Recovery of xanthan from aerobic granular sludge (AGS) wastewater systems

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Xanthan is one of the major polysaccharide biopolymers used in many industries due to its unique structure and physicochemical properties which gives the high degree of pseudoplasticity and functionality in different environments such as acid, high salts, and high shear stress. Due to its non- toxicity and biodegradability, it is extensively used in food industry as thickening and stabilizing agent for canned foods and various syrups. In tissue engineering, it has various applications in the area of bone and skin regeneration. The expensive carbon sources used in the production of xanthan has resulted in the direction of cost reduction that could be achieved by using inexpensive and eco-friendly sources such as recovery from waste sludge from aerobic granular sludge (AGS)-based wastewater treatment systems. The granules contain high concentrations of extracellular polymeric substance (EPS) which plays the crucial role in the formation and stabilization of sludge granules in the biological wastewater treatment. EPS contains polysaccharides, proteins, nucleic acids, etc. Due to the advantages of AGS over conventional wastewater treatment processes such as, the activated sludge process, sustainable approach towards the recovery of biopolymers is now emerging on the wide scale to obtain high value-added products such as xanthan, curdlan, tyrosine etc. One of the main components of EPS, Alginate-like exopolysaccharide (ALE), is already extracted from the EPS matrix and has wide range of applications. Current research is focused on the optimization of xanthan in the AGS matrix and development of suitable quantification and recovery protocols. The outcomes of the proposed research will contribute to attaining circular economy in the wastewater management industry.

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