole per one mole of glucose) of α -ketoglutaric acid was obtained with suspensions of washed cells of the bacteria grown aerobically on glucose medium, and pyruvic acid fermentation was revealed in the presence of arsenic compounds not only with growing culture but also with the washed cells. Moreover, pyruvic acid was found to be a potent precursor of α -ketoglutaric acid.

Microbiological Studies of *Coli-aerogenes* Bacteria. (IV)

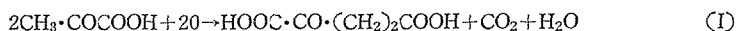
Production of α -Ketoglutaric Acid

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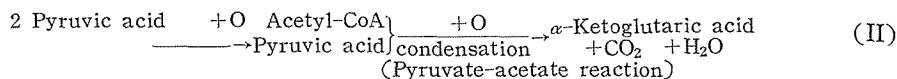
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The formation of α -ketoglutaric acid from pyruvic acid may be represented in the following equation in which the synthesis of the carbon chain would necessarily be involved.



Under the authors' experimental conditions, α -ketoglutaric acid was obtained in such a good yield as 0.5-0.7 mole from two moles of pyruvic acid, that is, the yield amounted to 50-70% of pyruvic acid used. Furthermore the experimental results with pyruvic acid, not containing high energy phosphate-bond ($\sim\text{Ph}$) in the molecule, will point out the propriety of the assumption that a major pathway of synthesizing α -ketoglutaric acid would not involve carbon dioxide fixation (oxaloacetic acid formation from pyruvate). On the other hand, phosphoenol pyruvic acid is known to be most effective upon carbon dioxide fixation in both animal and plant tissues. As a further explanation for reaction (I), the following pathway would be possible:



The transformation of lactic acid into α -ketoglutaric acid was confirmed to proceed *via* pyruvic acid, based on the results that a minute trace of pyruvic acid could be detected during the oxidation of lactic acid.

From the ecological point of view, it is interesting to note that lactic acid, which is accumulated as the major product without being metabolized in the anaerobic fermentation by the bacteria of *coli-aerogenes*, is available as a source of carbon and moreover is converted in aerobic conditions into α -ketoglutaric acid, which is the precursor of glutamic acid, therefore the starting substance for the syntheses of various amino acids.