SUMMARY OF NEW CONCLUSIONS OF PhD THESIS

Title: "***Improving the conditions for polyhydroxyalkanoates production and recovery from bacteria isolated in Vietnam"***

Speciality: Microbiology Classification: 62.42.01.07

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New conclusions

- Vietnam has great potential for polyhydroxyalkanoate (PHA) synthesis gene resource. In this study, about 6% of total 869 isolated strains could produce PHA. The percentage is range from 3% to 13.9% depending on the collected soil samples. Based on phylogenetic and phynotypic characterization studies, eight PHA producing bacterial strains isolated from mangrove soil samples were clasified into two genera: *Bacillus* (3 strains ND97, ND153, and QN194) and *Yangia* (5 strains ND199, ND218, ND240, QN 187, and QN271). Among them, two bacterial strains (*Yangia* sp. ND199 and *Yangia* sp. ND218) could produce poly(3-hydroxybutyrate-co-3-hydroxyvalerate) [P(3HB-co-3HV)] when glucose was used as sole carbon source.

- The strain *Yangia* sp. ND199 is a moderate halophile, heterotroph, able to utilize different carbon and nitrogen sources. This strain can produce both homopolymer poly(3-hydroxybutyrate) P(3HB) and copolymer including P(3HB-co-3HV) and poly(3-hydroxybutyrate-co-4-hydroxybutyrate) [P(3HB-co-4HB)] from different carbon sources. Fed-batch fermentation with different fructose feeding strategies was applied for PHA production by *Yangia* sp. ND199. The highest cell dry weight of 78.5 g/l, PHB content of 67.5 wt%, and PHB productivity of 1 g/l/h were obtained by using two-stage fed-batch fermentation, is among the highest reported so far for PHB production by halophilic bacteria. A simple method for PHA recovery from *Yangia* sp. ND199 was developed. The PHA purity of 92% and PHA recovery of 97% were obtained after treatment of bacterial cells with 0.125 M NaOH at 50 ^{o}C for 5 h. The purified PHA product has physio-chemical properties as a biodegradable plastic material. The results obtained in this study demonstrated that the moderate halophile *Yangia* sp. ND199 is a promising choice for biopolymer production in Vietnam.

Supervisors **PhD student**

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