



The Potentials of Raw and Processed (*Coelocaryon preussii*) seeds as Feed for Livestock

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Abstract

*In the sub tropic and perhaps worldwide a novel plant (*Coelocaryon preussii*, warb) has not actually been utilized as food for man, livestock or poultry, though in abundance. Also, the effective utilization of *Coelocaryon preussii* seeds in livestock and poultry feed is limited by the presence of anti-nutrient components which requires some form of processing. The effect of boiling (60 mins), soaking (24hrs) and toasting (30 mins) on proximate composition, gross energy, mineral composition, fibre fractions and anti-nutritional factors (ANFs) of *Coelocaryon* plant (*Coelocaryon preussii*, Warb) were determined with aim of investigating its suitability as a feed ingredient. The raw, boiled, soaked and toasted seeds were dried, milled and chemically analysed. Crude protein contents of raw and processed *Coelocaryon preussii* seed meals range were 14.93 – 20.52% and the crude fibre values ranged between 3.74 and 5.95%. The gross energy content for raw was significantly ($P<0.05$) higher than the processed. The micro and macro mineral composition of boiled *Coelocaryon preussii* seed meal was significantly ($P<0.05$) lower compared to soaking and toasting method. Also, boiled seeds had significantly ($P<0.05$) lower levels of all the toxic substances determined. The results indicate that processing techniques adopted enhanced the proximate composition, caloric components, fibre fractions, mineral contents and significantly ($P<0.05$) lowered the levels of anti-nutrients present in *Coelocaryon preussii* seed meals, with boiling being the best and hence the recommended processing method for use in detoxifying *Coelocaryon preussii* seeds.*

Keywords: Processing methods, Livestock, *Coelocaryon preussii* seed meal

Introduction

Feed accounts for about 70 – 80% of total cost of production in livestock and poultry (Udo *et al.*, 2020). Conventional energy and protein sources are the costliest among the feed ingredients (Ogunbode *et al.*, 2014, Ekeruke *et al.*, 2018). The need then to search for alternative cheap energy and protein sources, is imperative and one of the envisaged alternative feed is *Coelocaryon* seeds (*Coelocaryon preussii*) (Burkill, 1997; CIRAD, 2009).

Coelocaryon preussii is an edible flowering plant found in tropical Africa including Cote D'Ivoire, Nigeria, Cameroon, Central African Republic, Equatorial Guinea, Garbon, DR Congo (Christenhusz *et al.*, 2016). This plant belongs to family

Myristicaceae. The genus *Coelocaryon* comprises five species (*Coelocaryon preussii* or multiforme warb; *Coelocaryon oxycarpum* Stapf; *Coelocaryon sphaerocarpum* Fouilloy; *Coelocaryon botryoides* Vermoesen and *Coelocaryon klainei* Pierre) (Tela Botanica, 2017; Josi-Noelline *et al.*, 2017). The genus *Coelocaryon* is used in traditional medicine to treat various diseases (Burkill, 1997). *Coelocaryon oxycarpum* stems are taken as purgative. The leaves and seeds of *Coelocaryon sphaerocarpum* and *preussii* are used to treat somnolence (Ouattara *et al.*, 2016). These species are trees that grow up to 30 m in height (Jiofack, 2011). The wood is very durable and is commonly harvested mainly for trade. The tree produces wood marketed as “ekoune” or “ekun” which is

suitable for joinery (Jiofack, 2011). In Côte d'Ivoire, the seeds are used to treat diabetes and hypertension (Ouattara *et al.*, 2016).

Coelocaryon preussii fruit has a high socio-cultural value in the region where it is consumed (Josi-Noelline *et al.*, 2017). Indeed, the fruit of the plant, that mature during the month of March and available until the end of June, are picked up and sun-dried by women during this period. The dried fruits are then preserved either for domestic use or sale (Josi-Noelline *et al.*, 2017). They are used preferentially for the preparation of the sauce (soup) for women who have just given birth. According to the users, the consumption of the sauce made with its fruits gives no room for blood clots after the childbirth and a rapid healing of the wounds (Josi-Noelline *et al.*, 2017).

To date, there are no specific studies evaluating the nutritive quality of this alternative feedstuff (*Coelocaryon preussii*). Thus, the need arose to evaluate this feed resource for its optimum utilization in feeding animals. The study reported here was conducted to determine the chemical components, mineral composition, fibre fractions and anti-nutritional factors of *Coelocaryon preussii* seeds, subjected to different processing methods.

