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Impact of sludge properties on solid-liquid separation of activated sludge

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Solid-liquid separation of activated sludge is important both during the biological treatment of wastewater and for dewatering of excess sludge. The separation of solid from the treated wastewater can be done by using clarifiers (conventional plants) or membranes (MBR). Further, excess sludge is usually mechanically dewatered before further handling. Solid-liquid separation is a costly part of wastewater treatment. The separation process depends on the composition and the properties of the sludge. Sludge contains sludge flocs, filaments, single cells, dissolved extracellular polymeric substances (EPS) and ions. The best separation is obtained for sludge that contains strong, compact flocs without single cells and EPS. Di and trivalent ions improve the floc strength and improve the separation whereas monovalent ions (e.g. from road salt, sea water intrusion and industry) impairs the separation. High pH e.g. due to the inlet flow impairs the separation process due to floc disintegration. In membrane operation, single cells and dissolved EPS clogs the membrane whereas strong sludge flocs courses the membrane and thereby reduce membrane fouling. In filtration dewatering small cells and EPS, blinds the cake and thereby lowers the dewaterability. Thus, in all separation processes single cells and dissolved EPS should be avoid e.g. anaerobic storage and high shear levels should be avoid as this erode the flocs and results in more single cells. Sludge can be aerated during storage or nitrate added to avoid anaerobic condition. Further, pumping and mixing should be gently and pipes with sharp bends should be avoided.

Biography

Morten Lykkegaard Christensen has completed his PhD from Aalborg University, Denmark. He is currently an Associate Professor at Aalborg University and Head of the Separation Science Group. He has published more than 40 papers in reputed journals.

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