

Experiment 1: Chitin from crab shells

Duration: First step: 20 minutes without drying time; second step: 2 hours resp. first day: 30 minutes, second day: 30 minutes; third step: 30 minutes without drying time.

Equipment: beaker (400 ml), strainer (mesh size 3-4 mm), magnetic stirrer with heating plate, stirring rod, crystallization dish (0 14 cm), drying oven, balance, mortar with pestle, suction flask (500 ml), porcelain nutsch filter (0 9 cm), filter ring, water pump or diaphragm pump, thermometer, retort stand material, filter paper (0 9 cm).

Reagents and materials: sodium hydroxide solution, $w(\text{NaOH}) = 2\%$, hydrochloric acid, $w(\text{HCl}) = 7\%$, crab shells, demineralized water. **Procedure:**

First step: Coarse purification

Crab shells (150 g) are coarsely cleaned by breaking and stirring with water for some minutes. Then the shells are filtered off. This process is repeated until sand and other soil are removed. The crab shells pre-cleaned are dried overnight in the drying oven at 80°C.

Second step: Protein removal

15 g of the dried shells are grinded in a mortar and transferred to a beaker. Then 250 ml of sodium hydroxide solution are added and the mixture is heated under stirring at 60 - 70 °C for half an hour. The shells are filtered off with a strainer and the process is repeated. The filtrate should be almost clear and colorless. Then the shells are washed neutral with demineralized water. For time-saving the shells may be soaked in sodium hydroxide solution overnight, after the first sodium hydroxide treatment, then filtered off and washed.

Third step: Calcium carbonate removal

250 ml of hydrochloric acid are slowly added to the shells and the mixture is stirred at room temperature until no gas escapes. As a check, 10 ml of hydrochloric acid are added. If no generation of gas occurs, the mixture is filtered off and washed neutral with water. The product is dried overnight in the oven at 60 °C.

Result: The chitin isolated is an almost colorless and fluffy substance. 15 g of precleaned crab shells yield 3 g of chitin, corresponding to a yield of 20 %. **Faults:** On reduction of the cleaning steps, the chitin obtained is not colorless. **Waste disposal:** Sodium hydroxide solution and hydrochloric acid are neutralized and poured down the sink.

