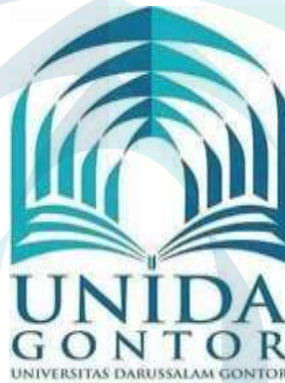


THESIS
MODIFICATION OF ARROWROOT (*MARANTA*
***ARUNDINACEA*) FLOUR STICK BISCUITS WITH THE**
ADDITION OF CASHEW NUTS AND TILAPIA AS PROVIDING
SUPPLEMENTARY FOOD FOR UNDERWEIGHT TODDLERS
(Analysis of Energy Content, Protein Levels, Protein Digestibility, Fat,
and Organoleptic Properties)



Arranged by:
Sofiatun Annayah
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DEPARTMENT OF NUTRITION SCIENCE
FACULTY OF HEALTH SCIENCES
UNIVERSITAS DARUSSALAM GONTOR
PONOROGO

2025

APPROVAL SHEET

THESIS DEFENCE

It is hereby stated that the thesis with the title :
**MODIFICATION OF ARROWROOT (*MARANTA ARUNDINACEA*) FLOUR
STICK BISCUITS WITH THE ADDITION OF CASHEW NUTS AND
TILAPIA AS PROVIDING SUPPLEMENTARY FOOD
FOR UNDERWEIGHT TODDLERS**

*(Analysis of Energy Content, Protein Levels, Protein Digestibility, Fat, and
Organoleptic Properties)*

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It has been reviewed and recommended to meet scientific standards, in terms of both
scope and quality.

It has been approved to presented on: **Monday, 27 January 2025**

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**Head of Nutrition Science Departement
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Lulu' Luthfiya, S.Gz., M.P.H.

NIDN. 0718019203

VALIDITY SHEET

It is hereby stated that the thesis with the title :

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ABSTRACT

MODIFICATION OF ARROWROOT (*MARANTA ARUNDINACEA* FLOUR) STICK BISCUITS WITH THE ADDITION OF CASHEW NUTS AND TILAPIA AS CRUCIAL PROVIDING SUPPLEMENTARY FOOD FOR UNDERWEIGHT TODDLERS

(Analysis of Energy Content, Protein Levels, Protein Digestibility, Fat, and Organoleptic Properties)

Sofiatun Annayah
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Underweight in toddlers is a nutritional problem that has a negative impact on physical growth and development. This problem can be overcome through innovation in making local food-based supplementary foods. This study aims to analyze the differences in arrowroot flour stick biscuits, with the addition of cashew nuts and tilapia fish on energy content, protein, protein digestibility, fat and organoleptic. This study used a type of true experimental laboratory research. The research design was a completely randomized design (CRD) consisting of 3 treatments and 1 control with the ratio of arrowroot flour, cashew nuts, and tilapia with formulations F0 (100:0:0), F1 (80:15:5), F2 (70:20:10), F3 (60:25:15) with 3 repetitions of analysis. The test method of energy content (by atwater), protein (kjeldahl), protein digestibility (enzymatic), fat content (soxhlet) and organoleptic with research subjects amounted to 50 untrained panelists consisting of 25 mothers of toddlers and 25 toddlers. Data analysis of energy content, protein content, protein and fat digestibility with One Way Anova test followed by post hoc Duncan and organoleptic test data using Kruskal Wallis ($p < 0.05$). The results of the study on significant differences in energy content, protein, protein digestibility and fat in arrowroot flour stick biscuits, cashew nuts and tilapia fish ($p = 0.000$). The results of organoleptic tests on mothers of toddlers with color parameters show a value ($p = 0.864$), texture ($p = 0.791$), taste ($p = 0.806$) and aroma ($p = 0.924$), while in toddlers the value of favorability ($p = 0.861$). There are significant differences in energy content, protein, protein digestibility, fat and there are no significant differences in organoleptic tests on arrowroot, cashew nut and tilapia flour stick biscuits.

Keywords: Energy content, macronutrients, organoleptic, protein digestibility, stick biscuits.

ABSTRAK

MODIFIKASI BISKUIT STIK TEPUNG GARUT DENGAN PENAMBAHAN KACANG METE DAN IKAN NILA SEBAGAI MAKANAN TAMBAHAN BALITA *UNDERWEIGHT*

(Analisis kandungan energi, kadar protein, daya cerna protein, lemak dan organoleptik)

Sofiatun Annayah
NIM. 422021728032

Underweight pada balita merupakan masalah gizi yang memiliki dampak negatif pada pertumbuhan dan perkembangan fisik. Masalah ini dapat diatasi melalui inovasi pembuatan makanan tambahan berbasis pangan lokal. Penelitian ini bertujuan untuk menganalisis perbedaan biskuit stik tepung garut, dengan penambahan kacang mete dan ikan nila terhadap kandungan energi, protein, daya cerna protein, lemak dan organoleptik. Penelitian ini menggunakan jenis penelitian *true experimental laboratory*. Desain penelitian Rancangan Acak Lengkap (RAL) yang terdiri dari 3 perlakuan dan 1 kontrol dengan perbandingan tepung garut, kacang mete, dan ikan nila dengan formulasi F0 (100:0:0), F1(80:15:5), F2(70:20:10), F3(60:25:15) dengan 3 kali pengulangan analisis. Metode uji kandungan energi (*by atwater*), protein (*kjeldahl*), daya cerna protein (enzimatis), kadar lemak (*soxhlet*) dan organoleptik dengan subyek penelitian berjumlah 50 orang panelis tidak terlatih yang terdiri dari 25 ibu balita dan 25 balita. Analisis data kandungan energi, kadar protein, daya cerna protein dan lemak dengan uji One Way Anova dilanjutkan dengan post hoc Duncan dan data uji organoleptik menggunakan Kruskal Wallis ($p < 0,05$). Hasil penelitian terhadap perbedaan nyata kandungan energi, kadar protein, daya cerna protein dan lemak pada biskuit stik tepung garut, kacang mete dan ikan nila ($p = 0,000$) . Hasil uji organoleptik pada ibu balita dengan parameter warna menunjukkan nilai ($p = 0,864$), tekstur ($p = 0,791$), rasa ($p = 0,806$) dan aroma ($p = 0,924$), sedangkan pada balita nilai tingkat kesukaan ($p = 0,861$). Terdapat perbedaan nyata kandungan energi, kadar protein, daya cerna protein, lemak dan tidak terdapat perbedaan yang signifikan uji organoleptik pada biskuit stik tepung garut, kacang mete dan ikan nila.

Kata Kunci: Biskuit stik, daya cerna protein, kandungan energi, organoleptik, zat gizi makro.

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Ngawi, 10 February 2025


Sofiatun Annayah

STATEMENT OF RESEARCH AUTHENTICITY

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I declare with complete sincerity that this thesis is my work and is not a copy or the result of another person's research. This thesis has never been submitted to obtain an academic degree at any university. Furthermore, this work has never been published except for references explicitly cited in this manuscript and listed in the bibliography. I understand that if this thesis is found to contain elements of plagiarism in the future, I am willing to accept academic sanctions by the applicable regulations. This statement is made truthfully and without any coercion from any party.

Ponorogo, 14 January 2021

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