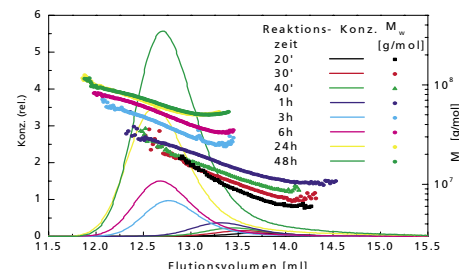


## Enzymatic synthesis of highmolecular inulin

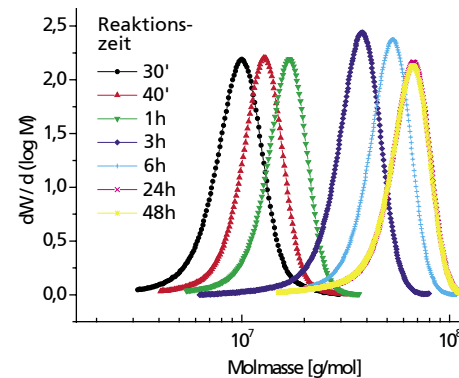
Fructanes are saccharide polymers whose monomer component is diabetin. In the case of inulin the polymer chain is built up by  $\beta$ -(1,2) linked diabetin monomers, in the case of levan by  $\beta$ -(2,6) linked diabetin monomers and at the end it sustains a glucol residue. Inulin formed in plants can reach polymerization degrees reaching 70. The only hitherto known bacteria species which produces inulin belongs to the type streptococcus mutans. This inulin has a considerably higher molar weight reaching more than  $10^6$  g/mol [1,3] and contains approx. 5%  $\beta$ -(2,6) branchings [2]. For the investigations at hand highmolecular inulin was formed by in vitro synthesis with a cleaned fructosyl transferase from streptococcus mutans whereby saccharide served as the substrate for the enzymatic reaction [3, 4].

Concentration molar weight and polydispersity of the inulin were determined in the course of the enzymatic reaction by GPC-MALLS. The area of chromatograms indicates the size the polymer concentration. Inulin was detected first after a reaction time of 4 minutes. After 20 minutes the concentration of the formed inulin allows a determination of the mean weight of the molar weight MW and the molar weight distribution (figure 1 and 2). The highest increase of MW takes place in the first 6 hours of the reaction. From 24 hours on the molar weight remains constant while the inulin concentration increases further. The polydispersity during the whole reaction time is 1.1.

The shift of the absolute calibrating plots to higher molar weights with increasing reaction times means an increase in the density of the synthesized inulin molecule in diluted solution with



**Figure 1**  
Concentration signal and absolute calibration curves of inulin depending on the synthesis time



**Figure 2**  
Molar weight distributions of inulin after different synthesis times

increasing molar weight. Indications of aggregate formation were not observed.

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### Cooperations

- Max-Planck Institute for Molecular Plant Physiology