

Abstrak

ABSTRAK

Pati *busil* (*Xanthosoma sagittifolium* (L.) Schot) merupakan potensi pangan lokal Kabupaten Banjarnegara. Namun kurang stabilnya sifat pasta pati alami *busil* menjadi tantangan tersendiri saat diaplikasikan pada kukis. Kukis yang dihasilkan Teksturnya menjadi terlalu rapuh dan saat diproduksi membutuhkan energi tinggi. Modifikasi fisik dengan iradiasi ganda gelombang mikro dan gamma dinilai mampu mengatasi kelemahan tersebut karena keduanya secara sinergis mampu merubah jumlah kandungan amilosa-amilopektin pati *busil* modifikasi sehingga sesuai untuk diterapkan pada kukis. Tujuan penelitian ini adalah: 1) identifikasi karakteristik pati alami *busil*; 2) modifikasi dan karakterisasi pati *busil* iradiasi tunggal gelombang mikro; 3) modifikasi dan karakterisasi pati *busil* iradiasi ganda gelombang mikro dan gamma; serta 4) produksi dan uji penerimaan konsumen terhadap kukis pati *busil* modifikasi. Kegiatan penelitian ini meliputi tahapan ekstraksi pati *busil* dan karakterisasi sifat fisikokimianya, kemudian iradiasi tunggal gelombang mikro dengan variasi intensitas energi 0,5; 1; 1,5 W/g dan waktu iradiasi 3; 5; 7 menit. Pati modifikasi perlakuan terpilih iradiasi gelombang mikro dilanjutkan dengan iradiasi ganda gamma dengan variasi intensitas energi 1; 5; 10 kGy. Kegiatan terakhir adalah produksi kukis pati *busil* modifikasi dan uji penerimaan konsumen terhadap kukis pati *busil* modifikasi.

Hasil penelitian menunjukkan bahwa granula pati alami *busil* berbentuk polihedral cenderung bulat dengan ukuran 11,8 μm ; kadar amilosa dan amilopektin masing-masing 15,15% dan 80,21%; profil amilografi tipe B; suhu gelatinisasi puncak (Tp) 74,45°C; dan pola kristalinitas tipe A. Kandungan amilosa yang relatif rendah dan amilopektin yang relatif tinggi pada pati *busil* alami berpotensi menghasilkan kukis yang rapuh dan mudah patah. Iradiasi gelombang mikro pada pati alami *busil* mampu meningkatkan kadar amilosa (34,57%), menurunkan amilopektin (56,82%) serta meningkatkan Tp (78,5 °C) sehingga pati lebih stabil terhadap pengolahan panas. Perlakuan ganda iradiasi gelombang mikro 1 W/g 7 menit dan gamma pada intensitas 5 kGy menghasilkan pati modifikasi dengan kadar amilosa 32,6%; amilopektin 56,91% dan Tp 77,80°C. Kukis yang ditambahkan pati busil modifikasi dapat diterima oleh konsumen pada uji sensoris.

Kata kunci : *busil*, modifikasi pati, iradiasi, gelombang mikro, gamma

Abstract

ABSTRACT

Busil starch (*Xanthosoma sagittifolium* (L.) Schot) is a local food potential of Banjarnegara Regency. However, the unstable pasting properties of native busil starch are a challenge when applied to cookies. The resulting cookies become too brittle in texture and require high energy to produce. Physical modification with dual microwave and gamma irradiation is considered to be able to overcome these weaknesses because both are synergistically able to change the amount of amylose-amylopectin content of modified *busil* starch so that it is suitable for application in cookies. The objectives of this study were: 1) identification of the characteristics of native *busil* starch; 2) modification and characterization of single microwave irradiation starch; 3) modification and characterization of double microwave and gamma irradiation starch; and 4) production and consumer acceptance test of modified *busil* starch cookies. The research activities included the extraction of *busil* starch and characterization of its physicochemical properties, then microwave single irradiation with energy intensity variations of 0.5; 1; 1.5 W/g and irradiation time of 3; 5; 7 minutes. The modified starch was treated with microwave irradiation followed by double gamma irradiation with energy intensity variations of 1; 5; 10 kGy. The last activity was the production of modified *busil* starch cookies and consumer acceptance tests of modified busyl starch cookies.

The results showed that the native starch granules were polyhedral and tended to be round with a size of 11.8 μm ; amylose and amylopectin content were 15.15% and 80.21%, respectively; amylographic profile type B; peak gelatinization temperature (T_p) 74.45 $^{\circ}\text{C}$; and crystallinity pattern type A. The relatively low amylose and relatively high amylopectin content of native *busil* starch has the potential to produce cookies that are brittle and easily broken. Microwave irradiation on native *busil* starch was able to increase amylose content (34.57%), decrease amylopectin (56.82%), and increase T_p (78.5 $^{\circ}\text{C}$) so that the starch is more stable to heat processing. Double treatment of microwave irradiation of 1 W/g 7 min and gamma at 5 kGy intensity produced modified starch with an amylose content of 32.6%; amylopectin 56.91% and T_p 77.80 $^{\circ}\text{C}$. Cookies added with modified *busil* starch were acceptable to consumers in the sensory test.

Keywords: *busil*, starch modification, irradiation, microwave, gamma