Experimental location

Coelocaryon preussii seeds were harvested from fallow land in Obio Akpa, Oruk Anam L.G.A of Akwa Ibom State. Obio Akpa is located between latitude 5°17'N and 5°27' N and between longitude 7°27'N and 7°58'E with an annual rainfall ranging between 3500 and 5000mm and average monthly temperature of 25°C, and relative humidity between 60 and 90%. It is in the tropical rainforest zone of Nigeria (SLUS AK).

Processing methods

The following processing methods were used;

(i) Raw

One kilogramme of raw *Coelocaryon* seeds were dehulled and the nuts subsequently milled to obtain raw *Coelocaryon* seed meal. Triplicate samples were later taken for laboratory analysis.

(ii) Boiling

One kilogramme of raw *Coelocaryon* seeds was introduced into cooking pot whose water has attained boiling temperature (100°C). The content was allowed to boil for 60 minutes before the seeds were decanted. The boiled seeds were sundried and the nuts subsequently milled to obtain boiled *Coelocaryon preussii* seed meal. Triplicate samples were also taken for laboratory analysis.

(iii) Soaking

One kilogramme of raw *Coelocaryon* seed was soaked in 20 litres of water and kept for 24 hours at a room temperature of 22 - 23°C. The soaked water was decanted and samples were withdrawn, sundried and milled to obtain soaked *Coelocaryon preussii* seed meal. Triplicate samples were taken for laboratory analysis.

(iv) Toasting

One kilogramme of raw *Coelocaryon* seed was toasted in a garri frying pot for 15 minutes. The product was dehulled after cooling and the nut milled and used as toasted *Coelocaryon preussii* seed meal. Triplicate samples of the raw, boiled, soaked and toasted seeds were taken for laboratory analyses.

Analytical procedures

The proximate composition of raw, boiled, soaked and toasted *Coelocaryon preussii* were determined using AOAC (2000). The

samples were also analysed for gross energy (McDonald *et al.*, 2011). Van Soest (1994) procedure was employed to determine the fibre fractions of the samples. Iron (Fe), Calcium (Ca), Zinc (Zn), Magnesium (Mg), Iodine (I), Cobalt (Co), Manganese (Mn) of raw, boiled, soaked and toasted *Coelocaryon preussii* seed meals were analysed using Atomic Absorption Spectrophotometer (Model AA280FS; Agilent Technologies). Potassium (K) and Sodium (Na) content of raw and processed *Coelocaryon preussii* seed meals were determined using Jenway flame photometer (Model PFP7; Cole-Parmer, Vernon Hill) in line with the AOAC methods (AOAC, 2000). Total phosphorus range of 0.220 – 0.330nm was determined using Ascorbic acid method by measuring

Results and Discussion

Table 1: Proximate composition of raw, boiled, soaked and toasted *Coelocaryon preussii* seed meals

Parameters	Processing method				SEM
	Raw	Boiled	Soaked	Toasted	
Dry matter (%)	90.07 ^b	80.26 ^d	84.29 ^c	91.29 ^a	0.02
Crude Protein (%)	20.52 ^a	14.93 ^d	19.13 ^b	16.63 ^c	0.04
Ether extract (%)	1.85 ^a	1.26 ^d	1.74 ^b	1.71 ^c	0.01
Crude fibre (%)	5.95 ^a	3.74 ^d	5.57 ^b	4.91 ^c	0.02
Ash (%)	3.38 ^a	2.65 ^d	3.21 ^b	3.04 ^c	0.02
Nitrogen free extract (%)	58.52 ^b	57.68 ^c	54.64 ^d	65.01 ^a	0.06
Gross energy (kcal/g)	4.02 ^a	3.91 ^d	3.95 ^c	3.98 ^b	0.01

^{a, b, c, d} means on the same row with different superscripts differ significantly (P<0.05)

SEM = Standard error of mean

The proximate composition and gross energy of raw, boiled, soaked and toasted *Coelocaryon preussii* seed meals are shown in Table 1. There was significant (P<0.05) difference for all the parameters considered. The values for the raw seeds were significantly (P<0.05) higher than those of the processed seeds with exception of dry matter and nitrogen- free extract. According

the absorbance at 880nm with KH₂SO₄ as standard (James *et al.*, 2008).

