**Dextrans of *Weissella cibaria*: from structure to functionality**

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During the manufacture of fermented milk products, some lactic acid bacteria starters are able to produce exopolysaccharides (EPS). These EPS improve texture and show similar functionalities as commercial thickeners, which is mainly attributed to their high water binding capacity. However, the isolation of hetero EPS for addition as highly purified food ingredients is not efficient due to the low amount produced *in situ* (< 1 g/L). On the other hand, there are some strains, e.g. from the genus *Weissella* contributing in spontaneous fermentations, which produce high amounts (> 1 g/L) of homo EPS extracellularly by the action of dextransucrases. Due to their pending safety assessment (QPS/GRAS status), they are not used as starter cultures yet. This study aims to demonstrate the techno-functional potential of dextrans from *W. cibaria* DSM14295 with respect to their structural and macromolecular properties. Dextrans were produced in bioreactor cultivations under variation of medium composition, temperature and pH with subsequent isolation from the fermentation broth. The degree of branching and length of side chains as well as the molecular mass, intrinsic viscosity and water binding capacity were determined. To evaluate their effect on gelation and stiffness of model milk gels the dextrans were added to milk prior to chemical acidification and the resulting gels visualised with confocal laser scanning microscopy.

As key factors for enhanced dextran production, a pH of 5.4, a sucrose concentration of 0.2 mol/L and a Ca2+ concentration of 1.0 mol/L were identified. A maximum of 23.1 g/L dextran was achieved when applying the “cold shift” temperature regime (30 – 25°C). Five dextrans could be isolated from productions under different cultivation conditions. They differed in their molecular mass (9 - 22∙108 Da), intrinsic viscosity (52 – 73 mL/g), degree of branching (3.8 – 5.7% at position *O*3) and the length and architecture of their side chains (up to trimeric side chains were detected). Generally, milk gels spiked with dextrans (0 – 10 g/kg) showed a linear increase in normalised gel stiffness (1.00 – 1.36) and larger pore size in the protein network in microscopic images with increasing dextran concentrations. On the basis of a principal component analysis the dextrans could be clustered according to their respective cultivation pH: dextrans produced at pH 5.4 were primarily described by their water sorption and branching properties, whereas dextrans from pH 6.0 were clustered by their functionality and macromolecular properties.

Dextrans from *W. cibaria* DSM14295 stand out due to their production in high amounts and their functionality which can be tailored by defined fermentation conditions.

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