Beide Ionenaustauscher waren geeignet, das Virus direkt aus der Brühe zu adsorbieren. Die Elution des Virus war jedoch nur durch eine Anhebung der Ionenstärke zu bewirken. Die Senkung des pH-Wertes auf bis zu pH 3 führte hingegen zu einer irreversiblen Schädigung des Virus. Die Ausbeuten mit Sartobind Q lagen zwischen 70 % und 90 %, mit Sartobind D betrugen sie lediglich 30 % bis 50 %. Die dynamische Kapazität der Sartobind Q Membranen wurde auf ca. 2 mL Brühe pro $cm^2$ Membran bestimmt. Die maximal erreichbare Aufkonzentrierung betrug Faktor 9 bei optimaler Fraktionierung. Das Gesamtprotein wurde auf 20 % der ursprünglichen Menge abgereichert. Die DNA blieb hingegen quantitativ erhalten. Es wurde eine Produktivität von 60 L $m^2h^{-1}$ erreicht.

**VA.17**

# Chiral Separation of Amines and Amino-alcohols by Fractional Reactive Extraction

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The development of fractional reactive extraction technology (FREX) as a multi-product isolation and purification method for a variety of chiral species within the classes of amines and amino-alcohols is investigated. Relative to other separation technologies, FREX promises a high process capacity and therefore a drastic reduction in manufacturing costs.

Implementation of FREX first of all asks for the availability of selective and versatile enantioselective extractants. Therefore, an identification method was successfully developed to transfer chiral selectors from other separation techniques to extraction. The most promising enantioselective extractants were found from techniques in which the selectivity originates from a difference in stability of the diastereomeric complexes in the liquid. This way an azophenolic crown ether was selected, which could separate 5 out of 6 target amines and amino-alcohols with a selectivity of 1.5–10.

The single-stage physical and chemical equilibria were studied experimentally as function of various process parameters (selector concentrations, pH, temperature) and satisfactorily predicted with a model using independently determined equilibrium constants. The intrinsic complexation kinetics was studied in a modified Lewis-cell. Based on this single-stage model, a multistage model of a fractional extractor was constructed. The flexibility of FREX was demonstrated because differences in complexation constants between the selector and different species within the same class of enantiomers could be compensated for by varying design and operation conditions. Finally, fractional reactive extraction was experimentally demonstrated in a small-scale membrane contactor, comprising about two stages each in the wash and strip section (see Fig.).

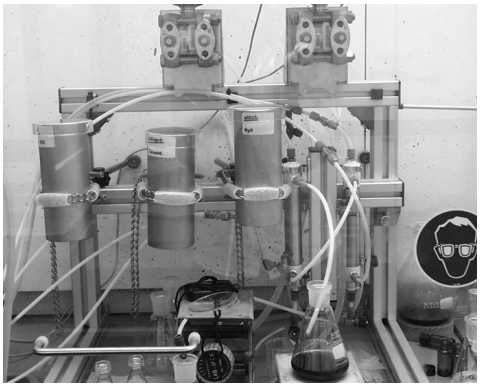

**Figure.** Pilot membrane contactor setup for the fractional reactive extraction of chiral amines and amino alcohols.