Quantitative analysis of tannin, hydrogen cyanide (HCN), saponin, phytate and oxalate of raw, boiled, soaked and toasted *Coelocaryon preussii* seed meal were also assayed by Onwuka (2005); Arntfield *et al.*, (1985); Vantraub and Lapteva (1988); Wheeler and Ferrel (1971) and AOAC (2000).

Statistical analysis

Data obtained in this study were subjected to analysis of Variance (Steel and Torrie, 1980). Duncan's Multiple Range Test was used to separate the significant means among the treatment groups (Duncan, 1955).

to Udo *et al.*,(2020), raw meal of *Coelocaryon preussii* can cause digestive ailment in man and probably same to non-ruminant animals due to the similarities in their gastro- intestinal tract. This necessitates processing of the seeds before incorporating them into animal diets.

The values of processed *Coelocaryon preussii* seed meals decreased significantly

($P < 0.05$) as compared to raw *Coelocaryon preussii* seed meal. The reduction in values may be as a result of solubilization or leaching of nutrient compositions due to water treatment and denaturation during toasting of the samples (Aremu *et al.*, 2015; Solomon *et al.*, 2017; Udo *et al.*, 2020). The crude protein range of 14.93 – 20.52% was in line with that reported for *Coelocaryon oxycarpum* ($16.16 \pm 1.14\%$) (Josi-Noelline *et al.*, 2017). The crude protein reported in the present study may not be adequate enough to support the production of monogastric species but can only serve as a supplementary protein source in monogastric diets (Abaza, 2014; Ekeruke *et al.*, 2018). However, this level is above the 7% CP requirements for ruminants which will provide ammonia required by rumen microorganism to support optimum microbial activity (Njidda, 2010).

The values obtained for crude fat or ether extract (EE) decreases significantly ($P < 0.05$) during processing of *Coelocaryon* seeds. The least value was obtained for boiled seed meals (1.26%). It shows that the seeds could be reckoned with as minor oil seeds (Akinmutimi, 2006). The range of 1.26 – 1.85% recorded for EE in this study was lower than $7.57 \pm 0.20\%$ reported for its synonym (Josi-Noelline *et al.*, 2017). These lower values of EE indicate a poor energy source. Also, the low EE values suggest that medicinally, *Coelocaryon preussii* seed meals will be less susceptible to lipid-related type of spoilage (Okpala and Gibson-Uweh, 2013; Mohamad *et al.*, 2019).

The crude fibre significantly ($P < 0.05$) decreased with the different processing methods. This agrees with the report of Udo *et al.*, (2020). The authors reported the same in rubber seed as an alternative feedstuff. The values obtained from the present study were lower than the reported value for *Coelocaryon oxycarpum* ($46.98 \pm 1.20\%$)

(Josi-Noelline *et al.*, 2017) and a conventional feedstuff like soya bean meal with 6.5% crude fibre, but higher than some conventional feedstuffs such as maize and guinea corn with 2.0% crude fibre, respectively (Olomu, 1995). The values of fibre obtained for raw and processed *Coelocaryon* seed meals tend to be advantageous to monogastric animals especially poultry, since they have low ability to handle fibrous materials (Udo *et al.*, 2018; Amadi *et al.*, 2018).

The ash values obtained for the raw and processed seeds were lower than the earlier worker (Josi-Noelline *et al.*, 2017) who reported $5.09 \pm 0.11\%$. Geographical location, stage of maturity and soil type might be the cause of the variation in ash content (Jubril *et al.*, 2018). The ash content of 2.65 – 3.38% along with other mineral sources will adequately enhance the mineral content of livestock diets.

The nitrogen free extract ranges between 54.64 – 65.01% with seeds toasted being the highest and the soaked seeds the lowest. When compared with other feedstuffs such as groundnut cake (23.84%) (Ameafule, 2005), soya bean meal (28.60%) (Olomu, 1995), *Mucuna utilis* (47.82%) (Akinmutimi, 2001) and *Coelocaryon oxycarpum* ($24.20 \pm 0.64\%$) (Josi-Noelline *et al.*, 2017), it is slightly higher. This implies higher total digestible nutrient when the seeds are used (Mohamad *et al.*, 2019; Udo *et al.*, 2020).

Proximate composition revealed that dried seeds from fruits *Coelocaryon preussii* contained about 80.26 – 91.29% DM for raw and processed seed meals. The high dry matter content is an indication that *Coelocaryon preussii* seeds will be less susceptible to microbial growth and enzyme activity which accelerates spoilage during storage (Sumathy *et al.*, 2015).

