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# Proximate and Phytochemical Analysis of the Leaves of Justicia carnea Lindi. and Justicia secunda Vahl and its Taxonomic Implications

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Proximate and phytochemical analysis of the leaf extracts of Justcia carnea and J. secunda commonly found in Rivers State, Nigeria was carried out using standard methods. Justicia carnea (Flamingo flower) and J. secunda (blood herb, Christ's blood) belong to the family Acanthaceae. Both species are widely used in folk medicine for the treatment of inflammation, respiratory, and gastrointestinal disorder. The results showed that the content value for carbohydrates was 6.79+0.01 in J. secunda and 3.57+0.03 in J. carnea. Crude protein was 22.33+0.02 and ash was 15.62+0.03 as compared to the values of 17.53+0.02 and 15.01+0.01 respectively in J. carnea. But J. carnea contained higher values of fibre (42.53+0.00) and lipid (8+0.01) than J. secunda (42.21+0.02 and 0.91+0.02) respectively. The moisture content in both plants was relatively higher, 13.55+0.16 and 12.21+0.02 in J. carnea and J. secunda respectively. The qualitative result revealed the presence of alkaloids, saponin, tannin,b flavonoid, cynogenic glycosides and phytate in the two species, while the quantitative result showed the quantity of phytochemicals in Justicia carnea and Justicia secunda as follows; alkaloid (11.17±0.01 and 10.45±0.01), saponin (6.75±0.05 and 0.8±0.00), tannin (132.54±0.04 and 195.22±0.02), flavonoid (7.53±0.03 and 4.33±0.01), cyanogenic glycoside (140.01±0.01 and 230.01±0.01) and phytate (98.25±0.01 and 63.28±0.01) respectively. The presence of some phytochemicals (saponins, alkaloids, flavonoids, cynogenic glycosides, tannins and phytate) and some essential minerals proves that it is really an alternative source of medicine.

Keywords: Acanthaceae, Justicia carnea, Justicia secunda, Proximate analysis, Phytochemhhicals.

## 1. Introduction

Acanthaceae Juss. is a family of dicotyledonous flowering plants commonly called Brazilian plume, flamingo flower, Jacobinia, pine-bur begonia, pink jacobinia, pink tongues, king's crown and cardinal's guard [1]. The family consists of 346 genera and 4300 species [2] and are mainly perennials which are predominant in the tropical and subtropical regions with few species in the temperate [3,4]. The species rich nature of the Acanthaceae family has placed it among the top 12 most diverse plant families all over the globe. Although it is a cosmopolitan plant family, its centers of diversity are Indonesia, Malaysia, Africa, Brazil and Central

America. In West Africa, [5] reported over 30 genera and notable members of interest include Justicia L. (Justicia or shrimp plant), Hygrophila R.Br. (swampweed), Chlamydocardia Lindau, Anisotes Nees, Rungia Nees, Barleriola Oerst, Acanthopale C.B.Clarke, Thunbergia Retz and many more [3].

The taxonomic hierarchy of Acanthaceae has been complex for several reasons particularly due to its population. The family Acanthaceae is made up of four (4) subfamilies namely; Acanthoideae, Avicennioideae, Nelsonioideae and Thunbergioideae with Acanthus as the type genus of the family [3]. In the 18th and 19th century, some taxonomists attempted to classify Acanthaceae and grouped them into suborders, genera and tribes. This classification was based on number of stamens, form of corolla, seeds, absence or presence of retinacula etc. Although significant progress was made, the systematic position and circumscription of Acanthaceae, there has been a challenge in resolving this taxonomic concern mainly due to its complexity of habitat range and considerable variation in morphology and genetics [2,6]. In view of the above, [6] further reported that several attempts to classify Acanthaceae has been done using the pollen morphology at the familial, sub-familial, tribal and sub-tribal levels from time to time.

