

SDEWES2023.0485**Properties Leading to Starch Hydrolysates Impurities and Membrane-Based Technologies as an Available Sustainable Treatment**C. Cabeza^{*1}, A. Ahmed², M. Minauf³, M. Harasek⁴

¹Technische Universität Wien / Competence Center CHASE GmbH, Austria; ²Technical university of Vienna, Austria; ³AGRANA Research & Innovation Center GmbH, Austria; ⁴TU Wien, Austria (*camila.cabeza@tuwien.ac.at)

Abstract

The starch hydrolysates are obtained from a hydrolysis process of corn, wheat, rice or potatoes. Its quality depends on yearly harvest conditions and availability on the market. After hydrolysis, a glucose syrup is obtained with a determined sugar composition and concentration. In the end, high-quality starch products for a wide range of applications in various industries are obtained. For instance, native and modified starches are used as ingredients in the production of foodstuffs and, on the other hand, in the textile, paper, cosmetics, pharmaceutical and construction industries. Different unwanted compounds are added and generated in the solution during starch processing, such as coloured molecules, salts, and proteins. Starch hydrolysates have similar strict quality demands to sugar production, where low content of non-sugar compounds and the lowest colour are required. This review article covers approaches to the different phases of the production of starch hydrolysates, from composition and properties to downstream processing. The first part focuses on explaining the production of starch hydrolysates, including the possible chemical processes that lead to the formation of unwanted compounds, their final composition and specific characteristics. The second part focuses on downstream processing and briefly covers the traditional methods for recovery, purification and concentration of starch hydrolysates and emphasizes in the existing commercial membrane technologies available at the industrial scale as a potential alternative to concentrate, purify or fractionate macromolecular solutions. During the review, the advantages of membrane technology in starch processing are mentioned, such as increasing product quality while reducing energy consumption and waste generation compared to conventional methods. Besides, the challenges of this application are also mentioned, like overcoming membrane fouling, selecting an adequate membrane, and finally, the operation life and the replacement costs, which still need to be determined.