EFFECT OF PROCESSING OF LABLAB BEANS AT VARRYING DURATION OF TIMES ON THEIR PROXIMATE COMPOSITION AND ANTI-NUTRITIONAL FACTORS CONTENT

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ABSTRACT
The study was designed to evaluate the effects of processing on the proximate composition and anti nutritional factors in Lablab purpureus seeds. The raw seeds were processed by directly cooking the seed at various duration of time (30, 45 and 60 mins) and by soaking the seed in excess water overnight for about 14hours before cooking at various duration of time (30, 40 and 50 mins). Samples of the raw and processed seeds were analysed for proximate and anti nutritional factors. Result for proximate analysis showed that, the raw lablab seeds contained 93.88%DM, 4.73%Ash, 37.01%CP, 9.67%EE, 6.76%CF and 41.79%NFE. The result for anti nutritional factors revealed that, the raw lablab contained 8.39% Alkaloids, 0.01mg/l00g terpenoids, 0.32mg/l00g, trypsin inhibitor, 8.91mg/l00g cyanide, 1.45% tannin, 18.90mg/l00g oxalate and 0.30% phytate. Generally, both the proximate components and anti nutritional factors analysed were reduced with processing. Directly cooking the lablab seedsfor 30, 45 and 60 minutes yield reduction in both the proximate and anti nutritional factor content. Soaking the seeds before cooking also yields significant reduction in the proximate and anti nutritional factors contents of lablab seeds.
Keywords: Lablab beans, Anti nutritional factors, Proximate compositions.

INTRODUCTION
One of the major problems facing the livestock industry in Nigeria is the increasing unavailability and high cost of conventional feedstuffs like maize, groundnut, soya beans, etc (Bawal *et al*, 2007). This has been attributed to the high level of competition between livestock and man for the same ingredients. The overall effect of this competition is shortage of animal protein production and hence, shortage of animal protein intake due to scarcity and high cost of animal products (Akinmutimi *et al*, 2007).The need therefore, to source for alternative feedstuffs cannot be over emphasized. Such alternative should be cost efficient, available and less competed for by man and industry. Lablab bean can be one of such alternative feedstuff. Lablab bean *(Lablab purpureus)* is an annual leguminous crop that is grown in many tropical and sub tropical areas, particularly in Asia and Africa. It is grown as seed, fodder and vegetable crop. Lablab bean seed is very nutritious and generally estimated to contain 20%-23% protein, 48%-53% carbohydrate and 1.3% fat (Elsiddig *et al.,* 2002). Other nutrient composition of lab lab seed includes; 0.48% calcium and 0.4% phosphorus.The nutritive value of the seed protein is determined by its amino acid content and the magnitude of susceptibility to hydrolysis by the digestive enzymes. However, the nutritional value of *lablab purpureus* beans is shrouded by the presence of anti nutritional factors such as tannin, phytate, trypsin inhibitors, etc which would limit its u se in monogastric nutrition (Shaahu *et al.*,2014*).*Tannin is considered the major anti nutritional factor in lablab bean. Tannin is known to interact with proteins to form Tannin-Protein complexes, which lead to either inactivation of the enzymes or make the protein insoluble (Salunkhe *et al.*,1989). Tannins cause growth depression in animals due to reduction in feed intake of animals. The coat colour of the seed has been associated with tannin content with

the brown seeded cultivar being more tannin containing . Deka and Sarkar (1990) reported that tannin content of five cultivars of lablab bean ranged from 2000-2005 mg/100g, while Elsiddig et *al* (2002) reported a range of 201- 353. Phytate or phytic acid chelates minerals like Calcium, Iron, Magnesium and Zinc. Such chelates make the elements nutritionally unavailable thereby inducing dietary deficiency (Nelson *et al.,* 1999*).* All these anti nutritional factors limit the use of lablab bean in monogastric nutrition.