The medicinal values of Acanthaceae cannot be over emphasized due to its use across the globe in the treatment of lethal diseases. Several scholars have reported that some species of Acanthaceae possess anti-inflammatory, antioxidant, hepatoprotective, anticancer, antimicrobial, antiviral and antidiabetic properties [7,8]. Important secondary metabolites (bio-active compounds) present include flavonoids, phenols, tannins, alkaloids, cardiac glycosides, saponins, quinones etc. have aided the therapeutic potentials of some species.

Justicia carnea is a member species of the genus Justicia in the family Acanthaceae. Herbaceous and perennial in nature and commonly called Jacobinia or Flamingo plant or Hospital too far. Morphologically, J. carnea grows up to 3-6feet tall with evergreen leaves and highly branched stem. The leaves are simple and opposite, elliptic, acute with entire margins, deciduous and pinnate venation. The inflorescence is spike with clustered flowers. The fragrant flower colors are white, pink, apricot, yellow and lavender [7,9]. The difference in flower colour explains that this could be variety forms of J. carnea. The fruits are brown, pod-like in structure with dry or hard surface.

The medicinal properties of J. carnea are enormous and are paramount in southern Nigeria. Recent research has shown that it possesses anti-inflammatory, antimicrobial, hepatoprotective effects, anti-cancerous properties [10-12]. In trado-medicine, decoction of J. carnea is used to boost blood level, aid digestion, dysentery, boost the immune system, influenza, diarrhea etc. [7,13]. Although it is used to boost blood level in southern Nigeria, this application has not been certified and without clinical tests [11].

Justicia secunda is a pantropical species within the genus Justicia. It is erect and grows up to 3-4ft, evergreen leaves, perennial herb and commonly called Jacobinia. Morphologically, the leaves are simple, opposite, acuminate and acute at apex and base and entire margins. Glabrous surface across the stem, petiole and leaves. The flowers are red to pink in colour with terminal panicle inflorescence [14] and at the nodes.

Member species within the genus Justicia shares lots of economic importance as J. secunda is an ornamental plant and grown around domestic homes, gardens and offices. Its beautiful flowers make it attractive to butterflies who act as visitors or pollinators. The traditional use of medicinal plants in treating ailments is the bedrock of herbal traditional medicine and it dates back to the third millennium BC. This shows that plant derived natural products are an integral part of ancient tradition all over the world particularly in China and Egypt [15]. About 50% of the world population are dependent on herbal medicine [16] and 20% of the pharmaceutical drugs are plant based used in cancer harmful disease treatment [17]. The natural products from plants that aids its therapeutic use are known as bioactive compounds or phytochemicals or secondary metabolites.

Plants have occupied a very significant position in human life for a very long time by providing food, medicine, fiber and fodder for domestic animals. Though they have promising nutritive values which could serve as nourishment for the ever-increasing human population, they remain underutilized as a result of lack of awareness and technologies for their utilization. Many plant species are more resilient, adaptive and tolerant to adverse climatic conditions than the conventional foods. It is therefore imperative to explore these underutilized wild foods in order to increase availability of foods and create a balance between population growth and agricultural productivity, particularly in developing countries like Nigeria. Generally, Plants contribute to the mineral, vitamin and fiber contents of diets. For instance, vegetables are excellent sources of minerals and contribute to the recommended dietary allowance (RDA) of the essential nutrients.

The science encompassing the study of phytochemicals is referred to as phytochemistry. Phytochemistry otherwise known as plant chemistry is considered as a subfield of botany or chemistry due to its broad application in both fields [18]. The science involving the application of plants in herbal medicine is called ethno pharmacology and is the bedrock of traditional medicines. Hence the need to assess the phytochemicals present as its gaining wide application in research. The chemicals found in plants are extracted through soxhlet method, maceration, serial exhaustive extraction, decoction, infusion, digestion and percolation [19]. Generally, phytochemicals (secondary metabolites) are analyzed either through qualitative or quantitative methods. Both methods can be achieved via Gas Chromatography (GC), High Performance Liquid Chromatography (HPLC), High Performance Thin Liquid Chromatography (HPTLC) and Optimum Performance Laminar Chromatography (OPLC) [19,20]. These techniques show the presence/absence and volume of the phytochemicals and the amount of their respective constituents.

