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Nutritional Quality of Cookies Produced From Mixtures of Fermented Pigeon Pea, Germinated Sorghum and Cocoyam Flours

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Authors' contributions

This work was carried out in collaboration between both authors. Author OOE designed the experimental animal housing, while author LCO managed the analyses of the study, conducted the literature searches and wrote the manuscript. Both authors read and approved the final manuscript.

Research Article

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ABSTRACT

Due to the high foreign exchange spent on the importation of wheat and the need to combat issues of malnutrition in developing countries, cookies were produced from flour blends of fermented pigeon pea (FPF), germinated sorghum (GSF) and cocoyam (CF). Proximate composition of the cookies revealed that cookies made with 100%FPF had the highest protein content of 16.13% while cookies made with 100%CF had the least protein value of 6.40%. The antinutritional factors investigated in the cookies were low and within allowable limits. The nutritional quality evaluated by animal feeding experiments revealed that biological values (BV) of cookies ranged from 78.16% (for 100%CF) to 96.57% (for 33.3%FPF:33.3%GSF:33.3%CF); net protein utilization (NPU) values ranged from 70.08% (for 100%CF) to 92.98% (for 33.3%FPF:33.3%GSF:33.3%CF) while true digestibility (TD) ranged from 89.53%(for 100%CF) to 97.88% (for 66.6%FPF:16.7%GSF:16.7%CF). The results obtained suggest that cookies of good nutritional value can be produced from these locally available crops.

Keywords: Cookies; nutritional quality; composite flours.

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1. INTRODUCTION

Cookies are snacks which are widely consumed all over the world especially by children. Wheat flour which is used to produce cookies is unavailable in many regions of the world resulting in importation of the flour by regions with limited supplies. There is therefore, a compelling need to develop an adequate substitute for wheat flour. This substitute should be readily available, cheap and replace wheat in functionality. Composite flour can be defined as a mixture of several flours obtained from roots and tubers, cereals, legumes etc. with or without the addition of wheat flour [1]. Composite flours have been used extensively in the production of baked goods. In fact, several attempts have been made to produce cookies from different types of composite flours [2,3,4]. In countries where malnutrition poses a serious problem especially among children, composite flours which have better nutritional quality would be highly desirable.

Fermentation is an age long process of processing cereals and legumes which not only modifies some physical characteristics of these grains but also increases the levels of nutrients, digestibility and bioavailability as well as decreases the level of antinutrients [5]. Germination is another traditional method of processing grains which has resulted in increasing free limiting amino acids and available vitamins with modified functional properties of seed components [6]. With such potentials, the use of composite flours made from grains which have undergone fermentation and/or germination should result in products of enhanced nutritional quality.

Pigeon pea (*Cajanus cajan*) is an underutilized legume which grows in the tropics and sub-tropics of India, Africa, South-east Asia and Central America [7]. It has a protein content of about 25.83% [8]. Sorghum (*Sorghum bicolor*), a cereal is a member of the grass family. It is the fifth most important cereal in the world after wheat, rice, corn and barley. More than 35% of sorghum is grown for human consumption while the rest is primarily used for feed and industrial alcohol production [9]. Available data from FAO [10], reports that there is a decrease in consumption in parts of Africa and this has been attributed to shift in consumer habits brought about by rapid rate of urbanization, time and energy required to prepare food based on sorghum as well as poor marketing facilities and processing techniques. Cocoyam (*Xanthosoma sagittifolium*) is an edible root crop grown in the tropics of which Nigeria is a major producer. It belongs to the family Aracea [11]. The flour from cocoyam has been used in baking of products as it has been reported that cocoyam has fine granular starch which improves binding and reduces breakage of snack products [12].

All these crops are grown in large quantities but are grossly underutilized. This work therefore seeks to produce cookies from flour blends of fermented pigeon pea, germinated sorghum and cocoyam with the aim of producing products of high nutritional quality.

2. MATERIALS AND METHODS

2.1 Materials Used for Cookie Preparation

The white variety of pigeon pea (*Cajanus cajan*), the white variety of sorghum (*Sorghum bicolor*) and the tannia variety of cocoyam (*Xanthosoma sagittifolium)* were purchased from a retail outlet in Abakaliki, Ebonyi State, Nigeria. Wheat flour and all other baking ingredients such as eggs, baking powder, fat, milk and flavourings were also obtained from the same source.

