
**Production Of Polyhydroxyalkanoates From Sludge Fermentation
Liquid At Laboratory And Pilot Scales**

Qianqian JIA, Huilei XIONG, Hui WANG*,

School of Environment, Tsinghua University, Beijing, 100084, China

E-mail: wanghui@tsinghua.edu.cn

The generation of polyhydroxyalkanoates (PHA) from excess sludge fermentation liquid (SFL) was studied at lab and pilot scales. A PHA-accumulated bacterial consortium was isolated from activated sludge using substrate containing high concentration volatile fatty acids (VFA) and nitrogen. The maximal PHA content at lab scale accounted for 59.18% in simulated SFL and dropped to 23.47% in actual SFL of the dry cell weight (DCW). The pilot-scale integrated system comprised an anaerobic fermentation reactor (AFR), a ceramic membrane system (CMS) and a PHA production bio-reactor (PHAR). The PHA content from pilot scale SFL was finally obtained with 59.47% DCW through four-round domestication. The maximal PHA yield coefficient (YP/S) with respect to COD degradation in the pilot-scale PHAR was derived as high as 0.17gPHA/gCOD. The results indicated that the VFA-containing SFL was a suitable carbon source for PHA production. The adverse impact of excess nitrogen and non-VFAs on PHA synthesis might be eliminated by pilot-scale domestication, which might result in community structure optimization and substrate selective ability improvement of the PHA-accumulated bacterial consortium.