

# 嫌気性下廃水処理における糖・蛋白・脂質の分解に係る硫酸塩還元反応の役割

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# 1986 Fiscal Year Final Research Report Summary

## The role of sulphate reduction in the anaerobic decomposition of carbohydrates, protein and fatty acids

Research Project

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### Research Institution

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### Principal Investigator

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Anaerobic treatment / Acid formation / Sulphate reduction / Carbohydratis / lactic acid / Propionic acid / Acetic acid / ペプトン

### Research Abstract

The role of sulphate reduction in the anaerobic decomposition of carbohydrates and protein were investigated. In an anaerobic fluidized bed reactor, anaerobic bacteria of mainly acid formation grew by the feed of the substrate consisted of skimmed-milk with sulphate. Glucose, galactose, lactose and xylose were examined for the anaerobic decomposition. Xylose did not show the decomposition because of no acclimatization of the bacteria to the pentose. other hexoses showed the decomposition. In conclusion, the sulphate reduction does not directly relate to the decomposition of the carbohydrates. In the process of the decomposition, lactic acid, propionic acid and acetic acid are main intermediates. The sulphate reduction occurred with the decomposition of propionic acid to acetic acid. The sulphate reduction was an autotrophic reaction using hydrogen as an electron acceptor. Another intermediate of

carbohydrate decomposition was ethanol. The sulphate reduction did not relate to the decomposition of ethanol. The sulphate reduction, again, relates to the conversion of propionic acid to acetic acid. Polypeptone was used to investigate the anaerobic decomposition of protein. The fluidized bed was well acclimated with the substrate of polypeptone. The decomposition of polypeptone reached about 75% with 60 min. of the hydraulic retention time. It was not improved with more longer retention time. Comparing to the aerobic decomposition of activated sludge which usually reaches about 95%, the decomposition was low probably due to less anaerobic bacteria which had enzymes of protease. The mixture of amino acids (Glu., Val., Gly., Met., Leu., Phe. and Lys.) which composed polypeptone were used as the substrate of the anaerobic decomposition. All amino acids well decomposed and released propionic acid, acetic acid and ammonia. The sulphate reduction, again, related in the process of the conversion of propionic acid to acetic acid. Although investigation of the decomposition of fatty acids was not conducted due to time limit, the role of sulphate reduction in the decomposition process may be the same as the role in the carbohydrates and organic acids.▲ Less

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