2.2 Method of Preparation

2.2.1 Cocoyam flour (CF)

Cocoyam flour was produced using the method described by Udensi et al [13] with slight modifications. The corms were washed, peeled, sliced and blanched at 80ºC for four minutes. They were dried and milled to pass through 100µm mesh sieve.

2.2.2 Fermented pigeon pea flour (FPF)

The pigeon pea flour was subjected to natural lactic acid fermentation using the method of Hallén et al [6]. Washed and dried grains were ground into fine flour. The flour was mixed with water (1:5 wt/wt) to form slurry followed by the addition of 5% sugar by weight of flour. The slurry was left to ferment in trays at room temperature until the pH of the slurry reached 5.5. The fermented slurry was dried at 50^{o}C and then sieved through a 100µm mesh screen.

2.2.3 Germinated sorghum flour (GSF)

Sorghum grains were germinated using the modified method of Hallén et al [6]. Cleaned grains were soaked in 0.1% sodium hypochlorite solution for 30 minutes to prevent mould growth. The grains were thoroughly washed and soaked in water (24 hours). The hydrated seeds were spread on jute bags and allowed to germinate for 4 days after which they were dried at 50ºC. Thereafter, formed roots and testa were rubbed off before milling and sieving through 100µm mesh sieve. All of the flour samples were kept in airtight containers until needed for analysis.

2.2.4 Formulation of flour composites

Ten formulations were generated (Table 1). The flours were thoroughly mixed to obtain homogeneous blends. Samples were stored in airtight containers at room temperature until ready for use.

Table 1. Formulation of composite flour

Formulation	Cocoyam (CF)	Fermented pigeon pea (FPF)	Germinated sorghum (GSF)
1	100	-	-
2	-	100	-
3	-	-	100
4	50	50	-
5	-	50	50
6	50	-	50
7	33.3	33.3	33.3
8	66.6	16.7	16.7
9	16.7	66.6	16.7
10	16.7	16.7	66.6

2.3 Cookie Preparation

The ingredients used were: flour, 100.0g; hydrogenated vegetable fat, 40.0g; sugar (granulated cane), 25.0g; egg (whole, fresh), 31.0g; milk (full-fat filled, powdered); 7.8g;

nutmeg; 0.3g, vanilla (liquid), 5.0ml, salt, 1.0g and baking powder, 1.0g. Fat and sugar were creamed using an electric mixer at medium speed for 5 minutes. Eggs and milk were added while mixing and then mixed for a total of about 30 minutes. Vanilla, nutmeg, flour, baking powder and salt were mixed thoroughly and added to the cream mixture where they were all mixed together to form a dough. The dough was rolled and cut into circular shapes of 5cm diameter. Baking was carried out at 185ºC for 20±5 minutes. Cookie samples were cooled and stored in airtight containers until needed. Cookies were made from wheat to serve as a control.

2.4 Laboratory Analysis

2.4.1 Proximate composition of cookies

Protein content was determined using the micro – Kjeldahl method as described AOAC [14]. Fat, ash, fibre and moisture contents were also determined according to the methods described by AOAC [14]. Carbohydrates were determined by difference. Analyses were performed in triplicates

2.4.2 Evaluation of antinutritional factors

Phytic acid was determined using the method of Reddy and Love [15]. Saponins were determined using the method of Birk *et al* [16] as modified by Hudson and El- Difrawi [17], hydrogen cyanide was determined using the alkaline picrate spectrophotometric method as described by Balagopalan et al [18], oxalate was determined using the method described by Ukpabi and Ejidoh [19], tannins were determined using the method of Folin- Dennis [14], while trypsin inhibitor activity was determined using the spectrophotometric method described by Arntifield et al [20]. Analyses were performed in triplicates.

