

INTISARI

Kolagen telah banyak digunakan untuk pencegahan penuaan tetapi belum banyak yang mengombinasikannya dengan belimbing wuluh yang kaya akan antioksidan. Untuk memperpanjang masa simpan, minuman dapat dibuat menjadi serbuk minuman instan. Penelitian ini bertujuan untuk mengevaluasi permeabilitas kolagen, mengevaluasi pengaruh suhu *inlet* dan konsentrasi maltodekstrin terhadap kadar kolagen dan sifat fisik, dan menentukan formula optimum.

Kolagen untuk pembuatan serbuk ditentukan berdasarkan hasil uji permeabilitas yang paling tinggi di antara kolagen peptida dan kolagen tripeptida dengan metode *BCA Protein Assay* untuk pembacaan kadar kolagen. Eksperimen pembuatan serbuk dilakukan sebanyak 12 *run* berdasarkan *full factorial design* dengan konsentrasi maltodekstrin (10-25%*b/v*) dan suhu *inlet* (125-175 °C). Pengaruh faktor terhadap respons dianalisis dengan ANOVA dan optimasi formula dilakukan dengan menentukan kriteria respons yang diinginkan.

Kemampuan kolagen tripeptida menembus membran lebih baik dari pada kolagen peptida berdasarkan sampel yang tersisa pada kompartemen donor sehingga kolagen tripeptida dipilih untuk formulasi. Maltodekstrin menurunkan kadar kolagen, *moisture content*, dan higroskopisitas serta meningkatkan indeks kelarutan air dan indeks absorpsi air. Suhu *inlet* menurunkan kadar kolagen, *moisture content*, dan indeks kelarutan air serta meningkatkan higroskopisitas dan indeks absorpsi air. Formula optimum adalah maltodekstrin 13,612%*b/v* dan suhu *inlet spray drying* 125 °C. Kolagen dan belimbing wuluh dapat dikombinasikan untuk pengembangan nutrasetikal.

Kata Kunci: Kolagen, Belimbing Wuluh, Maltodekstrin, *Spray Dry*

ABSTRACT

Collagen has been widely used as an anti-aging, but not many have combined it with bilimbi which is rich in antioxidants. Drinks could be made into instant drink powder through spray drying to extend the shelf life. This study aims to evaluate collagen permeability, evaluate the effect of inlet temperature and maltodextrin as drying aids on collagen content and physical properties, and determine the optimum formula for instant drinks.

The collagen chosen for the formulation was determined based on the best permeability test result between collagen peptide and collagen tripeptide by using BCA Protein Assay to calculate the collagen. Experiments were done in 12 runs based on a full factorial design with maltodextrin concentration (10-25%w/v) and inlet temperature (125-175 °C). Statistical analysis was used to analyze the significance of factors on responses and optimization was carried out by setting desired criteria.

The ability of collagen tripeptide to penetrate the membrane is better than collagen peptide based on the sample remaining in the donor compartment so collagen tripeptide was chosen for the formulation. Increasing the concentration of maltodextrin reduces collagen content, water content, and hygroscopicity and increases the water solubility index and water absorption index. Increasing the inlet temperature reduces collagen content, water content, and water solubility index and increases hygroscopicity and water absorption index. The optimum formula was obtained with a maltodextrin concentration of 13.612%w/v and an inlet temperature of 125 °C for the spray drying. Thus, collagen and bilimbi fruit can be combined to enhance the benefits of nutraceuticals.

Keywords: *Collagen, Bilimbi, Maltodextrin, Spray Dry*