Effect of pH on the Filtration of Aquatic Humus Using Gels and Membranes

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Introduction

In some areas of the world the fresh water has a brown-yellow colour due to complex organic substances – the so-called humus. Humus is not known to be physiologically harmful; it is, however, esthetically unacceptable in potable water. In Norway humus also creates problems of considerable importance in many water works.

It has been shown that aquatic humus acts as an acid-base indicator, the colour increasing with increasing pH (Fig. 1), and this is, apparently, reversible. In the current work gel filtration (Gjessing and Lee [10]) and membrane dialysis were used to study the change in composition of humus by the change of pH.

![Fig. 1. Change of colour with change of pH.](image-url)
The water sample used had an original colour of 110 mg Pt/l and a pH of 4.8 (the sample as used in the pH-colour illustration, Fig. 1). This sample was concentrated 200 times by evaporation under reduced pressure at approximately 35°C. The filtered concentrate contained 1.35 mg of organic carbon (Beckman Carbon Analyzer, Model 915) and 22 μg of iron per ml (HENRIKSEN [11]).

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**Fig. 2.** Separation of an alkaline (pH 12.1), an acid (pH 1.7) and a 'natural' (pH 3.7) humus sample (conc. 200 times) on Sephadex G-25. Column-length/volume: 30 cm/65 ml.