

**KARAKTERISTIK BISKUIT SUBSTITUSI TEPUNG IKAN KEMBUNG  
(*Rastrelliger* sp.) DAN TEPUNG BERAS HITAM (*Oryza sativa L. indica*)  
TERHADAP PERUBAHAN KADAR GLUKOSA DARAH PADA  
TIKUS DIABETES MELITUS**

**TESIS**



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## ABSTRAK

FAKULTAS KESEHATAN MASYARAKAT  
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### KARAKTERISTIK BISKUIT SUBSTITUSI TEPUNG IKAN KEMBUNG (*Rastrelliger* sp.) DAN TEPUNG BERAS HITAM (*Oryza sativa L. indica*) TERHADAP PERUBAHAN KADAR GLUKOSA DARAH PADA TIKUS DIABETES MELITUS

xiii + 133 halaman, 23 gambar, 31 tabel, 14 lampiran

#### ABSTRAK

**Latar belakang:** Diabetes melitus (DM) merupakan kelainan metabolisme kompleks yang ditandai dengan hiperglikemia. Hiperglikemia adalah suatu kondisi yang ditandai dengan peningkatan kadar glukosa darah. Magnesium berperan dalam homeostasis glukosa dan kerja insulin, ikan kembung memiliki kandungan magnesium sebesar 76 mg/100 g. Antosianin bermanfaat dalam pencegahan dan pengobatan diabetes, tepung beras hitam memiliki kandungan antosianin berkisar 50-600 mg/100 g.

**Tujuan:** Penelitian ini bertujuan untuk menganalisis pemberian biskuit substitusi tepung ikan kembung dan tepung beras hitam yang mengandung magnesium dan antosianin sehingga berpengaruh terhadap perubahan kadar glukosa darah.

**Metode:** Penelitian adalah *true experimental* dengan rancangan *pre-post only with randomized control group design*. Intervensi dilakukan di Animal House Fakultas Farmasi Universitas Andalas, pada bulan Maret-April 2024 selama 21 hari terhadap 24 ekor tikus wistar jantan berusia 3 bulan, yang dibagi menjadi 4 kelompok perlakuan, yaitu kelompok P0 (biskuit standar), P1 (biskuit substitusi tepung ikan 10 g; tepung beras hitam 15g), P2 (biskuit substitusi tepung ikan 20 g; tepung beras hitam 30g), dan P3 (biskuit substitusi tepung ikan 30 g; tepung beras hitam 45g). Kadar glukosa darah diukur menggunakan glukometer EasyTouch. Analisis statistik menggunakan uji *Paired T-Test*, *one-way Anova*, dan *Duncan's Multiple Range Test*.

**Hasil:** Terdapat pengaruh pemberian biskuit substitusi tepung ikan kembung dan tepung beras hitam terhadap perubahan kadar glukosa darah setelah intervensi selama 21 hari ( $p < 0,05$ ) pada kelompok P1, P2, dan P3. Perubahan kadar glukosa darah pada kelompok (P1) yang memperoleh biskuit dengan formula terbaik (substitusi tepung ikan kembung 10 g dan tepung beras hitam 15 g) terjadi penurunan sebesar 215 mg/dL.

**Kesimpulan:** Pemberian biskuit substitusi tepung ikan kembung dan tepung beras hitam sebanyak 2.88 ml/200 g BB tikus/hari dapat menurunkan kadar glukosa darah puasa pada tikus.

**Daftar pustaka :** 157 (2001-2023)

**Kata Kunci :** biskuit, tepung ikan kembung, tepung beras hitam, glukosa darah.

## ABSTRACT

FACULTY OF PUBLIC HEALTH  
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THESIS, JULY 2024

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### CHARACTERISTICS OF BISCUITS SUBSTITUTED WITH MACKEREL FLOUR (*Rastrelliger* sp.) AND BLACK RICE FLOUR (*Oryza sativa* L. *indica*) ON CHANGES IN BLOOD GLUCOSE LEVELS IN DIABETES MELLITUS RATS

xiii + 133 pages, 23 pictures, 31 tabels, 14 attachments

#### ABSTRACT

**Background:** Diabetes mellitus (DM) is a complex metabolic disorder characterized by hyperglycemia. Hyperglycemia is a condition characterized by increased blood glucose levels. Magnesium plays a role in glucose homeostasis and insulin action, mackerel has a magnesium content of 76 mg/100 g. Anthocyanins are useful in the prevention and treatment of diabetes, black rice flour has an anthocyanin content ranging from 50-600 mg/100 g.

**Objective:** This study aims to analyze the provision of substitute biscuits of mackerel flour and black rice flour containing magnesium and anthocyanin so that it affects changes in blood glucose levels.

**Method:** The study was a true experimental with a pre-post only design with randomized control group design. The intervention was carried out at the Animal House, Faculty of Pharmacy, Andalas University, in March-April 2024 for 21 days on 24 male Wistar rats aged 3 months, which were divided into 4 treatment groups, namely group P0 (standard biscuits), P1 (fish flour substitute biscuits 10 g; black rice flour 15 g), P2 (fish flour substitute biscuits 20 g; black rice flour 30 g), and P3 (fish flour substitute biscuits 30 g; black rice flour 45 g). Blood glucose levels were measured using an EasyTouch glucometer. Statistical analysis using the Paired T-Test, one-way Anova, and Duncan's Multiple Range Test.

**Results:** There was an effect of giving biscuits substituted with mackerel flour and black rice flour on changes in blood glucose levels after intervention for 21 days ( $p < 0.05$ ) in groups P1, P2, and P3. Changes in blood glucose levels in group (P1) that received biscuits with the best formula (substitution of mackerel flour 10 g and black rice flour 15 g) decreased by 215 mg/dL. Conclusion: Giving biscuits substituted with mackerel flour and black rice flour as much as 2.88 ml/200 g rat body weight/day can reduce fasting blood glucose levels in rats.

**Conclusion:** Giving biscuits as a substitute for mackerel flour and black rice flour as much as 2.88 ml/200 g rat body weight/day can reduce fasting blood glucose levels in rats.

**References** : 157 (2001-2023)

**Keywords** : biscuits, mackerel flour, black rice flour, blood glucose.