2.4.3 Animals and housing

Fifteen groups (Ten composite cookie formulations groups + one wheat cookie group + three casein control groups + one group receiving a protein-free diet) of five male adult albino rats of the Wistar strain with average initial weight of 120-210g were used. They were divided in such a way that all the groups of rats had the same average weight. Subsequently, they were housed in individual screened bottomed cages designed to separately collect faeces and urine. Experimental animals each received 20g of the corresponding group diets and water *ad libitum.* The temperature of the laboratory was 28 ± 1ºC with alternate 12h periods of light and dark. These animals were used to assess the BV and NPU of the diets based on casein. Following the method described by Al- Numair and Ahmed [21], a 9-day balance study which included a four-day adjustment and five-day nitrogen (N) balance period was carried out. There was a preliminary feeding period of four days followed by a balance period of five days during which complete collection of faeces and urine was performed for each rat. Food intake was monitored daily and final body weights were recorded. Urine was collected in sample bottles, preserved in 0.1N HCl to prevent loss of ammonia and stored in a refrigerator until analyzed for urinary nitrogen. Faeces of individual rats were pooled, dried at 85ºC for 4 hours, weighed before being ground into fine powder and stored for faecal N determination. The concentration of nitrogen in the diet, faeces and urine was estimated by the Kjeldahl method [14].

2.4.4 Diets

Formulations of the test diets are shown in Table 2. The diets were adjusted to provide 6, 8 and 10% protein. The diets made from cookies with protein content above 10% were adjusted to provide 10% protein; test diets made from cookies with protein content ranging from 8.1-9.9% were adjusted to provide 8% protein while diets from cookies with protein content ranging from 6.1-7.9% were adjusted to provide 6% protein. There were three reference protein diets of casein at 6, 8 and 10% protein levels for comparison of the protein quality of these test diets [22]. Other ingredients included 5% vegetable oil, 0.25% vitamins, 0.05% minerals and the remainder, corn starch added to balance the diets [23]. The diets were thoroughly mixed, pelletized and stored in polyethylene bags labeled with designated names. The polyethylene bags were kept in airtight containers until ready for use.

2.5 Statistical Analysis

The data collected were subjected to analysis of variance (ANOVA). Means were separated using Duncan’s multiple range test using the Statistical Package for the Social Sciences (SPSS) version 16.0 (SPSS Inc., Chicago, IL. USA).

3. RESULTS AND DISCUSSION

3.1 Proximate Composition of Cookies

The chemical composition of cookies produced is presented in Table 3. The protein content of the cookies ranged from 6.40 to 16.13%. Cookies made from 100% fermented pigeon pea flour (100FPF) had the highest protein content and it was significantly higher ($p<0.05$) than all the other cookies. This was closely followed by cookies made from 100% germinated sorghum flour (100GSF). It was observed that increase in FPF resulted in an increase in the protein content of the cookies. The ash contents were observed to increase with increase in cocoyam flour (CF). Ash content is indicative of the amount of minerals in any food sample [24]. The fat content of the cookies were relatively low. Fat plays a significant role in the shelf life of food products as it can promote rancidity in foods, leading to the development of unpleasant and odorous compounds [11]. As such, relatively low fat content is desirable in baked food products.

3.1.1 Antinutritional factors

The levels of antinutritional factors in the cookies produced (Table 4) were much lower than the values obtained by Okpala and Okoli [25] for biscuits made with pigeon pea, sorghum and cocoyam flour blends which did not undergo any form of fermentation or germination. This suggests that germination of sorghum and fermentation of pigeon pea led to reduction in the antinutritional factors present in the flours. All the values obtained were low and within safe limits.

Table 2. Formulation of fermented pigeon pea, germinated sorghum and blanched cocoyam flour cookies and casein based diets fed to rats

Ingredients	Protein (%)	100GSF	100FPF	50GSF:50FPF	66.6FPF:16.7CF:16.7GSF	Casein A	50CF:50GSF	50CF:50FPF
100GSF	10	648.5	-	-	-	-	-	-
100FPF	10	-	620.4	-	-	-	-	-
50GSF:50FPF	10	-	-	673.0	-	-	-	-
66.6FPF:16.7CF:16.7GSF	10	-	-	-	629.7	-	-	-
Casein A	10	-	-	-	-	110.1	-	-
50CF:50GSF	8	-	-	-	-	-	813.0	-
50CF:50FPF	8	-	-	-	-	-	-	892.9
Oil	-	50	50	50	50	50	50	50
Vitamins	-	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Minerals	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Corn starch	-	298.5	326.6	274.0	317.3	836.9	134.0	54.1
Total	-	1000	1000	1000	1000	1000	1000	1000

