DIPLOMA THESIS

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metabolism rate of activated sludge plants
as shown by the example
of the Uelzen and Suderburg
sewage treatment works.

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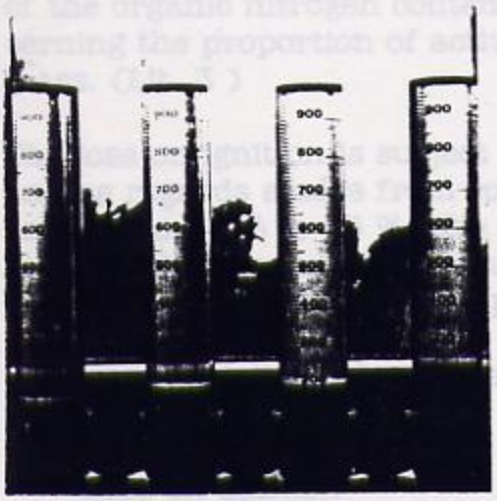
Effect of folic acid in activated sludge plants

All the principles which do not operate with the prevailing activated sludge od the sewage plant can therefore only indicate a behavioural trend.

A further objection refers to the fact that removal of the probe samples as such involvesmajor fluctuations. To determine the particular fluctuation when sampling, 4 samples each were provided, which were examined on a comperative dry sludge level. Were this difference was greater than 10 % the entire experiment was reducted and carried out with fresh sludge.

The examinations in the laboratory were all effected according to the German standar procedure for examining water, wastewater and sludge.

A dilution ration of 4 : 1 for the comparative sludge volume was chosen for the Uelzen slugde, and a ratio of 1 : 4 for the Suderburg sludge.



Sludge volume ml/l

1. Uelzen with folic acid dilution 4:1 -> 194 ml/l

2. Uelzen without folic acid dilution 4:1 -> 237 ml/l

3.Suderburg with folic acid dilution 1:4 -> 1000 ml/l

4.Suderburg without dilution 4:1 -> 1225 ml/l

This clearly indicates how differently these sludges had to be examined and treated.

Due to the increases of bulking sludge in Suderburg the fluctuatiuons in the sampling became so considerable that this sludge was no longer suitable for the examinations.

Evaluation of the results

It can be seen from the graphs that folic acid is effective particularly when, due to oxygen deficiency, it is more difficult for the nutrients to decompose. As opposed to the tests at the sewage treatment plants, a reduction in dry sludge level with the addition of folic acid was established here.

There is, however, a direct connection between O_2- content and folic acid effect. A folic acid effect is directly visible only in the case of very little oxygen.

Apparently folic acid addition leads to intensified energy metabolism. As a result of the alleviated oxygen transfer, more sludge is evidently exhaled in the form of carbon dioxide in the activating basin.

Evaluation of loss on ignition

The content of the activated sludge in mineral substances is determinded. As a rule the solid constituents of the activated sludge haave a high organic proportion. This is defined as loss on ignition. Determination of the organic proportion, or of the organic nitrogen content, permits of no indication concerning the proportion of active living organisms in the biomass. (Lit. 3)

The loss on ignition is subject to a broad fluctuation range, and as regards sludge from communal wastewater can amount to 35 % to 85 %. The lowest losses on ignition occour in activation works without preliminary clarification and those with simultaneous phosphate elimination. (Lit. 3)

The loss on ignition also serves to determinate sludge mineralisation:

Loss on ignition	=	organic substance
Residue on ignition	=	mineral substance

However, loss on ignition also establishes dead, combustible materials (e.g., cellulose and woollen fibres). On account of the inadequate preliminary clarification, it was therefore not possible to use the Suderburg sludge as a comparison; it revealed too high a deviation rate during sampling.

Evaluation of the results

The evaluation shows that with the addition of folic acid the residue on ignition is clearly higher in certain O_2 sectors than without folic acid. This leads to the conclusion that as the result of the increased energy metabolism less organic substance is formed.

The relationship of residue on ignition to dry sludge level should make clear the connection between the two factors.

Summary

Summing up, these experiments can only show that something happens with the activated sludge. On the basis of the results no statement can be made as to the precise mode of effect of folic acid.

It seems safe to assume, however, that what is involved here is enhanced energy metabolism which is engendered by folic acid.