For gross energy, the least value occurred in boiled seeds (3.91 kcal/g). This value compared favourably with other feedstuffs such as groundnut cake (2.64 kcal/g)

(Ogbonna et al., 2000), jackfruit seeds (3.44 kcal/g) (Mohamad *et al.*, 2019) and *Coelocaryon oxycarpum* seeds (1.89 ± 1.73 kcal/g) (Josi-Noelline *et al.*, 2017).

Table 2: Fibre fractions composition of raw, boiled, soaked and toasted *Coelocaryon preussii* seed meals

Parameters (%)	Raw	Boiled	Soaked	Toasted	SEM
Neutral detergent fibre (NDF)	31.66 ^a	23.77 ^d	29.17 ^b	25.65 ^c	0.01
Acid detergent fibre (ADF)	17.37 ^a	9.58 ^d	14.83 ^b	11.40 ^c	0.01
Acid detergent lignin (ADL)	3.13 ^a	1.05 ^d	2.83 ^b	1.95 ^c	0.02
Hemicellulose	14.40 ^a	14.20 ^d	14.34 ^b	14.25 ^c	0.02
Cellulose	14.14 ^a	8.53 ^d	12.00 ^b	9.45 ^c	0.03

^{a, b, c, d} means on the same row with different superscripts differ significantly ($P < 0.05$)

SEM = Standard error of mean

The fibre fractions of raw, boiled, soaked and toasted *Coelocaryon preussii* seed meals are presented in Table 2. The values of fibre fractions obtained for raw seeds were significantly higher than those of the processed seed meals. This is an indication of the potential of raw *Coelocaryon preussii* seed meal to support rumen microbial fibre requirement (Gladys, 2018). The NDF (neutral detergent fibre) ranged from 23.77 – 31.66% and the ADF (acid detergent fibre) varied from 9.58 – 17.27%. These values favourably compared with NDF values (23.6 – 43.4%) and ADF values (12.3 – 24.7%) reported by Mahgoub *et al.* (2005) who concluded that ruminant animals fed these levels of dietary fibre had decreased fat content of carcass and non-carcass portions. Also, Bava *et al.* (2001) and Christopher *et al.* (2008) in their various studies reported that feeding ruminant animals with high fibre diet provides not only the substrate that favour growth of cellulolytic microbes, but also increases salivation through eating and ruminating. However, the values reported for NDF were higher than the NDF values of soya bean meal (7.40 – 12.20% on dry matter basis) for monogastric animal nutrition (Van eys *et al.*, 2004; Choct, 2015). It is therefore

difficult to see a great deal of relevance of the NDF value to monogastric animal nutrition especially poultry birds with low capacity to handle diets high in fibre (Choct, 2015).

The result of mineral content (both macro and micro) of raw and processed *Coelocaryon preussii* seed meal is presented in Table 3. Values obtained for minerals indicate significant differences ($P < 0.05$) between the treatment groups in both raw and processed *Coelocaryon preussii* seed meal. However, processing reduced the mineral content of the samples with boiling having the highest reducing effect followed by toasting and soaking. Heat treatment and solubilisation does not destroy mineral, therefore low values of minerals for boiled, toasted and soaked *Coelocaryon preussii* seed meals might be due to leaching of minerals into the water (Saulawa *et al.*, 2014; Olanipekun *et al.*, 2015; Nwafor *et al.*, 2017) and the removal of the seed coat of *Coelocaryon preussii* seeds before toasting (Olanipekun *et al.*, 2015). For macro minerals (Na, K, Ca, Mg and P) soaked *Coelocaryon preussii* seed meal recorded values which were significantly higher

($P < 0.05$) than boiled and toasted *Coelocaryon preussii* seed meal. This implies that the seed meals can enhance good neural conduction and muscular contraction, blood coagulation, bone and teeth formation, better membrane function and carbohydrate metabolism (NRC, 1994; McDonald *et al.*, 1995; Udo *et al.*, 2020). Micro minerals values followed similar pattern like macro minerals in that the soaked seed meals as ingredient in animal diet would enhance

blood formation (because of high value of iron) normal utilization of carbohydrate by livestock/poultry animals (because manganese serves as a co-factor to enzymes responsible for carbohydrate metabolism such as kinase, decarboxylase, peptidase); zinc promotes healing of wounds and also favour good taste, appetite and growth, while cobalt enhances synthesis of vitamin B₁₂ by microorganisms in the rumen (NRC, 1994; McDonald *et al.*, 1995; Udo *et al.*, 2020).