Ingredients	Protein %)	33.3CF:33.3 GSF:33.3FPF	66.6GSF:16. 7CF:16.7FPF	66.6CF:16.7GSF:16.7FPF	100 WHEAT	Casein B	100CF	Casein C
33.3CF:33.3GSF:33.3FPF	8	806.50	-	-	-	-	-	-
66.6GSF:16.7CF:16.7FPF	8	-	809.7	-	-	-	-	-
66.6CF:16.7GSF:16.7FPF	8	-	-	801.6	-	-	-	-
100 WHEAT	8	-	-	-	829.0	-	-	-
Casein B	8	-	-	-	-	88.1	-	-
100CF	6	-	--	-	-	-	872.1	-
Casein C	6	-	-	-	-	-	-	66.1
Oil	-	50	50	50	50	50	50	50
Vitamins	-	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Minerals	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Corn starch	-	140.5	137.3	145.4	118.0	858.9	74.9	880.9
Total	-	1000	1000	1000	1000	1000	1000	1000

CF= Cocoyam flour; GSF= Germinated sorghum flour; FPF= Fermented pigeon pea

Table 3. Chemical composition of cookies produced from fermented pigeon pea, germinated sorghum and blanched cocoyam flour blends

Blends CF:GSF:FPF	Moisture (%)	Fat (%)	Protein (%)	Ash (%)	Fibre (%)	Carbohydrates (%)	Energy (kcal/100g)
100:0:0	6.85^{i}	5.10^{k}	6.40^{k}	2.95^{a}	2.26^{de}	76.44^{a}	377.35^{b}
0:100:0	8.88^{c}	5.48^{j}	15.42^{c}	2.17^{f}	2.33^{c}	65.69^{g}	373.76^{c}
0:0:100	8.85^{d}	6.32^{a}	16.13^{a}	2.36^{c}	2.23^{e}	64.12^{i}	377.88^{b}
50:50:0	8.47^{f}	5.95^{e}	9.84^{h}	2.35^{cd}	2.29^{cd}	71.10^{d}	377.31^{b}
0:50:50	8.46^{f}	6.12^{c}	14.86^{d}	2.05^{g}	2.28^{d}	66.23^{f}	379.44^{a}
50:0:50	8.12^{g}	6.05^{d}	8.96^{j}	2.18^{f}	2.13^{f}	72.56^{b}	380.53^{a}
33.3:33.3:33.3	8.62^{f}	5.79^{h}	9.92^{f}	2.28^{de}	2.33^{bc}	71.06^{d}	376.03^{b}
16.7:16.7:66.6	9.02^{a}	6.22^{b}	15.88^{b}	2.36^{c}	2.08^{f}	64.37^{h}	376.98^{b}
16.7:66.6:16.7	8.94^{b}	5.83^{g}	9.88^{g}	2.26^{e}	2.37^{ab}	70.72^{e}	374.87^{bc}
66.6:16.7:16.7	8.77^{e}	5.87^{f}	9.98^{e}	2.42^{c}	2.25^{de}	70.72^{e}	375.63^{b}
100% wheat flour	7.46^{h}	5.64^{i}	9.65^{i}	2.56^{b}	2.41^{a}	72.28^{c}	378.48^{ab}

CF= Cocoyam flour; GSF= Germinated sorghum flour; FPF= Fermented pigeon pea
Means within a column with the same superscript are not significantly different (p> 0.05).
Values in Tables 3-4 are means of triplicate determinations.

Table 4. Antinutritional factors of cookies produced from fermented pigeon pea, germinated sorghum and blanched cocoyam flour blends