MATERIALS AND METHODS

This study was conducted at the Livestock Teaching and Research Farm of the university of Agriculture Makurdi, Benue State, Nigeria. Makurdi lies between latitude 7.41° North and longitude 8.3^0 East with ambient temperature range of 17.3^0C to 35.6^0C and a relative humidity of 47-85% and 95 metres above sea level. The area has an annual rainfall of 1200-1500mm.

Cooking

The 25kg of the beans was added in 50 litres of water and then placed on a well stoked fire. Timing commenced immediately the pot was placed on the fire. The beans were cooked at varying duration of times (30,45 and 60 minutes).

Soaking

25kg of the beans were soaked in 50 litres of water overnight for a period of about 14 hours. The beans were then drained and placed in 50 litres of fresh water. The beans were then cooked for varying duration of times (30, 40 and 50 minutes).

Chemical Analysis

Samples of the processed *Lablab purpureus* were oven-dried, weighed and sent for laboratory analysis.

RESULTS AND DISCUSSION

The results of the effect of processing of lablab beans at various duration of time on their proximate composition and anti nutritional factors content are presented in table 1, 2, 3 and 4

Table 1: The proximate and Mineral Composition of Directly Cooked Lablab Seeds (%DM).

Parameter	RS	DC30	DC45	DC60	SEM
DM (%)	93.88	93.60	93.41	92.26	3.48NS
CP(%)	37.01	36.58	36.55	35.76	4.58NS
EE(%)	9.67^{bc}	9.78^{b}	10.78^{b}	11.59^{a}	1.25*
CF(%)	6.76	6.46	5.85	5.65	1.78NS
NFE(%)	41.79	41.84	43.25	44.52	2.87NS
Energy (mj/kg)	17.19	17.41	17.92	18.42	1.98NS
Ca (mg/100g)	22.38	22.22	22.95	21.13	3.11NS
P (mg/l00g)	81.93^{c}	85.43^{b}	86.88^{b}	87.82^{a}	1.88*
Ash (%)	4.73	4.25	4.06	3.75	2.75NS

^{abc}: means with different superscripts within a row are significantly different; SEM: Standard error of mean; RS: Raw seed; DC30: Directly cooked beans for 30 minutes; DC45: Directly cooked beans for 45 minutes; DC60: Directly cooked beans for 60 minutes; DM: Dry matter; CP: Crude protein; EE: Ether extract; CF: Crude fibre; NFE: Nitrogen free extract; Ca: Calcium; P: Phosphorus

Table 2: The Proximate and Mineral Composition of Soaked and Cooked Lablab Seeds (%DM).

Parameter	RS	SC30	SC40	SC50	SEM
DM (%)	93.88	93.55	93.40	92.25	5.17NS
CP(%)	37.01[a]	35.79[b]	34.58[b]	32.19[c]	2.74*
EE(%)	9.67	10.94	10.99	11.61	3.88NS
CF(%)	6.76	6.52	5.77	5.60	2.97NS
NFE(%)	41.79[b]	41.86[b]	43.56[ab]	44.72[a]	1.65*
Energy (mj/kg)	17.19	17.43	17.49	17.59	2.12NS
Ca (mh/100g)	22.38	21.43	21.96	22.22	2.49NS
P (mg/100g)	81.93	81.56	81.77	82.25	3.90NS
Ash (%)	4.73	4.20	4.04	3.63	1.98NS

[abc]: means with different superscripts within a row are significantly different; SEM: Standard error of mean; RS: Raw seed; SC30: Soaked and cooked beans for 30 minutes; SC40: Soaked and cooked beans for 40 minutes; SC50: Soaked and cooked beans for 60 minutes; DM: Dry matter; CP: Crude protein; EE: Ether extract; CF: Crude fibre; NFE: Nitrogen free extract; Ca: Calcium; P: Phosphorus

Table 3: The Anti- nutritional Factor Composition of Directly Cooked Lablab Beans at Various Duration of Time.

