

皮革汚泥の嫌気性消化に関する研究

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概 要

回分処理法を適用してクロムなめしを含む製革加工から生ずる皮革汚濁の高温(55℃)嫌気消化性について検討を行った。披検皮革汚泥ならびにシェービング屑はいずれも容易に消化され、各添加濃度が25,000mg/lおよび12,500mg/lまでは、添加量あたりのガス生成量は282ml/gおよび365ml/g、消化による減少揮発性固形物量あたりのガス生成量は936ml/gおよび686ml/gの値を得た。添加濃度が上述の値を越えると消化数日後にはガス生成が阻害され、これは代謝産物の蓄積によるものとみられた。なお、汚泥中のクロムの化学形態に関する知見を得るために0.1~6 M硝酸溶液を用い、消化前後の汚泥からのクロムの抽出性についても調べた。皮革汚泥中のクロム(III)化合物は遊離および吸着型として存在し、消化によりやや抽出性が低下された。シェービング屑中のクロム(III)化合物は吸着型と強く配位結合された結合型から成り、消化により遊離および吸着型に変化された。

Studies on Anaerobic Digestion to Tannery Waste Sludge

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Abstract

Thermophilic (55°C) anaerobic digestion of chromium tannery waste sludge was studied in batch cultures. Both the waste sludge and the chromed hide powder showed good digestibilities. When the concentrations of the waste sludge and the chromed hide powder added as respective substrates were up to 25000 mg/ℓ and 12500 mg/ℓ, the gas productions were found to be 282 ml/g and 365 ml/g · solids added, which corresponded to 936 ml/g and 686 ml/g · volatile solids decreased by digestion, respectively. At the concentrations beyond those mentioned above, the gas production was inhibited after several days of digestion, which might be caused by accumulation of anaerobic metabolites in the culture solution.

To obtain information on the chemical forms of chromium, the extractability of

chromium before and after digestion was also examined with 0.1~6M HNO₃ solutions. The results showed that chromium (III) compounds in the waste sludge were water-insoluble, and were presumably free and adsorbed forms, and their extractabilities were somewhat lowered by digestion. The chromium (III) compounds in the chromed hide powder were adsorbed and tightly coordinately bound forms, which were changed into free and adsorbed forms by digestion.