Blends CF:GSF:FPF	Saponins (mg/100g)	Hydrogen Cyanide (mg/kg)	Phytic acid (mg/100g)	Tannins (mg/100g)	Oxalate (mg/100g)	Trypsin Inhibitor (TIU/mg)
100:0:0	0.04^{a}	0.06^{b}	0.70^{a}	0.46^{ab}	5.70^{a}	0.04^{b}
0:100:0	0.03^{a}	0.11^{a}	0.62^{c}	0.32^{c}	4.00^{c}	0.06^{a}
0:0:100	0.04^{a}	0.11^{a}	0.55^{e}	0.37^{bc}	4.20^{c}	0.06^{a}
50:50:0	0.03^{a}	0.10^{ab}	0.63^{bc}	0.37^{bc}	3.30^{e}	0.06^{a}
0:50:50	0.03^{a}	0.09^{bc}	0.58^{d}	0.39^{abc}	3.40^{e}	0.05^{ab}
50:0:50	0.03^{a}	0.08^{cd}	0.58^{d}	0.38^{abc}	3.70^{d}	0.05^{ab}
33.3:33.3:33.3	0.03^{a}	0.07^{d}	0.53^{f}	0.34^{c}	3.70^{d}	0.05^{ab}
16.7:16.7:66.6	0.03^{a}	0.08^{cd}	0.64^{b}	0.39^{abc}	3.60^{d}	0.04^{b}
16.7:66.6:16.7	0.04^{a}	0.10^{ab}	0.62^{c}	0.37^{bc}	3.10^{f}	0.05^{ab}
66.6:16.7:16.7	0.03^{a}	0.10^{ab}	0.47^{g}	0.45^{ab}	3.40^{e}	0.06^{a}
100% wheat flour	0.04^{a}	0.06^{b}	0.69^{a}	0.47^{a}	5.50^{b}	0.05^{ab}

CF= Cocoyam flour; GSF= Germinated sorghum flour; FPF= Fermented pigeon pea
Means within a column with the same superscript are not significantly different (p> 0.05).

3.1.2 Nutritional evaluation

Table 5 shows the nutritional evaluation of experimental diets. It was observed that there were no significant differences (p>0.05) in the food intake of rats fed the casein based diets at all the levels of protein. However for the test diets which provided 10% protein, the food intake of the diet formulated with 100FPF cookies was significantly lower (p<0.05) than all other diets in the same group with the exception of that of 16.7CF:16.7GSF:66.6FPF. The reduced food intakes could be as a result of poor palatability of the diets. Rats fed diets from 100CF (which provided 6% protein) had the least food intake. Mercer et al, [26] demonstrated that the dietary concentration of protein or amino acids regulates many aspects of food intake, growth and growth efficiency of rats. They further reported that at very low or very high concentrations of protein in the diet, there is a marked depression in food intake by rats. De Angelis et al, [27] also demonstrated a relationship between the ratio of non-essential amino acids to essential amino acids in a protein and that proteins ability to stimulate food intake. These findings therefore suggest that the low food intake by rats fed diets from 100CF could actually be as a result of the low protein concentration and/or possibly the essential amino acid profile.

With the exception of diets from 10% casein and 50GSF:50FPF, the nitrogen (N) intake of the 100GSF group was significantly higher ($p<0.05$) than all the experimental diets. There was no significant difference ($p>0.05$) in the N intakes of the 10% casein and 50GSF:50FPF groups. The high N intakes could be due could be due to the high food intake by the animals. Nnam [28] observed that high food intake was associated with high mean nitrogen intake.

Diets with high digested N but low urinary N resulted in high nitrogen retention, biological values and net protein utilization as seen with wheat cookies. Similar findings were reported by Onweluzo and Nwabugwu [29]. In the same vein, those diets with low digested N but high urinary N resulted in low nitrogen retention, biological values and net protein utilization as seen with diets from 100CF. It has been reported that lower values of N balance are indicative of lower protein quality [30].

With the exception of test diets made from 100CF, all of the diets compared favourably with the casein diets with respect to protein quality. Some of these test diets even exhibited superior protein quality than some of the casein diets. The rats fed the diet made from 33.3CF:33.3GSF:33.3FPF had the highest biological value (BV) of 96.57%. About four other groups of rats (fed other cookie based diets) had BVs that were not significantly different ($p>0.05$) from these values. The biological values of all the diets were higher than the recommended value of 75% for children [31]. The net protein utilization (NPU) values were also observed to be within the values (>70%) recommended for good food protein and dietary mixture [32]. True digestibility (TD) values were also high and this could be due to the reduction in antinutritional factors which are often responsible for the poor digestibility of proteins [33]. The cookies were generally of good protein quality with high values of BV, NPU and TD.

