Intisari

PENGARUH FERMENTASI PADAT DENGAN BERBAGAI PERSENTASE INOKULUM BAKTERI PROTEOLITIK TERHADAP AKTIVITAS ANTIOKSIDAN *Arthrospira platensis*

Penelitian ini bertujuan untuk mengetahui pengaruh persentase inokulum bakteri asam laktat terhadap aktivitas antioksidan *Arthrospira platensis* dengan metode *Solid State Fermentation* (SSF). Penelitian ini menggunakan Rancangan Acak Lengkap (RAL) dengan 5 perlakuan yaitu variasi persentase inokulum yaitu 5%, 10%, 15%, 20%, dan tanpa penambahan inokulum (0%) sebagai kontrol. Parameter yang diamati meliputi uji biokimia bakteri meliputi katalase, KOH, dan uji aktivitas proteolitik, TPC, pH, derajat hidrolisis, serta uji aktivitas antioksidan dengan metode DPPH (*1,1-diphenyl-2-picrylhydrazin*) IC_{50} dan FRAP (*Ferric Reducing Antioxidant Power*). Hasil penelitian menunjukkan bahwa variasi persentase inokulum berpengaruh terhadap pH, DH, dan aktivitas antioksidan (FRAP dan DPPH) . Nilai pH mengalami perubahan signifikan dari kontrol, tetapi tidak berbeda nyata antara perlakuan 5% dengan 10%, dan 10% dengan 15%, dan 20%. Nilai derajat hidrolisis meningkat dari 0% hingga 20% dengan persentase berturut-turut sebesar 25,75%, 39,67%, 46,48%, 55,05%, dan 62,07%. Aktivitas antioksidan *Arthrospira platensis* pada uji DPPH meningkat dari nilai IC_{50} kontrol sebesar 3893 ppm menjadi 2131 ppm pada perlakuan terbaik 10%, sedangkan nilai FRAP meningkat dari 19,33 µM/mg menjadi 39,52 µM/mg. Berdasarkan hasil tersebut, fermentasi SSF dengan persentase inokulum BAL 10% menghasilkan aktivitas antioksidan terbaik, dengan peningkatan kapasitas antioksidan sekitar 45% berdasarkan penurunan nilai IC_{50} dan sekitar 104% berdasarkan peningkatan nilai FRAP dibandingkan kontrol.

Kata kunci: *Arthrospira platensis*, *solid state fermentation*, bakteri asam laktat, antioksidan, fermentasi

Abstract

THE EFFECT OF SOLID STATE FERMENTATION WITH VARIOUS INOCULUM PROTEOLITIC BACTERIA PERCENTAGES ON ANTIOXIDANT ACTIVITY OF *Arthrospira platensis*

This study aimed to evaluate the effect of lactic acid bacteria (LAB) inoculum percentage on the antioxidant activity of Arthrospira platensis using the Solid State Fermentation (SSF) method. The experiment was conducted using a Completely Randomized Design (CRD) with five treatments consisting of LAB inoculum percentages of 5%, 10%, 15%, and 20%, as well as a control without inoculum addition (0%). The observed parameters included bacterial biochemical tests (catalase, KOH, and proteolytic activity), Total Plate Count (TPC), pH, degree of hydrolysis (DH), and antioxidant activity assessed using the DPPH (1,1-diphenyl-2-picrylhydrazyl) IC_{50} and FRAP (Ferric Reducing Antioxidant Power) methods.The results showed that variations in inoculum percentage significantly affected pH, DH, and antioxidant activity as measured by FRAP and DPPH assays. The pH values changed significantly compared to the control; however, no significant differences were observed between the 5% and 10% treatments, nor between the 10%, 15%, and 20% treatments. The degree of hydrolysis increased with increasing inoculum percentage from 0% to 20%, with values of 25.75%, 39.67%, 46.48%, 55.05%, and 62.07%, respectively. The antioxidant activity of Arthrospira platensis measured by the DPPH assay increased, as indicated by a decrease in IC_{50} values from 3893 ppm in the control to 2131 ppm in the optimal 10% inoculum treatment, while FRAP values increased from 19.33 μM/mg to 39.52 μM/mg. Based on these findings, SSF with a 10% LAB inoculum produced the highest antioxidant activity, resulting in an approximately 45% increase in antioxidant capacity based on IC_{50} reduction and an approximately 104% increase based on FRAP enhancement compared to the control.

Keywords: *Arhtrospira platensis*, solid state fermentation, lactic acid bacteria, antioxidant, fermentation