RINGKASAN

Sorgum dapat diolah menjadi tepung yang selanjutnya dapat digunakan sebagai bahan dasar untuk pembuatan berbagai jenis produk pangan seperti *cookies*. Pada umumnya, *cookies* dibuat menggunakan tepung terigu yang mengandung protein gliadin dan glutenin sehingga pada saat pengolahannya akan terbentuk gluten. Pengolahan *cookies* tanpa menggunakan tepung terigu dan disubstitusi dengan tepung sorgum akan menghasilkan *cookies* bebas gluten. Untuk mengatasi rasa agak pahit dari sorgum dan meningkatkan cita rasa *cookies* dapat dilakukan dengan cara penambahan tepung almond. Selain itu tepung almond mengandung protein tinggi dan dapat menggantikan penggunaan susu sebagai sumber protein dalam pembuatan *cookies*, sehingga *cookies* yang dihasilkan bebas laktosa. Penambahan lemak nabati seperti margarin dan *virgin coconut oil* (VCO) dalam pembuatan *cookies* juga dapat berpengaruh terhadap sifat akhir *cookies*.

Penelitian ini bertujuan untuk: 1) mengetahui pengaruh proporsi tepung sorgum dan tepung almond terhadap sifat fisik dan kimia *cookies* bebas gluten dan laktosa yang dihasilkan, 2) mengetahui pengaruh variasi jenis lemak yang ditambahkan terhadap sifat fisik dan kimia *cookies* bebas gluten dan laktosa yang dihasilkan, dan 3) mengetahui perlakuan terbaik pada proporsi tepung sorgum dan tepung almond serta jenis lemak yang ditambahkan dalam pembuatan *cookies* bebas gluten dan laktosa. Penelitian ini dilakukan secara eksperimental menggunakan Rancangan Acak Kelompok (RAK) faktorial dengan 9 kombinasi perlakuan dan 3 ulangan sehingga didapat 27 unit percobaan. Faktor yang diteliti yaitu perbandingan tepung sorgum dan tepung almond (A) yang terdiri dari 1:1 (A1), 2:1 (A2), dan 3:1 (A3) serta variasi jenis lemak yang ditambahkan (L) yang terdiri dari margarin (L1), VCO (L2), dan campuran margarin dan VCO (1:1 b/b) (L3). Data sifat fisik dan kimia dianalisis menggunakan analisis ragam (ANOVA) pada taraf 95% dan jika terdapat pengaruh nyata dilanjutkan dengan *Duncan Multiple Range Test* (DMRT) pada taraf 5%. Penentuan perlakuan terbaik dilakukan dengan uji indeks efektivitas.

Hasil penelitian menunjukan bahwa perbandingan tepung sorgum dan tepung almond berpengaruh nyata terhadap kadar abu, kadar lemak, kadar protein terlarut, dan kadar gula reduksi *cookies* namun tidak berpengaruh nyata terhadap kadar air dan volume pengembangan *cookies*. Semakin tinggi perbandingan tepung sorgum akan menurunkan kadar abu, kadar lemak, kadar protein terlarut dan kadar gula reduksi *cookies*. Variasi jenis lemak yang ditambahkan berpengaruh nyata terhadap kadar abu, kadar lemak, dan kadar gula reduksi *cookies* namun tidak berpengaruh nyata terhadap kadar air, kadar protein terlarut, dan volume pengembangan *cookies*. *Cookies* dengan penambahan margarin memiliki kadar abu tertinggi (0,67%), *cookies* dengan penambahan VCO memiliki kadar lemak tertinggi (36,14%), dan *cookies* dengan penambahan campuran margarin dan VCO memiliki kadar gula reduksi tertinggi (0,49%). Perlakuan terbaik dalam penelitian ini adalah *cookies* dengan perbandingan tepung sorgum dan tepung almond 1:1 (A1) dan menggunakan jenis lemak margarin (L1) yang memiliki sifat fisik dan kimia sebagai berikut: kadar air 3,08%, kadar abu 0,82%, kadar lemak 36,65%, kadar protein terlarut 1,27%, kadar gula reduksi 0,56%, dan volume pengembangan 92,04%.

SUMMARY

Sorghum can be processed into flour which can be used as a raw material for processing various types of food products, such as cookies. In general, cookies are made using wheat flour as a raw material which contains gliadin and glutenin protein, and during processing it will be formed as a gluten. Processing cookies without using wheat flour and substituted with sorghum flour will produce gluten-free cookies. To overcome the slightly bitter taste of sorghum and increase the cookies flavor can be done by adding almond flour. In addition, almond contains high protein and can replace the used of milk as a source of protein in cookies processing, resulting in lactose-free cookies. The addition of vegetable fats such as margarine and virgin coconut oil (VCO) in cookies processing also affect the final characteristics of cookies.

This study aimed to: 1) know the effect of sorghum flour and almond flour proportion to the physical and chemical properties of gluten and lactose-free cookies, 2) know the effect of fat variation to the physical and chemical properties of gluten and lactose-free cookies, and 3) know the best treatment in the proportion of sorghum flour and almond flour and fat variation in gluten and lactose-free cookies processing. This study was conducted experimentally using Randomized Block Design (RBD) factorial with 9 treatment combinations and 3 replications as of 27 experimental units obtained. The factors studied were proportion of sorghum flour and almond flour (A) consisting of 1:1 (A1), 2:1 (A2), and 3:1 (A3), and fat variation (L) consisting of margarine (L1), VCO (L2), and mixture of margarine and VCO (1:1 b/b) (L3). Physical and chemical properties data were analyzed using analysis of variance (ANOVA) at 95% level and if there were a tangible effect, will be continued with Duncan Multiple Range Test (DMRT) at 5% level. The best treatment determination were analyzed using effectiveness index test.

The results showed that the proportion of sorghum flour and almond flour has a tangible effect on ash content, fat content, dissolved protein levels and reducing sugar levels. However there were no tangible effect on water content and baking expansion. The higher sorghum flour proportion decreased the ash content, fat content, dissolved protein levels, and reducing sugar levels. Fat variation has a tangible effect on ash content, fat content, and reducing sugar levels but did not affect the water content, dissolved protein levels, and baking expansion. Cookies with margarine addition has the highest ash content (0,67%), cookies with VCO addition has the highest fat content (36,14%), and cookies with the addition of margarine and VCO mixture has the highest reducing sugar levels (0,49%). The best treatment in this study was the cookies with 1:1 proportion of sorghum flour and almond flour (A1) and with margarine addition (L1) which has the following physical and chemical properties: water content 3.08%, ash content 0.82%, fat content 36.65%, dissolved protein levels 1.27%, reducing sugar levels 0.56%, and baking expansion 92.04%.