Table 5. Food Intake and Nitrogen balance of rats fed diets of casein and cookies produced from fermented pigeon pea, germinated sorghum and blanched cocoyam flour blends

Diets	% Protein	Food intake (g)	Nitrogen intake (g)	Fecal nitrogen (g)	Digested nitrogen (g)	Urinary nitrogen (g)	Nitrogen balance (g)	BV (%)	NPU (%)	TD (%)
	10	70.26^{a}	1.12^{a}	0.09^{b}	1.03^{a}	0.11^{a}	0.92^{a}	88.91^{e}	84.12^{cde}	94.62^{de}
100FPF	10	49.92^{b}	0.80^{bc}	0.06^{c}	0.74^{cdef}	0.12^{a}	0.61^{cd}	82.58^{f}	79.00^{e}	95.64^{cd}
50GSF:50FPF	10	63.44^{a}	1.01^{ab}	0.07^{c}	0.94^{ab}	0.11^{a}	0.84^{a}	89.02^{de}	85.90^{bcd}	96.47^{bcd}
66.6FPF:16.7CF:16.7GSF	10	60.85^{ab}	0.97^{ab}	0.05^{cde}	0.92^{ab}	0.07^{bc}	0.86^{a}	93.14^{abcde}	91.13^{ab}	97.88^{abc}
Casein A	10	68.03^{a}	1.09^{a}	0.14^{a}	0.95^{ab}	0.10^{ab}	0.85^{a}	89.84^{de}	83.25^{de}	93.63e
50CF:50GSF	8	64.28^{a}	0.82^{bc}	0.07^{c}	0.75^{bcde}	0.03^{ef}	0.72^{bc}	95.78^{ab}	89.90^{ab}	93.86^{e}
50CF:50FPF	8	45.20^{b}	0.58^{c}	0.04^{cde}	0.54^{f}	0.02^{f}	0.52^{d}	94.99^{abc}	91.03^{ab}	95.85^{cd}
33.3CF:33.3GSF:33.3FPF	8	67.32^{a}	0.86^{bc}	0.06^{cd}	0.80^{bcd}	0.03^{def}	0.78^{abc}	96.57^{a}	92.98^{a}	96.27^{bcd}
66.6GSF:16.7CF:16.7FPF	8	47.91^{b}	0.61^{c}	0.05^{cde}	0.56^{ef}	0.06^{cd}	0.51^{d}	90.08^{cde}	86.44^{bcd}	95.62^{cd}
66.6CF:16.7GSF:16.7FPF	8	48.61^{b}	0.63^{c}	0.04^{def}	0.59^{ef}	0.03^{def}	0.56^{d}	94.51^{abcd}	92.60^{a}	97.98^{abc}
100 WHEAT	8	65.86^{a}	0.84^{bc}	0.04^{def}	0.80^{bcd}	0.04^{def}	0.77^{abc}	95.13^{abc}	93.63^{a}	98.11^{abc}
Casein B	8	60.65^{ab}	0.78^{bcd}	0.02^{f}	0.76^{bcde}	0.06^{cd}	0.70^{bc}	92.80^{abcde}	92.02^{ab}	99.32^{a}
100CF	6	26.30^{c}	0.26^{d}	0.05^{cde}	0.21^{g}	0.04^{def}	0.17^{f}	78.16^{g}	70.08^{f}	89.53^{f}
Casein C	6	68.10^{a}	0.66^{c}	0.03^{f}	0.63^{def}	0.06^{cd}	0.57^{d}	90.68^{bcde}	89.64^{abc}	98.83^{ab}

CF= Cocoyam flour; GSF= Germinated Sorghum flour; FPF= Fermented Pigeon pea flour
Means within a column with the same superscript are not significantly different ($p > 0.05$).
BV=Biological Value; NPU=Net Protein Utilization; TD=True Digestibility
Values are means obtained from 5 rats.

4. CONCLUSION

This study has shown that fermentation and germination of grains generally improved the nutritional quality of cookies produced from them. The use of fermentation and germination of the grains not only reduced the antinutritional factors but also improved the protein quality of the cookies. This study has also opened new possibilities of the application of flours produced from grains used in this study. Cookies produced from such composites will not only increase savings in foreign exchange for countries that rely heavily on the importation of wheat, but will also improve utilization of locally available crops and lead to enhanced nutrient intake by the consumer.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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