

## CE 380

### Fixed bed catalysis



The illustration shows a similar unit.

#### Description

- **chemical and biological fixed bed catalysis**
- **3 reactors for comparative experiments**
- **product analysis with photometer**

Catalysts enable or accelerate chemical reactions. CE 380 is designed for the decomposition reaction of dissolved saccharose in glucose and fructose.

A peristaltic pump transports the reactant (saccharose solution) into bottom of the reactor from a tank. The catalyst takes the form of a fixed bed in the reactor. The saccharose solution flows through the fixed bed. In the process, saccharose is decomposed into glucose and fructose. The catalyst accelerates the reaction and so increases the yield of the product (glucose/fructose mixture). The product is collected in a tank.

Three reactors allow various catalyses to be compared. The chemical catalyst used is exchanger resin. The recommended biological catalyst is the enzyme invertase. A regulated heating water circuit additionally permits analysis of the influence of temperature on the reaction.

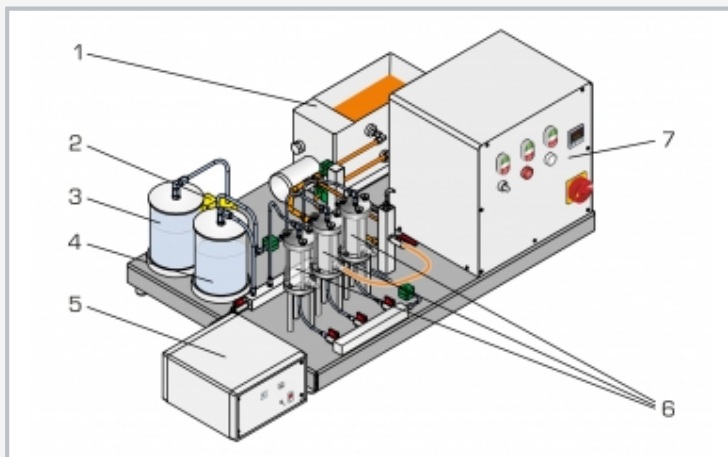
To determine the glucose concentration in the product, a photometer specifically adapted to the unit is supplied. The photometer data are transferred to a PC and evaluated by software. The flow injection analysis (FIA) CE 380.01 is available as an optional accessory. The FIA enables a larger number of measurements to be performed during the experiment compared to manual analysis, while at the same time reducing the effort involved and improving reproducibility.

#### Learning objectives/experiments

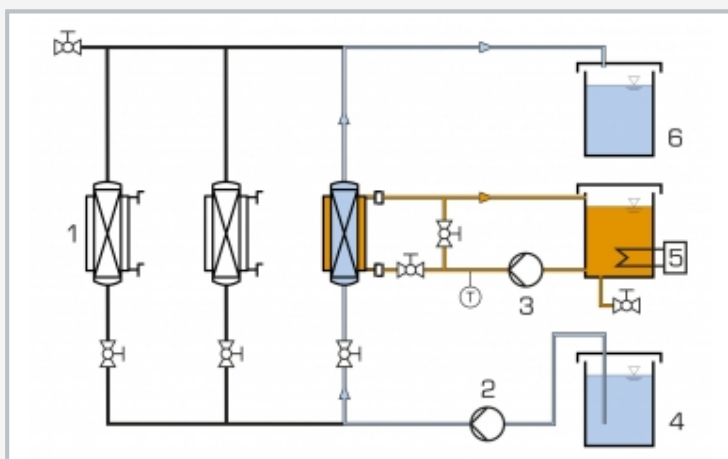
- fundamentals of chemical catalysis
- fundamentals of enzymatic catalysis
- use of a photometric analyser
- drawing up a quantity balance
- determining yield

# CE 380

## Fixed bed catalysis



1 water tank for heating circuit, 2 peristaltic pump, 3 reactant tank, 4 product tank, 5 photometer, 6 reactor, 7 switch cabinet



1 reactor, 2 peristaltic pump, 3 heating circuit pump, 4 reactant tank, 5 heater, 6 product tank



Photometer: 1 cell, 2 light conductor, 3 spectrometer connection, 4 main switch, 5 light source connection, 6 cap

### Specification

- [1] investigation of catalytic reactions
- [2] 3 reactors (PMMA) for comparison of various fixed bed catalyses
- [3] peristaltic pump with adjustable speed to transport the reactant into the reactors
- [4] regulated heating circuit with water tank, heater and pump to regulate the reactor temperatures
- [5] 1 scaled container for reactant and product respectively
- [6] photometer for analysis of the product
- [7] software for data acquisition via USB under Windows Vista or Windows 7 (photometer)
- [8] flow injection analysis (CE 380.01) available as accessory

### Technical data

#### Reactors

- diameter: approx. 10mm
- height: approx. 120mm

#### Peristaltic pump

- max. flow rate: approx. 28mL/min

#### Heating circuit pump

- max. flow rate: 10L/min
- max. head: 30m
- power consumption: 120W

#### Heating circuit

- tank: approx. 7500mL
- heater: approx. 1kW

#### Tanks for reactant and product

- capacity: approx. 2000mL
- scale division: 50mL
- material: PP

Photometer wavelength: 610nm

230V, 50Hz, 1 phase

230V, 60Hz, 1 phase

120V, 60Hz, 1 phase

UL/CSA optional

LxWxH: 1000x680x485mm (experimental unit)

LxWxH: 260x260x180mm (photometer)

Weight: approx. 63kg

### Required for operation

PC with Windows

### Scope of delivery

experimental unit, 1 photometer, 1 cpacking unit of chemical catalyst, 1 CD with software for photometer, 1 set of hoses, 2 light conductors, 1 single-end wrench, 1 stopwatch, 1 funnel, 3 bottles, 1 beaker, 1 set of instructional material

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### Optional accessories

020.30009	WP 300.09	Laboratory trolley
083.38001	CE 380.01	Flow Injection Analysis