Starchy Wastewater as Raw Material for Biohydrogen Production by Dark Fermentation: A Review

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Abstract : High amount of chemical oxygen demand (COD) in starchy waste can be harmful to the environment. In common practice, starch processing wastewater is discharged to the river without proper treatment. However, starchy waste still contains complex sugars and organic acids. By the right pretreatment method, the complex sugar can be hydrolyzed into more readily digestible sugars which can be utilized to be converted into more valuable products. At the same time, the global demand of energy is inevitable. The continuous usage of fossil fuel as the main source of energy can lead to energy scarcity. Hydrogen is a renewable form of energy which can be an alternative energy in the future. Moreover, hydrogen is clean and carries the highest energy compared to other fuels. Biohydrogen produced from waste has significant advantages over chemical methods. One of the major problems in biohydrogen production is the raw material cost. The carbohydrate-rich starchy wastes such as tapioca, maize, wheat, potato, and sago wastes is a promising candidate to be used as a substrate in producing biohydrogen. The utilization of those wastes for biohydrogen production can provide cheap energy generation with simultaneous waste treatment. Therefore this paper aims to review variety source of starchy wastes that has been widely used to synthesize biohydrogen. The scope includes the source of waste, the performance in yielding hydrogen, the pretreatment method and the type of culture that is suitable for starchy waste.