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In vitro nutraceuticals elemental research of two Bangladeshi plants

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Abstract
The *Anacardium occidentale* L nut phytochemicals screening showed that with Glycosides (-), Tanins (+), flavonoids (+++), Alkaloids (++), Saponins (-) and the proximate composition (%) were as follows: moisture content (9.81 ± 0.2), ash content (3.48±0.3), crude fat (26.76± 0.3), crude protein (14.24 ± 0.01) carbohydrate (by difference) (44.98± 0.01) Calorific (Energy) value 482.18 Kcal. The mineral analysis (mg/100g) revealed that magnesium (3.51 ± 0.01), Manganese (2.00 ± 0.01), Nickel (3.23 ± 0.01) and Cobalt (0.13 ±0.01) while the phytochemical screening for *Carica papaya* seeds extracts also showed Glycosides (+), Tanins (++), flavonoids(++), Alkaloids(++), Saponins(-) for the moisture content (8.48 ± 0.3), ash content (3.95±0.01), crude fat (15.54± 0.2), crude protein (15.82 ± 0.01) carbohydrate (by difference) (41.60) Calorific (Energy) value 1546.87 Kcal. The mineral analysis (mg/100g) revealed that magnesium (3.0 ± 0.01), Manganese (0.21 ± 0.01), Nickel (3.43 ± 0.01) and Cobalt (0.17 ±0.01). The study therefore indicates that the *Anacardium occidentale* L nut and *Carica* may not provide all the nutrients required by human in the right proportion though it contains an appreciable quantity of some essential nutrients like Fats, Proteins, Carbohydrate and some minerals.

Keywords: phytochemicals, *Carrica papaya, Anacardium occidentale* L, elemental analysis

Introduction
Phytochemicals can be referred to as naturally occurring compounds in the plant. They contribute to the color, smell and flavor of plants and are plant natural defense mechanism against most disease with many therapeutic values and diseases prevention for human beings [1]. Few examples of phytochemicals are saponin, tannins, flavonoids, and alkaloids [2]. Most plants have active compounds which are usually extracted from the plant structures such as roots, flowers, seeds or fruits, corms, stem and bark but, the concentration of the active compounds vary from structure to structure. The structure with the highest amount is usually preferred to be used as a therapeutic purpose. The pungent, repulsive smell and bitter taste in many plants are usually responsible for repressive ability over the metabolic activities of many microorganisms [3, 4]. The screening of photochemical compounds helps in knowing the presence of bioactive compounds, which can also be used for antimicrobials analysis of the plant extracts [5]. *Carrica papaya* can be described as an herbaceous fruit crop that comes from the family of Caricaceae. It is native to places like America, which is mostly grown in the tropics in subtropics and tropics [6]. It is also widely distributed in places like Asia, and other continents of the world and it is ranked first amongst major food crops which inite states recommend for deficiency caused by childhood blindness [7, 8]. The plant has some medicinal values such as antibacterial, cardiotonic, analgesic, amebicide, cholagogue, hypotensive, digestive, emenagogue, Febrifuge, vermifuge, pectoral, stomachic and laxative. It is also rich in three vital antioxidants such as vitamin E, vitamin A and vitamin C and some minerals such as potassium and magnesium, it also contains B vitamin, pantothenic acid, fiber and folate. It also contains digestive enzymes like papaintha, which successfully treats allergies, sports injuries, and cause of trauma [6]. Many biological active phytochemicals compounds have been isolated from *C. papaya* and studies for various applications. All the parts of *C. papaya* have been such as leaves, fruits, peal, latex, and roots have been found to have important biologically active compounds, which have various pharmaceutical uses [9]. The cashew plant with botanical name *Anacardium occidentale* L it belongs to the family Anacardiaceae also has the potential for use as a medicinal plant. The stem barks and the leaves have been used for the treatment of diarrhea, bronchitis, dysentery, cough, impotence and syphilis-related skin disorders [10, 11]. Nigeria is the largest

producers of cashew nut in the worlds with its shell where the cashew nut is a popular snack and food source [12]. Cashew nut oils and its many applications in polymer-based friction epoxy resins, varnishes, linings, primers and foundry chemicals [13]. The phytochemicals analysis reveals that it has phenolic glycosides, saponins, phenols, flavonoids [14 15]. In this present study, the comparative analysis of phytochemicals screening, proximate and elemental analysis of *Anacardium occidentale* L nut and Carica papaya seeds extracts were analyzed.

Materials and Methods

Phytochemicals analysis

The phytochemicals analysis for flavonoids, alkaloids, saponins, tanins and glycosides were both tested according to [16].

Elemental analysis

Mineral compositions for Magnesium, Manganese, Nickel and Glycosides of *Anacardium occidentale* L nuts and *Carrica papaya* were determined by atomic absorption spectrophotometer according to [17].

Proximate analysis

After bringing the samples to uniform size, they were analysed for moisture content, crude protein, crude fat, ash content, carbohydrate and energy value according to [17].

Results

Table 1: Qualitative photochemical analysis

Inference	Cashew nut	*Carica papaya*
Flavonoids	+++	++
Alkaloids	++	++
Saponins	_	_
Tanins	+	++
Glycosides	_	+

Key: + present, ++ moderately present, +++ adequately present and – absent.

Table 2: Elemental analysis

Parameter	Cashew nut	*Carica papaya*
Magnesium	3.51 ± 0.01	3.00±0.02
Manganese	2.00 ± 0.01	0.21±0.01
Nickel	3.23 ± 0.01	3.43±0.01
Cobalt	0.13 ± 0.01	0.17±0.01

Table 3: Proximate analysis

Parameter (%)	Cashew nut concentration (%)	*Carica papaya* concentration
Moisture Content	9.81 ± 0.2	8.48±0.3
Crude Fat	26.76 ± 0.5	15.54±0.2
Ash Content	3.48 ± 0.3	3.95±0.01
Crude Protein	14.24 ± 0.01	15.82±0.1
Carbohydrate	44.98 ±0.01	41.60
Energy Value	482.18kcal	1546.87(kcal)

Discussion

The proximate composition of the cashew nut (table) contained crude fat (26.79±0.5) and protein (14.26±0.01). It also contained (9.71±0.2) moisture, ash (3.46±0.3), and carbohydrate by difference (45.78± 0.01). Some of these values were in agreement with those reported by Achal [18]. The moisture content of cashew nut (table) was 7.2%. This value fell within the range of mean values of moisture of legumes (Between 7.0% and 11.0%) reported by Arkroyed and Doughty [19]. Seeds with low moisture content could store for a longer time without spoilage. Ash content of cashew nut (Table) in this study was 3.4%. Previous studies showed ash content of kolanut and cowpea to be 3.1% and 3.2% respectively [20] and of cashew nut flour 4.4±0.1% [21]. An ash content of 1.5 - 2.5% for nuts has been recommended for suitability as animal feeds [22] but with the value of ash reported in this study, cashew nut may be unsuitable for animal feeds. This is in agreement with [21]. The values of fat and protein (Table) were also comparable to those obtained by Pearson [23]. The fat content values ranged from 16.41-44.34%.

Conclusion

The study therefore indicates that the *Anacardium occidentale* L nut and *Carica* may not provide all the nutrients required by human in the right proportion though it contains an appreciable quantity of some essential nutrients like Fats, Proteins, Carbohydrate and some minerals.

Consent

Not applicable

Ethical approval

Not Applicable

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