Optimasi sumber nitrogen kompleks, pH, dan kadar air awal medium untuk produksi asam kojat oleh aspergillus oryzae menggunakan fermentasi substrat padat = Optimization of complex nitrogen source, pH, and moisture content of medium for kojic acid production by aspergillus oryzae under solid-state fermentation

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Abstrak

Asam kojat merupakan metabolit sekunder yang disekresikan oleh beberapa kapang dari genus Aspergillus melalui proses fermentasi. Senyawa ini sering digunakan sebagai zat aktif pemutih kulit pada produk kosmetik karena dapat menghambat aktivitas tirosinase dalam melanogenesis. Tujuan dari penelitian ini adalah untuk mendapatkan sumber nitrogen kompleks terbaik, nilai pH optimal, dan kadar air awal optimal untuk produksi asam kojat dengan Aspergillus oryzae menggunakan metode fermentasi substrat padat. Optimasi sumber nitrogen kompleks dilakukan dengan menggunakan medium yeast extract, kacang kedelai, kacang hijau, dan kacang tanah. Selanjutnya dilakukan optimasi nilai pH medium dan kadar air awal secara bertahap. Optimasi nilai pH medium dilakukan dengan tiga variasi, yaitu 3,5; 4,5; dan 5,5. Kadar air awal medium dioptimasi dengan variasi 70%, 80%, dan 90%. Dari empat variasi medium, didapatkan sumber nitrogen kompleks yang terbaik, yaitu kacang kedelai dengan perolehan kadar asam kojat sebesar 0,792 mg/ml. Nilai pH yang optimum untuk produksi asam kojat didapatkan pada pH 5,5 dengan kadar asam kojat sebesar 1,2888 mg/ml. Dari tiga variasi yang dilakukan dalam optimasi kadar air awal, diperoleh asam kojat dengan kadar tertinggi sebesar 3,1852 mg/ml pada kadar air awal 80%. Nilai yield sebagai penentu efisiensi proses fermentasi pada keadaan optimum didapatkan sebesar 0,0043 gg-1. Produktivitas dari proses fermentasi pada keadaan optimum diperoleh sebesar 0,0001 gg-1jam-1. Kesimpulan dari penelitian ini adalah kondisi optimal pada fermentasi substrat padat dengan Aspergillus oryzae untuk asam kojat diperoleh dengan kacang kedelai sebagai sumber nitrogen kompleks, nilai pH 5,5, dan kadar air awal 80%.
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Kojic acid is a secondary metabolite secreted by several molds from genus Aspergillus. It is often used as whitening agent in cosmetic products because of its ability to inhibit tirosinase activity in melanogenesis. The aim of this study is to obtain the best complex nitrogen source, optimal pH value, and optimal moisture content for kojic acid production by Aspergillus oryzae under solid-state fermentation. Optimization of complex nitrogen sources was carried out using medium yeast extract, soybean, mungbean, and groundnut. Furthermore, the optimization of pH value and initial moisture content were carried out gradually. Optimization of pH value was carried out with three variations (3.5, 4.5, and 5.5). Initial moisture content was also optimized with three variations (70%, 80%, and 90%). Of four variations of the medium, the optimal complex nitrogen source was obtained in soybeans with kojic acid levels of 0,792 mg/ml. The optimal pH value for kojic acid production was obtained at pH 5.5 with kojic acid levels of 1.2888 mg/ml. Three variations were carried out in the optimization of initial moisture content and the highest level of kojic acid was obtained 3.1852 mg/ml at an initial moisture content of 80%. The yield for determination of fermentation efficiency at optimal conditions was obtained at 0.0043 gg-1. The productivity of the fermentation process was obtained at 0.0001 gg-1hour-1 at optimal conditions. The conclusion of this

experiment is optimal condition for solid-state fermentation by Aspergillus oryzae for kojic acid production was obtained with soybean as complex nitrogen source, pH value of 5.5, and initial moisture content of 80%.