The essence of this study is to provide more relevant taxonomic information for J. carnea and J. secunda through proximate and phytochemical studies. Proximate and Phytochemical studies as taxonomic lines of evidence have solved taxonomic problems by showcasing the nutrient and metabolites present in plant species. The information generated will aid the taxonomic delimitation of the two species, highlight major nutrient and secondary metabolites present and their relative abundance and pinpoint the metabolites that have helped in the treatment of some ailments traditionally. Hence the research focuses on assessing the proximate and phytochemical compositions of the leaves of J. secunda and J. carnea to ascertain the safety of their uses for medicinal and culinary purposes. The research will serve as a guide to dietetics and nutritionist whether or not to recommend it as sources of drugs and food to the local community.

## 2. Materials and Methods

### 2.1. Sample Collection, Identification and Preparation

A huge amount of new and developed plant leaves were gathered from a farmland at Rumuigbo local location and by the side of the road at Akwaka Junction, Rukpokwu region, all in Port Harcourt. Distinguishing proof and confirmation of the plants was done at the Herbarium in the Department of Plant Science and Biotechnology, Rivers State University. Voucher examples with example number, RSUHb 0203, were stored at the Herbarium. The new and developed underlying foundations of the gathered and recognized plants Justicia secunda and Justicia carnea were washed with refined water, marked in like manner and air-dried in the research facility at encompassing temperature (28-30$^{o}$C) for 30 days. They were grounded into fine powder utilizing clean electric blender under research facility condition. Fifty (50) grams of every one of the powder was blended in with 500ml of Distilled water and ethanol in a clean conelike flagon independently and represent 3 days with discontinuous shaking. The combinations were sifted utilizing channel paper and

amassed in water shower at 70 °C for 3 hours. The concentrates were put in two different very much named clean funnel shaped flagon and refrigerated at 4 °C for additional examination.

### 2.2. Proximate Analysis

The dampness not entirely set in stone by drying at 105°C in a broiler until a consistent weight was reached. For absolute debris assurance, the leaves tests were gauged and changed over to dry debris in a stifle heater at 450 and at 550°C for cremation. The unrefined lipid not entirely set in stone by extraction with hexane, utilizing a Soxhlet contraption. This multitude of judgments were done by [21]. Kjeldahl technique was utilized for unrefined protein assurance. Starch still up in the air by computing the contrast between the amounts of the relative multitude of general structures from 100 percent. Unrefined fiber values were acquired by duplicating the sugar, protein and fat by the Atwater transformation elements of 17, 17 and 37, individually [22].

### 2.3. Phytochemical analysis

The phytochemical screening of the plants for different phytochemical constituents, for example, phytate, flavonoids, alkaloids, cyanogenic glycoside, saponin and tannin was directed involving standard strategies as portrayed by [23,24].

**Test for Alkaloids:** This procedure is as depicted by [25]. 5 gm of the model were weighed into a 250 ml estimating utencil and 200 ml of 10% acidic destructive in ethanol get added and covered and allowed for 4 hrs. Then it gets filtered and the focus get shifted around a water shower to one-fourth of the principal volume. Concentrated ammonium hydroxide then added to concentrate until the precipitation was done. Then it gets allowed to settle down and rushed was accumulated and washed with debilitate ammonium hydroxide and a while later filtered. It is the alkaloid, which was dried and measured.

