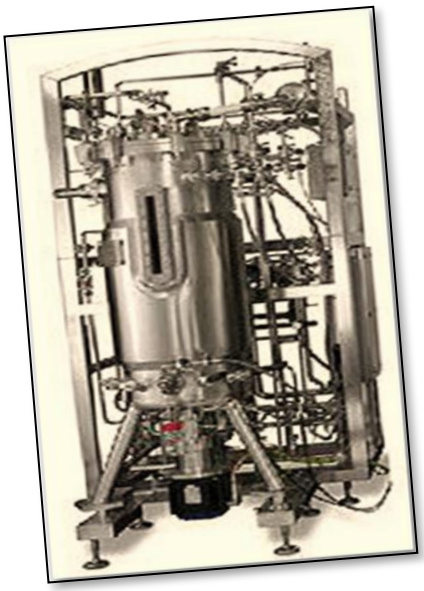
POTENTIAL PRODUCTION OF P(4HB) HOMOPOLYMER BY TRANSFORMANT *Cupriavidus* STRAIN EMPLOYING MIXED SUBSTRATE STRATEGY IN BIOREACTOR

ISHAK MUHAMAD SYAFIQ[1]

[1]*Malaysian Institute of Pharmaceuticals and Nutraceuticals, National Institute of Biotechnology Malaysia*

Polyhydroxyalkanoate (PHA) has gained great attention as a source for biodegradable plastic material with its material properties and structural diversity are similar to some conventional plastics. Poly(3-hydroxybutyrate-*co*-4-hydroxybutyrate) [P(3HB-*co*-4HB)] copolymers has been identified as potential biomaterial with high biocompatibility. The increment of 4HB monomer composition in P(3HB-*co*-4HB) copolymer will also increase its biocompatibility for medical and pharmaceutical applications. *Cupriavidus* sp. USMAA1020 was found to produce P(3HB-*co*-4HB) with various 4HB monomer composition ranging from 3 mol% to 75 mol% when supplemented with 4HB carbon precursors such as 4-hydroxybutyric acid, γ-butyrolactone and 1,4-butanediol into the culture.



However, to date, there are only a few studies reporting on the ability of *Cupriavidus* strains to produce P(3HB-*co*-4HB) copolymers with high 4HB monomer composition in bioreactor via one stage cultivation technique. Previously, the ability of genetically modified *Cupriavidus* sp. USMAA1020 to produce P(3HB-*co*-4HB) copolymer with high 4HB monomer composition, up to 89 mol% via one-stage cultivation in bioreactor has been reported. The production of high 4HB copolymer was achieved by introducing additional copies of PHA synthase genes into the wild-type *Cupriavidus* sp. USMAA1020 strain and by feeding a mixture of 4HB precursor substrates as well as controlling the culture parameters during cultivation process.

It is highly anticipated that the optimization of mixed carbon substrate concentration and alteration on bioreactor's parameters could produce P(4HB) homopolymer which is a favorable thermoplastics for biomedical sector in regards for its thermal and mechanical superiority as well as its biocompatibility.