Table 3: Mineral composition of raw, boiled, soaked and toasted *Coelocaryon preussii* seed meals

Parameters	Processing methods				SEM
	Raw	Boiled	Soaked	Toasted	
Sodium (%)	0.23 ^a	0.18 ^d	0.21 ^b	0.19 ^c	0.001
Potassium (%)	0.48 ^a	0.34 ^d	0.40 ^b	0.37 ^c	0.001
Calcium (%)	0.19 ^a	0.16 ^d	0.18 ^b	0.17 ^c	0.001
Magnesium (%)	0.20 ^a	0.17 ^d	0.19 ^b	0.18 ^c	0.001
Phosphorus (%)	0.33 ^a	0.22 ^d	0.29 ^b	0.24 ^c	0.001
Zinc (mg/kg)	39.64 ^a	25.75 ^d	30.79 ^b	27.20 ^c	0.010
Iron (mg/kg)	78.17 ^a	46.31 ^d	61.19 ^b	55.83 ^c	0.020
Manganese (mg/kg)	27.91 ^a	16.58 ^c	17.09 ^b	16.47 ^d	0.013
Cobalt (mg/kg)	18.36 ^a	15.61 ^d	17.12 ^b	16.20 ^c	0.011
Iodine (mg/kg)	5.27 ^a	3.27 ^d	3.85 ^b	3.68 ^c	0.011

^{a, b, c, d} means on the same row with different superscripts differ significantly ($P < 0.05$) SEM = Standard error of mean

Table 4: Anti-nutrients in raw, boiled, soaked and toasted *Coelocaryon preussii* seed meals

Parameters	Raw	Boiled	Soaked	Toasted	SEM
Oxalate (%)	0.158 ^a	0.122 ^d	0.146 ^b	0.137 ^c	0.001
Saponin (%)	0.275 ^a	0.153 ^d	0.207 ^b	0.188 ^c	0.001
Tannin (%)	0.010 ^a	0.007 ^d	0.009 ^b	0.008 ^c	0.001
Phytate (%)	0.196 ^a	0.125 ^d	0.146 ^b	0.140 ^c	0.001
Hydrogen cyanide (HCN) (mg/kg)	5.390 ^a	2.840 ^d	4.40 ^b	3.090 ^c	0.016

^{a, b, c, d} means on the same row with different superscripts differ significantly ($P < 0.05$) SEM = Standard error of mean



Table 4 shows the results of anti-nutrient components present in both raw and processed seeds. Presence of anti-nutrient components such as oxalate, saponin, tannin, phytate and hydrogen cyanide (HCN) was observed. Generally, processing significantly ($P < 0.05$) reduced the anti-nutrient components. This agrees with the studies of Udo *et al.*, (2018) and Udo *et al.*, (2020) who reported a similar trend for rubber seed meals (*Havea brasiliensis*) and cocoyam tubers (*Caladium bicolor*) subjected to different processing methods.

Oxalate is an anti-nutrient compound which under normal conditions is confined to separate places. However, when it is processed and/or digested, it comes in contact with the nutrients in the gastrointestinal tract (Kumar *et al.*, 2017; Ramchandra *et al.*, 2019). After release, oxalic acid binds with nutrient, rendering them inaccessible to the body. If feed with excessive amounts of oxalic acid is consumed regularly, nutritional deficiencies are likely to occur, as well as severe irritation to the lining of the gut (Yilka, 2015). Strong bonds are formed between oxalic acid and various minerals such as calcium, magnesium, sodium and potassium (Yilka, 2015). In the present study, oxalate content ranges from 0.122 to 0.158%. These values were reported to be above the lethal dose for chicken (20 g/kg oxalate) (Acamovic *et al.*, 2004; Njidda, 2010). Ca and carbon are also released from the hydrolysis of Ca oxalate some of which will be either absorbed or excreted by the ruminant animals. With Ca absorption rate of ruminant put at 31% (Njidda, 2010) and P at 4% absorption (Acamovic *et al.*, 2004; Njidda, 2010), reasonable amount of the Ca and P intakes will be lost via faeces and urine to the soil.

