



Investigation of the Acceptability of Cookie Made with Coconut Flour

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ABSTRACT

Objective: The aim of this study is to examine the use of coconut flour as an alternative to wheat flour in cookie making, and finally to evaluate the sensory properties and consumer acceptance of cookies. **Material and Method:** 74 panelists between the ages of 18-27 participated in the study. In the study, two different cookie samples were developed using coconut flour and wheat flour as raw materials. Taste test questionnaire was used in data collection of the research and a 9-point hedonic scale was used to evaluate the general acceptance of the samples. **Results:** While the cookies produced with coconut flour were liked by 74.3% (n=55) of the individuals, 60.8% (n=45) of the participants reported that they did not like the cookies produced with wheat flour. While 78.4% (n=58) of the individuals defined wheat flour cookies as lumpy, 87.8% (n=65) reported that they did not feel roughness in coconut flour cookies. While all of the participants reported that they felt a difference between the cookies, 91.9% (n=68) of the individuals reported that this difference was high or higher. **Conclusion:** In our study, it was determined that cookies made with coconut flour were more popular than cookies made with wheat flour, and it is thought that cookies made with coconut flour can be an alternative snack option.



1. INTRODUCTION

Snack food consumption has increased as a result of urbanisation and modernisation. However, most snacks contain high amounts of saturated fat, refined sugar, salt and low amounts of fibre, which can cause health problems [1]. Therefore, consumer demand for healthy snacks has increased. Since the consumption of foods with high nutritional value and functional properties has become a trend today, studies have been carried out to use alternatives to wheat flour [2,3].

Cookies are snacks that use wheat flour as raw material, can be easily processed and stored, and are generally consumed as a source of energy and pleasure [4]. The increasing demand for foods containing high amounts of fibre, vitamins, whole grains and zero sugar for healthy living and balanced nutrition has led to changes in the composition of cookies [5]. For this reason, flours with high nutritional value obtained from different sources have been used in cookie making, resulting

in the development of physically, chemically, sensory and functionally different products [6].

Coconut flour has beneficial health effects due to its high fibre and protein content [7,8]. Since it does not contain gluten and has a low glycaemic index, it is a good alternative for diabetic, cardiovascular and celiac patients [8]. However, the medium-chain fatty acids found in coconut are rapidly absorbed in the intestine and do not enter the cholesterol circulation and provide a quick source of energy [9]. In addition, thanks to its high lauric acid (12:0) and phenolic content, it shows antioxidant and anti-inflammatory effect, prevents the formation of atherosclerosis and shows protective effect from cardiovascular diseases [10]. Therefore, it can be said that it is a good alternative for wheat flour. There are studies showing that coconut flour can be used in making cookies, bread and snacks [11, 12, 13].

Although there are commercial products such as cakes, cookies and biscuits enriched with

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coconut flour, there are no cookies using coconut this study was to develop gluten-free cookies for celiac patients, to investigate the use of coconut flour as an alternative to wheat flour in cookie making and finally to evaluate the sensory properties and consumer acceptance of the cookies.

2. MATERIALS AND METHODS

This single-blind, cross-sectional study was conducted between October and December 2020 with individuals in Istanbul, Turkey. A total of 74 panellists, 65 female (87.8%) and 9 male (12.2%), aged between 18 and 27 years, participated in the study. Individuals with food allergy were not included in the study. In this study, two different cookie samples were developed using coconut flour and wheat flour as raw materials, the recipes of which are shown in Table 1. The samples, labelled A (coconut flour) and B (wheat flour), were given to the participants in random order and the participants were not informed about the contents of the samples in order to ensure objective sensory evaluation. Participants were given water at room temperature to clean their

flour as an alternative to wheat flour. The aim of mouths between the samples. The data for the study were obtained by face-to-face interview method using the taste test questionnaire created for this study. In the questionnaire form, which includes detailed questions designed for the hypothesis of the study, there are questions about the date of birth and gender of the participants regarding the sociodemographic characteristics of the participants, structural (roughness) and sensory (sour, bitter, salty, sweet) characteristics of the samples, favourite samples and differences between samples. A standard 9-point hedonic scale was used to evaluate the overall acceptance of the samples, with the highest value being 'excellent' and the lowest value being 'extremely poor' [14]. Only k

This study followed ethical standards. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights. The research strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing participant's rights and well-being in design, procedures, and confidentiality measures.