Parameters	RS	DC30	DC45	DC60	SEM
Alkaloids (%)	8.39[a]	7.00[b]	6.75[bc]	4.05[c]	1.09*
Terpenoids (mg/100g)	0.01	0.01	ND	ND	0.00NS
Trypsin inhibitor (mg/100g)	0.32	0.28	0.22	0.15	0.02NS
Cyanide (mg/kg)	8.91	8.62	8.44	7.59	2.85NS
Tanin (%)	1.45	1.34	1.33	1.08	0.57NS
Oxalate (100mg/100g)	18.90[a]	18.90[a]	18.90[a]	16.88[b]	1.99*
Phytate (%)	0.42	0.35	0.34	0.30	0.98NS

[abc]: means with different superscripts within a row are significantly different; SEM: Standard error of mean; RS: Raw seed; DC30: Directly cooked beans for 30 minutes; DC45: Directly cooked beans for 45 minutes; DC60: Directly cooked beans for 60 minutes

ND: Not detected

Table 4: The anti- nutritional Factor Composition of Soaked and Cooked Lablab Beans at Various Duration of Time.

Parameter	RS	SC30	SC40	SC50	SEM
Trepenoids (mg/100g)	0.01	0.01	ND	ND	0.00NS
Trypsin Inhibitor (mg/l00g)	0.32	0.25	0.18	0.12	0.05NS
Cyanide (mg/kg)	8.91[a]	8.45[a]	8.04[ab]	5.74[c]	0.97*
Tanin (%)	1.45	1.33	0.85	0.69	0.56NS
Oxalate (100mg/100g)	18.90[a]	18.10[a]	16.85[b]	14.20[c]	1.04*
Phytate (%)	0.42	0.30	0.30	0.30	0.27NS
Alkaloids (%	8.39[a]	5.42[b]	4.41[c]	4.11[c]	1.03*

[abc]: means with different superscripts within a row are significantly different; SEM: Standard error of mean; RS: Raw seed; SC30: Soaked and cooked beans for 30 minutes; SC40: Soaked and cooked beans for 40 minutes; SC50: Soaked and cooked beans for 60 minutes

Proximate Analysis

The proximate analysis showed that, the raw lablab seeds contained 93.8%DM, 4.73%Ash, 37.01%CP, 9.67%EE, 6.76CF and 41.79% NFE.

Dry matter: The dry matter content of the lablab seeds ranged from 93.88% in the raw seeds to 92.26% when directly cooked for 60min and 92.25% in soaked and cooked seeds (SC50). The variations in DM content may mean that the seeds were not equally dried as it is the level of dryness that can affect the dry matter of seeds.

Crude protein: Directly cooking the beans for 30, 45 and 60 min effected a 36.58, 36.55 and 35.76% reduction respectively in the crude protein content of the seeds, while soaking and cooking the seeds for 30, 40 and 50 mins effected 35.79, 34.58 and 32.19 reduction respectively in the crude protein content of the lablab seeds. These decreases in crude protein content of the seeds with boiling could be as a result of leaching of soluble or proteineous part of the seeds into the boiling water. Singh (1990) reported similar reduction when pigeon pea seeds were cooked for at different temperatures.

Anti Nutritional Factors

The level of anti nutritional factors (ANFs) as influenced by boiling periods is in table 5 and 6. Results of anti nutritional determination have revealed that, lablab bean seeds contained alkaloids, terpenoids, trypsin inhibitor, cyanide, tannin oxalate and phytate. This finding confirm the reports of D'Mello (1995) Udeibie and Carlini (2002).Cooking resulted in reduction of all the anti nutritional factors analysed in this study in agreement with Bawa *et al,* (2003) who reported that cooking of lablab beans significantly decreasedthe level of trypsin inhibitor activity, phytic acid, tannin and cyanide.The reduction increased as cooking periods increased.

CONCLUSION

Directly cooking of the lablab seeds and soaking of the seeds in excess water for about 14 hours before cooking had reducing effects on the level of anti nutritional factors measured therby enhancing its utilization.

RECOMMENDATION

Processing of lablab seeds is beneficial and should be done for 60 minutes when the seeds are to be cooked directly in water without soaking and 50 minutes when the seeds are to be soaked in water before cooking.

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