Saponin content of *Coelocaryon preussii* seed meals ranges from 0.275 in raw to 0.122% in boiled, 0.146 in soaked and 0.137% in toasted *Coelocaryon* seed meals. Feedstuff containing saponin had been shown to be defaunating agents (Teferedegne, 2000), and capable of reducing methane production (Njidda, 2010). Habtamu and Negussie (2014) reported that saponin have effect on erythrocyte, haemolysis, reduction of blood and liver cholesterol, depression of growth rate, bloat in ruminant by inhibiting smooth muscle activity, enzyme inhibition and reduction in nutrient absorption. Saponin value range of 0.153 – 0.275% for *Coelocaryon preussii* seed meal recorded here is higher than the values of (0.113 – 0.128%) observed in *Caladium bicolor* (Udo *et al.*, 2020).

Tannin values were 0.010% in boiled, 0.009% in soaked and 0.008% in toasted *Coelocaryon* seed meals. Tannins are known to have resistance to heat treatment and decrease the digestibility of protein in human and animal; either by partially making the protein unavailable or by inhibiting the digestive enzymes and thereby increasing faecal nitrogen content (Smith Patel *et al.*, 2013; Yilka, 2015). It is obvious that boiled seeds had significantly ($P < 0.05$) lower tannin and the product was better detoxified by boiling method compared to soaking and toasting method. The results in this study showed that the values were lower than the values reported for jackfruits (0.55%) (*Artocarpus heterophyllus*) (Akinmutimi, 2006). Boiling has been found to reduce the anti-nutritional factors and thereby enhance the nutritional value of feed processed by boiling (Medugu *et al.*, 2013).

The phytate reduction followed similar trend like that of tannin with highest reduction occurring with boiling (0.125%), this shows

some degree of thermostability. Its usage may still result in formation of insoluble salt with minerals like calcium and magnesium making them unavailable for metabolic processes. Magnesium for example is required as a co-factor for the conversion of glucose to glucose-6-phosphate, a major step in glycolysis (Akinmutimi, 2006; Tuleum *et al.*, 2012). The range of phytate from 0.125 – 0.196% for *Coelocaryon preussii* seeds obtained in this study is lower than the values (0.300 – 0.597%) reported for jackfruit seeds (*Artocarpus heterophyllus*) (Akinmutimi, 2006) but higher than 0.01% reported in another research with cocoyam (*Caladium bicolor*) (Udo *et al.*, 2020).

Hydrogen cyanide values were 5.30 mg/kg in raw, 2.840 mg/kg in boiled, 4.400 mg/kg in soaked and 3.090 mg/kg in toasted. The boiled *Coelocaryon preussii* seed meals recorded a lower value for HCN in this study than soaked and toasted seed meals. For the processed seed meal, values obtained in this study for HCN were less than the 50 mg/kg reported as the maximum level tolerated by poultry (Udedibie *et al.*, 2004; Okoli *et al.*, 2012) and close to the tolerated level (2.0 – 4.0 mg/kg/bodyweight) for ruminant animals for boiled and toasted seeds except for raw and soaked seeds (Smith Patel *et al.*, 2013; Udedibie *et al.*, 2004). Cyanide ion above tolerable level inhibits the cytochrome oxidase; stops ATP formation with no supply of oxygen to the tissues therefore causing sudden death in animal (Mudzwiri, 2007; Smith Patel *et al.*, 2013). The range of HCN from 2.840 – 5.390 mg/kg for *Coelocaryon preussii* seed meal obtain in this study was below the range 4.87 – 6.23 mg/kg reported for cocoyam (*Caladium bicolor*) tuber meal (Udo *et al.*, 2020) but the range agrees with the range (3.24 – 4.18 mg/kg) reported for *Colocasia esculenta* (Adejoro *et al.*, 2013).

Conclusion

The results indicate that processing techniques adopted have enhanced the proximate composition, calorie components, fibre nutrients, mineral contents and significantly reduced the anti-nutritional factors in *Coelocaryon preussii* seeds. The seed meal could serve as a good source of supplemented protein with values of 20.52%, 14.93%, 19.13% and 16.63% for raw, boiled, soaked and toasted respectively. Nitrogen free extract is high with 58.52%, 57.68%, 54.64% and 65.01% for raw, boiled, soaked and toasted, respectively with a complementary energy range of 3.91 – 4.02 kcal/kg. However, anti-nutritional components in *Coelocaryon preussii* appeared to be heat labile, and boiling for 60 minutes could make it a safe ingredient in livestock/poultry feed because the HCN value in the boiled *Coelocaryon preussii* seeds was found to be within the permissible value tolerated by livestock/poultry. However, further clinical studies on livestock/poultry with *Coelocaryon preussii* feed is required to validate its use as alternative livestock feed.

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