

Produksi polisakarida intrasel cendawan tiram putih (*pleurotus ostreatus* (Jacq) P Kumm) BPPTCC 6017 berkhasiat imunomodulator =
Production of intracellular polysaccharide of white oyster mushroom *pleurotus ostreatus* (Jacq) P Kumm) BPPTCC 6017 and its immunomodulatory activity assay / Priyo Wahyudi

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Abstrak

[ABSTRAK

Polisakarida intrasel adalah penyusun dinding sel hifa dan karpus cendawan yang menunjukkan aktivitas farmakologi yang cukup luas. Polisakarida cendawan umumnya diproduksi dengan mengekstrak dari karpus. Namun dibutuhkan waktu beberapa bulan untuk menumbuhkan hifa dari inokulum hingga karpus cendawan. Oleh karena itu diupayakan alternatif produksi polisakarida cendawan langsung dari miselia, melalui fermentasi cair.

Tujuan dari penelitian ini adalah untuk mengetahui kondisi optimal produksi polisakarida intrasel dari miselia cendawan tiram putih melalui fermentasi cair, dan mengetahui aktivitas imunomodulatornya. Faktor-faktor yang dioptimasi pada penelitian ini adalah: suhu, pH, agitasi dan waktu inkubasi, dengan desain central composite design (CCD) dari metode respon permukaan (RSM). Hasil penelitian menunjukkan kondisi optimal fermentasi cair *P. ostreatus* BPPTCC 6017 untuk menghasilkan biomassa dan polisakarida yang terbaik adalah pada suhu 27,89°C, pH awal medium of 5,49, agitasi 124,08 rpm, dan waktu fermentasi 11,44 hari yang menghasilkan biomassa kering 32,00±1,25 g/l, polisakarida intrasel larut air 0,29±0,01 g/l (rendemen 0,91%), dan polisakarida intrasel larut alkali 0,60±0,02 g/l (rendemen 1,88%), yang mendekati kondisi teoritik. Aktivitas imunomodulator polisakarida intrasel larut air dan larut alkali miselium *P. ostreatus* BPPTCC 6017 diujikan pada sistem imun alamiah berdasar aktivitas dan kapasitas fagositosis makrofag peritoneum mencit secara in vitro, bersihan karbon, dan sistem komplemen jalur klasik. Efek imunomodulator juga diujikan pada sistem imun adaptif sel dan humoral berdasar peningkatan jumlah limfosit total dan limfosit T, serta kadar imunoglobulin G. Hasil penelitian membuktikan bahwa polisakarida intrasel larut air dan larut alkali miselium tiram putih mempunyai aktivitas imunomodulator terhadap sistem imun alamiah dan adaptif masing-masing adalah 2 mg/20 g BB mencit dan 4 mg/20 g BB mencit atau setara 100 mg/kg BB dan 200 mg/kg BB.;

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ABSTRACT

Intracellular polysaccharide is a component of fungal cell-wall that has a wide

pharmacological activity. Mushroom polysaccharide commonly produced by extracting the fruit body. However, it takes several months starting by growing hyphae until forming fruit body, therefore an alternative for producing it directly from mycelia instead of fruit body through submerged fermentation.

This study

was aimed to determine the optimal submerged fermentation conditions for producing intracellular polysaccharide of oyster mushroom. Four variables were tested in this study: initial pH medium, agitation speed, incubation time and temperature, using a central composite design (CCD), one of the design in response surface methodology (RSM). The optimal conditions of submerged fermentation obtained as follows: 27.89°C, initial pH medium of 5.49, agitation speed of 124.08 rpm, and fermentation time of 11.44 days. Verification of optimal conditions produced 32.00±1.25 g/l dried mycelia, 0.29±0.01 g/l water-soluble POP (yield 0.91%), and 0.60±0.02 g/l alkali-soluble POP (yield 1.88%), which were close to the theoretical conditions. Immunomodulatory activity of intracellular polysaccharide then assessed on the innate immune system, based on activity and capacity phagocytic of murine peritoneum macrophages in vitro, carbon clearance, and on the classical complement pathway. Immunomodulatory assay also conducted on the cellular and humoral adaptive immune system, based on the increasing number of total lymphocyte, T lymphocyte, and Immunoglobulin G. Result of a series of immunomodulatory activity assay showed that the intracellular polysaccharides of *P. ostreatus* BPPTCC 6017 have immunomodulatory activity on the innate and adaptive immune system at a dose of 2 mg/20 g BW mice and 4 mg/20 g BW mice respectively, equivalent to 100 mg/kg BW and 200 mg/kg BW., Intracellular polysaccharide is a component of fungal cell-wall that has a wide

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