Title Poly(beta-hydroxybutyrate) production by a moderate halophile, Halomonas boliviensis LC1 using starch hydrolysate as substrate Author/s Jorge Quillaguaman, Suhaila Hashim, F Bento, Bo Mattiasson, Rajni Hatti-Kaul Department/s Biotechnology (LTH)

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Abstract English Aim: The objective of the present work was to enable the use of starch hydrolysate, generated by the action of a recombinant maltooligosaccharide forming amylase from Bacillus halodurans LBK 34, as the carbon source for the production of poly-beta- hydroxybutyrate (PHB) by Halomonas boliviensis LC1. Methods and Results: In this work, different amounts of the alpha-amylase (Amy 34) were utilized for starch hydrolysis, resulting in the production of mixtures of maltooligosaccharides (G1 - G6) at varying ratios. The highest PHB accumulation (56 wt%) by H. boliviensis cultivated in shake flasks (with agitation at 160 rev min(-1)) was obtained when 6.4 U ml(-1) of the amylase was used for starch hydrolysis. When H. boliviensis cells were grown in a fermentor with no oxygen limitation the accumulation of PHB was decreased to 35 wt%. Although some improvements in PHB accumulation and cell mass concentration were reached by the addition of peptone and phosphate, respectively, major enhancements were attained when oxygen limitation was induced in the fermentor. Conclusions: Halomonas boliviensis uses preferentially maltose for PHB formation from starch hydrolysate. It is also able to hydrolyse higher sugars if no other simpler carbon source is available but with a significantly lower polymer yield. Furthermore, H. boliviensis is able to adjust its metabolism to oxygen limitation, most probably by directing the excess NAD(P) H to PHB accumulation. Significance and Impact of the Study: There have been no reports related to PHB production amongst the members of the genus Halomonas. The use of a maltooligosaccharide forming alpha- amylase, which is active at a temperature and pH close to that required for growth of H. boliviensis, and the versatility of this bacterium in the selection of the carbon source may provide an attractive alternative for the utilization of starch- derived raw materials. Subject Chemistry
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