Experiment 7: Use of chitosan for cleaning of protein-containing waste water.

Duration: 20 minutes.

Equipment: 2 beaker (100 ml), 2 test tubes, 2 centrifuge tubes, magnetic stirrer, stirring rod, Pasteur pipette, centrifuge, light source (e.g. laser), pH paper.

Reagents and materials: Fresh egg-white, chitosan solution, w(C6H11N04)n = 0.5 %, sodium hydroxide solution, w(NaOH) = 5 %, copper sulfate solution, c(CuS04) = 1 mol/1, acetic acid, c(C2H4O2) = 0.2 mol/l.

Procedure: Preparation of chitosan solution: Under slight heating 1 g of Chitosan is dissolved in 50 ml of diluted acetic acid (w ~ 1.2 %). The solution is diluted with demineralized water to a volume of 200 ml, resulting in a 0.5-per-cent chitosan solution in 0,3-per-cent acetic acid. This solution shows no Tyndall effect.

50 ml of demineralized water are added to 1 g of fresh egg-white. After short-time stirring 0.5 g of chitosan are added and the mixture is stirred for another 5 minutes. Now the solution is centrifuged for 10 minutes. Then a biuret test for protein is performed and the solution is tested for the Tyndall effect. Observation: If water is added to egg-white, then a cloudy unfiltrable solution is formed. After addition of chitosan the precipitate agglomerates. The pH value amounts to 7. The centrifugate is clear. The biuret test proves unsuccessful A very slight Tyndall effect is visible.

Faults and precautions: The heating of the protein solution has an unfavourable effect on results. If more than 60 mg/1 of chitosan are added to the protein solution, the centrifugate remains cloudy. Waste disposal: The solutions are poured down the sink.