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**Pengembangan Roti Tawar Berbasis Tepung Sorgum (Sorghum bicolor (L.) Moench) dengan Variasi Jenis
dan Konsentrasi Hidrokoloid**
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Pengembangan Roti Tawar Berbasis Tepung Sorgum (*Sorghum bicolor* (L.) Moench) dengan Variasi Jenis dan Konsentrasi Hidrokoloid

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ABSTRAK

Indonesia masih ketergantungan pada impor gandum, sehingga membutuhkan bahan alternatif sebagai pengganti tepung gandum. Tepung sorgum berpotensi sebagai substitusi tepung gandum karena merupakan serealia yang dapat beradaptasi pada kondisi tropis dan memiliki keunggulan pada nutrisinya. Namun, ketiadaan gluten menyebabkan kemampuan pembentukan struktur adonan dan retensi gas menjadi rendah sehingga menghasilkan roti dengan volume kecil dan tekstur yang kurang baik. Penelitian ini bertujuan menganalisis pengaruh jenis dan konsentrasi hidrokoloid, yaitu xanthan gum (1%, 2%, 3%), hydroxypropyl methylcellulose/HPMC (1%, 2% ,3%), dan psyllium husk (2%, 4%, 6%) terhadap karakteristik fisik dan kimia roti tawar berbasis tepung sorgum, serta menentukan formulasi terbaik menggunakan metode *Analytic Hierarchy Process* (AHP) dan *Simple Additive Weighting* (SAW). Penelitian menggunakan Rancangan Acak Lengkap (RAL) faktorial dengan satu kontrol dan tiga kali ulangan perlakuan. Parameter fisik yang diamati meliputi viskositas adonan, volume spesifik, porositas, tekstur (*hardness, springiness, cohesiveness,* dan *resilience*), serta warna *crumb* dan *crust*. Parameter kimia meliputi kadar air, aktivitas air (Aw), dan kadar abu. Data dianalisis menggunakan *Two-Way Analysis of Variance* (ANOVA) pada taraf kepercayaan 95%, kemudian dilakukan pembobotan kriteria menggunakan metode AHP dan pemeringkatan alternatif menggunakan metode SAW. Hasil penelitian menunjukkan bahwa jenis dan konsentrasi hidrokoloid berpengaruh nyata ($p<0,05$) terhadap viskositas, volume spesifik, porositas, *hardness, springiness, cohesiveness, resilience,* warna *crumb* dan *crust* (L* dan a*), serta kadar abu, namun tidak berpengaruh nyata terhadap warna *crumb* dan *crust* (b*), kadar air, dan aktivitas air. Berdasarkan pembobotan AHP dan pemeringkatan SAW, formulasi terbaik diperoleh pada perlakuan HPMC 3% (H3) dengan nilai preferensi tertinggi. Sehingga dapat disimpulkan bahwa jenis dan konsentrasi hidrokoloid memengaruhi karakteristik roti tawar berbasis tepung sorgum dan berhasil dikembangkan sebagai produk bebas gluten.

Kata kunci: Hidrokoloid, HPMC, Psyllium Husk, Sorgum, Xanthan Gum

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Development of Sorghum Flour (Sorghum bicolor (L.) Moench) Based White Bread with Variation in Hydrocolloid Type and Concentration

by
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ABSTRACT

Indonesia remains highly dependent on wheat imports, creating the need for alternative raw materials to replace wheat flour. Sorghum flour has considerable potential as a wheat flour substitute because it is a tropical cereal crop with excellent adaptability to tropical environments and superior nutritional value. However, the absence of gluten limits dough structure formation and gas retention, resulting in bread with low loaf volume and poor texture. This study aimed to evaluate the effects of different types and concentrations of hydrocolloids, namely xanthan gum (1%, 2%, and 3%), hydroxypropyl methylcellulose (HPMC) (1%, 2%, and 3%), and psyllium husk (2%, 4%, and 6%), on the physical and chemical characteristics of sorghum-based bread, and to determine the optimum formulation using the Analytic Hierarchy Process (AHP) and Simple Additive Weighting (SAW) methods. The experiment was conducted using a completely randomized factorial design (CRD) consisting of one control and three repetitions of treatments. The physical properties evaluated included dough viscosity, specific volume, porosity, texture (hardness, springiness, cohesiveness, and resilience), and crumb and crust color. The chemical properties analyzed included moisture content, water activity (Aw), and ash content. Data were analyzed using two-way analysis of variance (ANOVA) at a 95% confidence level. Subsequently, criteria were weighted using the AHP method, and the treatment alternatives were ranked using the SAW method. The results showed that hydrocolloid type and concentration significantly affected ($p < 0.05$) dough viscosity, specific volume, porosity, hardness, springiness, cohesiveness, resilience, crumb and crust color (L and a*), and ash content, but had no significant effect on crumb and crust color (b*), moisture content, or water activity. Based on the AHP weighting and SAW ranking, the best formulation was obtained with 3% HPMC (H3), which achieved the highest preference score. It can be concluded that the type and concentration of hydrocolloids significantly influence the physical and chemical characteristics of sorghum-based bread, and that the combined AHP–SAW approach is an effective multi-criteria decision-making method for selecting the optimum formulation.*

***Keywords**: Hydrocolloid, HPMC, Psyllium Husk, Sorghum, Xanthan Gum*

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