Optimization and anticancer effect of L-asparaginase production in *Penicillium citrinum* isolated from Malaysian medicinal plant *Pereskia bleo*

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**Purpose:** L-asparaginase is commonly used as a chemotherapeutic agent in the treatment of acute lymphoblastic leukemia (ALL) to remove L-asparagine, which is required for the growth of the leukemia cancer cells. With the removal of L-asparagine, the rapid growth of tumor cells can be controlled. However, the commercialized bacterial-derived L-asparaginase has been reported to induce several toxic side effects and cause immunogenic reactions. Therefore, endophytes which live within the plants are proposed as an alternative source of L-asparaginase.

**Methods:** In this study, L-asparaginase producing endophytes were isolated from medicinal plant *Pereskia bleo* (Seven star needle). All endophytes were subjected to plate assay and quantitative assay to detect for the presence of L-asparaginase. The selected endophytes were identified via 18S rRNA gene sequencing. Six variables of growth condition, carbon and nitrogen sources, their concentrations, incubation period, pH, temperature and agitation rate were optimized. Cytotoxicity bioassay was performed on leukemic Jurkat E6 cell using crude extracts derived from endophytes cultured under optimum conditions.

**Results and conclusion:** Results revealed that 10 of the 13 endophytic isolates showed positive results on plate assay and isolate PL4 (*Penicillium citrinum*) showed highest L-asparaginase activity. The optimum conditions for L-asparaginase production were 0.2% glucose, 1.0% L-asparagine, 5 days, pH 5, 30 degree celsius and 140 rpm. The crude extract derived from PL4 showed strong dose dependent cytotoxicity effect against leukemic Jurkat cell. The results demonstrated that isolate PL4 is a potential alternative source for L-asparaginase.