

## Intisari

### **BIOAVAILABILITAS $\beta$ -KAROTEN *IN VITRO* PRODUK MINUMAN JELI DAN *FLAKES* YANG DIPERKAYA NANOKAPSUL KAROTENOID *Arthrospira platensis***

Penelitian ini bertujuan untuk mengetahui bioavailabilitas  $\beta$ -karoten *in vitro* produk minuman jeli dan *flakes* yang diperkaya nanokapsul karotenoid *Arthrospira platensis*. Tahapan dalam penelitian ini diawali dengan pembuatan minuman jeli dan *flakes* yang ditambah dengan nanokapsul karotenoid *A. platensis*. Perlakuan yang diberikan dengan membuat minuman jeli nanokapsul karotenoid *A. platensis* dengan konsentrasi 0,1%; *flakes* nanokapsul karotenoid *A. platensis* dengan konsentrasi 0,24%; minuman jeli karotenoid *A. platensis* dengan konsentrasi 0,4%; *flakes* karotenoid *A. platensis* dengan konsentrasi 2,5%; minuman jeli kontrol; dan *flakes* kontrol. Kemudian, dilanjutkan dengan pengujian bioavailabilitas  $\beta$ -karoten secara *in vitro* melalui 4 tahapan, yaitu fase pengunyahan, fase pencernaan, fase penyerapan, dan analisis senyawa  $\beta$ -karoten setelah proses metabolisme. Parameter yang diamati dalam penelitian ini, yaitu kadar air, nilai pH, kadar karotenoid total fraksi *supernatan* dan *pellet/residu*, serta aktivitas antioksidan fraksi *supernatan* dan *pellet/residu* pada masing-masing fase pasca metabolisme. Penelitian ini menggunakan model Rancangan Acak Lengkap (RAL). Data dianalisis menggunakan ANOVA (*One Way Analysis of Variance*) dan dilakukan uji lanjut DMRT (*Duncan Multiple Range Test*) dengan signifikansi 95%. Hasil penelitian menunjukkan bahwa perlakuan fortifikasi berpengaruh nyata ( $p < 0,05$ ) terhadap kadar air, karotenoid total *supernatan* & *pellet/residu*, aktivitas antioksidan *supernatan* & *pellet/residu* pasca proses metabolisme, serta bioavailabilitas  $\beta$ -karoten *in vitro*. Namun, tidak berpengaruh nyata terhadap nilai pH pasca proses metabolisme ( $p > 0,05$ ). Nilai bioavailabilitas  $\beta$ -karoten *in vitro* terbaik diperoleh pada perlakuan minuman jeli nanokapsul karotenoid *A. platensis* 0,1% sebesar  $84,90 \pm 2,28\%$ .

Kata kunci : Bioavailabilitas  $\beta$ -karoten, minuman jeli, *flakes*, nanokapsul karotenoid *Arthrospira platensis*.

## *Abstract*

### **IN VITRO BIOAVAILABILITY OF $\beta$ -CAROTENE IN PRODUCTS OF JELLY DRINK AND FLAKES FORTIFIED WITH CAROTENOID NANOCAPSULES *Arthrospira platensis***

This study aims to determine the in vitro bioavailability of  $\beta$ -carotene in jelly and flakes beverage products enriched with carotenoid nanocapsules *Arthrospira platensis*. The steps in this study were started with the manufacture of jelly drinks and flakes which were added with *A. platensis* carotenoid nanocapsules. The treatment was given by making *A. platensis* carotenoid nanocapsule jelly drink with a concentration of 0,1%; flakes of carotenoid nanocapsules of *A. platensis* with a concentration of 0,24%; *A. platensis* carotenoid jelly drink with a concentration of 0,4%; carotenoid flakes *A. platensis* with a concentration of 2,5%; control jelly drink; and control flakes. Then, it was continued by testing the bioavailability of  $\beta$ -carotene in vitro through 4 stages, namely the mastication phase, the digestion phase, the absorption phase, and the analysis of  $\beta$ -carotene compounds after the metabolic process. The parameters observed in this study were water content, pH value, total carotenoid content of supernatant and pellet/residue fractions, and antioxidant activity of supernatant and pellet/residue fractions in each post-metabolic phase. This study used a Completely Randomized Design (CRD) model. The data were analyzed using ANOVA (One Way Analysis of Variance) and further test of DMRT (Duncan Multiple Range Test) was performed with 95% significance. The results showed that the fortification treatment had a significant effect ( $p < 0.05$ ) on the water content, total carotenoids of the supernatant & pellet/residue, as well as the antioxidant activity of the supernatant & pellet/residue after the metabolic process, and in vitro  $\beta$ -carotene bioavailability. However, it did not significantly affect the pH value after the metabolic process ( $p > 0.05$ ). The best in vitro  $\beta$ -carotene bioavailability value was obtained in the treatment of *A. platensis* carotenoid nanocapsules jelly drink 0,1% at  $84,90 \pm 2,28\%$ .

Key words : Bioavailability of  $\beta$ -carotene, jelly drink, flakes, *Arthrospira platensis* carotenoid nanocapsules.