Table 1. Recipes of the cookies

Cookie Flavour	Cookie Flavour	Cookie Flavour	Cookie Flavour	Cookie Flavour	Cookie Flavour	Cookie Flavour
A	100	0	10	6,25	12,5	10
B	0	60	10	6,25	12,5	10

3. RESULTS AND DISCUSSION

shown in Table 2. Coconut and wheat flour cookies were rated as good or better by 68.9% (n=51) and 28.4% (n=21) of the participants, respectively. While 74.3% (n=55) of the participants liked the coconut flour cookies, 60.8% (n=45) of the participants did not like the wheat flour cookies. Supporting our study, in a study in which the general likability of cookies using coconut flour as an alternative to wheat flour was evaluated with a 9-point hedonic scale, the general acceptance of cookies was found to be high with a score of 7.33 ± 0.70 [15]. Paucean et al. [13] reported that the use of rice and coconut flour mixtures in the production of gluten-free cookies increased the nutritional value and provided a pleasant taste.

Information on the evaluation of the structural properties of the cookie recipes developed in the study is given in Table 3. While 78.4% (n=58) of the individuals described wheat flour cookies as rough, 87.8% (n=65) reported that

The scores of the cookie recipes as a result of sensory evaluation with 9-point hedonic scale are they did not feel roughness in coconut flour cookies.

When the dominant aroma felt after tasting coconut flour cookies and the perception time of this aroma were questioned, 66.2% (n=49) of the participants stated that coconut aroma was dominant, while 32.4% (n=24) reported that this aroma was perceived within 2 seconds.

In our study, it was determined that 74.2% of the participants liked cookies prepared with coconut flour. Coconut is rich in medium-chain fatty acids and has been reported to increase the metabolic rate by supporting thermogenesis in metabolism. In this context, it is argued that it can be used as a functional food in weight control. Similar to our study, in a study reporting that the taste and texture of mulberry pestils with added coconut flour were found to be suitable by the panellists, it was found that coconut flour pestils could be produced as an alternative food [16]. A

significant decrease in anthropometric measurements was found in mildly obese women as a result of daily consumption of 26 grams of

coconut flour compared to individuals receiving isocaloric diet [17].

Table 2. Evaluation of the general likability of the cookies

Scale of points for liking the cookies	Coconut flour		Wheat flour	
	n	%	n	%
Very bad	0	0	3	4.1
Bad	0	0	6	8.1
	7	9.5	11	14.9
Below average	4	5.4	14	18.9
	7	9.5	6	8.1
Below good	5	6.8	13	17.6
Good	26	35.1	10	13.5
Very good	16	21.6	8	10.8
Excellent	9	12.2	3	4.1
Total	74	100.0	74	100.0

The degree to which the cookies are liked	Coconut cookies		Wheat cookies	
	n	%	n	%
Liked	55	74.3	29	39.2
Not liked	19	25.7	45	60.8
Total	74	100.0	74	100.0

Table 3. Evaluation of structural properties of cookies

Perceptible Roughness in Cookies	Coconut flour		Wheat flour
	n	%	%
Yes	9	12.2	78.4
No	65	87.8	21.6
Total	74	100.0	100.0

Table 4. Evaluation of sensory properties of cookies

Recognised flavours of cookies	Coconut cookies	Wheat cookies
	%	%
Unrecognisable taste	25.7	5.4
Sour	0	1.4
Pain	4.1	0
Salty	4.1	0
Sweet	66.2	3.2
Total	100.0	100.0

Table 5. Evaluation of difference and degree of difference between cookies

Difference between Cookies and Degree	Valid	Stacked
	%	%
Difference		
Yes	100	100
No	0	0
Total	100.0	
Degree of Difference		
Light	2.7	2.7
Low	5.4	8.1
More	50.0	58.1
Too much	41.9	100
Total	100.0	

4. Conclusion

In our study, it was determined that cookies made with coconut flour were liked more than cookies made with wheat flour and it was thought that cookies made with coconut flour could be an alternative snack option. In addition to the positive effects of coconut on weight control due to its content, it is also expected that cookies containing coconut flour have lower fibre content than cookies containing wheat flour. When evaluated from this aspect, it should be taken into consideration that the amount of fibre taken from other foods in the daily nutrition plan of individuals should also be at the recommended level.

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Conflict of Interest

No conflict of interest

Ethics Committee

This study followed ethical standards. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights.

Author Contributions

Study Design, BMK, CK, CE; Data Collection, BMK, CK, CE; Statistical Analysis, CK; Manuscript Preparation, BMK, CK, CE; Literature Search, BMK, CK, CE. All authors have read and agreed to the published version of the manuscript.

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