Effect of Cassava Bioflavonoid Supplementation on Anaerobic Capacity in Amateur Athletes

Riset Peningkatan Kapasitas Peneliti ITB

Samsul Bahri[1], Elfahmi[1], Lalang[1], Mukti Priastomo[2], Carsiwan[3], Trisha Aryanti Septina[1]

[1]Institut Teknologi Bandung; [2]Universitas Mulawarman;
[3]Universitas Pendidikan Indonesia

Abstract

This study aimed to investigate the effects of cassava bioflavonoid (CBDs) supplementation at different doses on anaerobic performance and identify the most effective dose.

A randomized, single-blind, placebo-controlled trial involved 50 students from the Faculty of Sport and Health Education (FPOK) assigned to five groups: CBDs 50 mg, 100 mg, and 150 mg, placebo (maltodextrin), and control (no supplementation) for 4 weeks.

Anaerobic performance was assessed using the Running-based Anaerobic Sprint Test (RAST) and countermovement jump (CMJ).

Results revealed a significant time-by-dose interaction for mean power ($p = 0.005$), with the 50 mg group showing the greatest improvement, while the 100 mg group showed the greatest descriptive improvement in CMJ.

Keywords: *Sports Nutrition; Flavonoids; Cassava Bioflavonoids; Anaerobic Capacity.*

Introduction

Nutritional strategies utilizing bioactive compounds with antioxidant and anti-inflammatory properties have gained increasing importance in sports science to support energy metabolism and muscle recovery during high-intensity exercise.

Cassava leaves (*Manihot esculenta* Crantz) contain flavonoid compounds such as rutin and nicotiflorin, which exhibit potential antioxidant activities as a local plant-based resource.

Although the benefits of fruit and plant-derived flavonoids on exercise performance have been widely studied, research on the application of cassava leaf-derived bioflavonoids to human exercise physiology, particularly anaerobic capacity, remains limited.

Therefore, this study evaluated changes in anaerobic performance and compared responses across different CBDs supplementation doses relative to placebo and control groups.

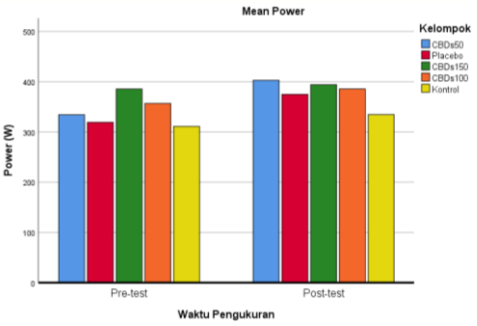
Research Method

This study used a randomized, single-blind, placebo-controlled experimental design with pre-test and post-test assessments.

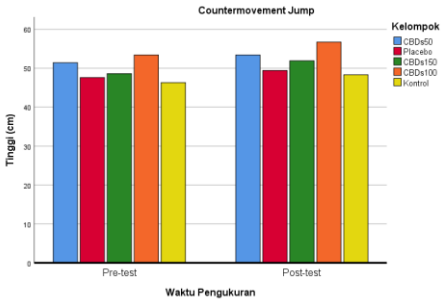
A total of 50 amateur athletes were randomly allocated into five groups ($n = 10$ per group): CBDs 50 mg, 100 mg, 150 mg, placebo (maltodextrin), and control for a 28-day intervention.

Performance assessments were conducted at the Universitas Pendidikan Indonesia (UPI) Stadium, Bandung, using the Running-based Anaerobic Sprint Test (RAST) and Countermovement Jump (CMJ).

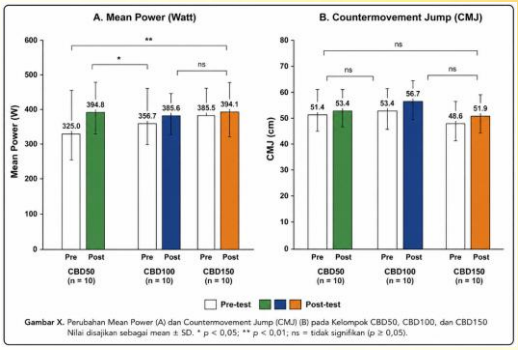
Data were analyzed using a mixed-design ANOVA to examine time-by-group interactions, alongside Tukey and Bonferroni post hoc tests at a significance level of $p < 0.05$.



Picture 1. Mean Power



Picture 2. Countermovement Jump



Gambar X. Perubahan Mean Power (A) dan Countermovement Jump (CMJ) (B) pada Kelompok CBD50, CBD100, dan CBD150 Nilai disajikan sebagai mean ± SD. * $p < 0,05$; ** $p < 0,01$; ns = tidak signifikan ($p \geq 0,05$).

Discussion & Result

Characteristics & CMJ Results: All groups demonstrated descriptive improvements in CMJ jump height (with the 100 mg and 150 mg groups increasing by 3.3 cm), though the time-by-dose interaction was not statistically significant ($p = 0.286$).

RAST (Mean Power) Results: Mixed ANOVA revealed a statistically significant time-by-dose interaction for mean power ($F = 6.396, p = 0.005, \eta_p^2 = 0.321$), indicating a large effect size. The CBDs 50 mg group showed the greatest increase in mean power, rising from 325.00 ± 54.76 W to 394.80 ± 95.63 W (an increase of 69.8 W).

Post hoc analyses confirmed a statistically significant difference between the 50 mg and 150 mg groups ($p = 0.004$ / 0.005).

Mechanistic Discussion: Performance enhancements are potentially attributed to the antioxidant properties of flavonoids in neutralizing reactive oxygen species (ROS) and reducing oxidative stress, though oxidative biomarkers were not directly measured.

Conclusion

Cassava bioflavonoid (CBDs) supplementation influences selected aspects of anaerobic performance, particularly mean power output, as indicated by a significant time-by-dose interaction.

The 50 mg dose showed the most favorable response for mean power, while the 100 mg dose demonstrated the highest descriptive improvement in countermovement jump performance.

These findings provide preliminary evidence that CBDs hold potential as a plant-derived ingredient in sports nutrition, though further research involving larger sample sizes, longer intervention periods, and physiological biomarkers is warranted.