**Test for Total Saponins:** This procedure is as presented by [26]. The models were ground and 20 g of each were put into a pipe formed container and 100 cm3 of 20% watery ethanol were added. These were stale in heated water shower for 4 hours with interminable mixing at 55°C. The mixture was filtered and it re-isolated with 200 ml 20% ethanol. Then it was lessened to 40 ml under water shower at around 90°C. It was moved into a 250 ml container and 20 ml of diethyl ether gets added and shaken. We recovered liquid layer and discard ether layer. The filtration cycle gets repeated. 60 ml of n-butanol was added. The joined n-butanol gets washed twice with 10 ml of 5% watery sodium chloride. It was then gets heated in a water shower. After scattering and dried to a consistent weight; the saponin not entirely settled.

**Test for Total Tannins:** This methodology is as presented by [27]. 500 mg of the model was weighed into a 50 ml holder. 50 manufacturing plants of refined water were added and shaken for 1 hr. It gets isolated into a 50 ml carafe. Then, 5 ml of mix was pipetted out into a test tube and mixed in with 2 ml of 0.1 M FeCl3 in 0.I N HCl and 0.008 M potassium ferrocyanide. Then it was assessed at 120 nm inside 10 moments.

**Test for Flavonoids:** This technique is as expressed by [28]. The technique depends on the arrangement of the flavonoids - aluminum complex which has an absorptivity greatest at 415nm. 100µl of the example separates in methanol gets blended in with 100 µl of 20 % aluminum trichloride in methanol and a drop of acidic corrosive, and then gets mixed with 5ml methanol. The ingestion at 415 nm gets perused for 40 min. Filtered mix then were ready from 100 ml of test removes and a drop of acidic corrosive, and then mixed with 5ml methanol. All judgments were completed in sets of three.

**Test for Glycosides**: 5gms of the example were weighed into a recepticle and 100ml of refined water were added. The example was soaked for 3hrs and channel to get filtrate. 1 ml of filtrate were pipetted into a test tube, 2 ml of 3,5-DNS were added and bubbled in a water shower for 10-15 minutes, the combination was permitted to cool in the test tube and 10ml refined water were added and the absorbance at 540 mm for glycoside were perused up.

**Test for Phytate:** Two grams (2g) of test were weighed into 100 mL 0.5 M of HCl. The blend was permitted to represent 2 hours, after which it was separated. An aliquot was killed with 0.5 M NaOH and made marginally corrosive with 0.17 M HCl and was weakened to 50 mL. An aliquot was taken in an axis tube, 4 mL FeCl3 arrangement was added and was warmed for 15 minutes at 100oC. It was cooled, centrifuged and disposed of in supernatant fluid. It was washed with 0.5 M and afterward 0.17 M corrosive, centrifuged and dispose of fluid. Two mililitres (2 mL) of water was added to the buildup and hotness a couple of moments at 100oc. Two mililitres (2 mL) of 0.5 M NaOH was added, warmed for 15 minutes, and channel into Kjeldahl cup. It was washed with heated water and held washings in the flagon. H2SO4 with 0.5 mL focus was added and reduced to white exhaust.

### 2.4. Statistical analysis

All determinations were replicated 3 times and results were reported in mean (±) SD.

## 3. Results

The results for the proximate compositions are shown in Table 1, while the results of the phytochemical constituents and their quantities are presented in Tables 2 and 3 respectively.

### 3.1. Proximate Compositions

The proximate analysis showed that both plant samples have high moisture content, though it was slightly higher in J. carnea (13.55+0.16) than in J. secunda (12.21+0.02). The carbohydrate content value of J. secunda (6.79+0.01) was higher than that of J. carnea (3.57+0.03). The result also showed that the leaves of J. secunda contain high protein value of (22.33+0.02) as compared to the leaves of J. carnea which had a lower value of (17.53+0.02). The ash content in J. secunda (15.62+0.03) was slightly higher than that of J. carnea (15.01+0.01) but it indicated that both plants contain appreciable amount of ash in their leaves. The fibre content values of both samples were very high. That of J. carnea (42.53+0.00) was slightly higher than that of J. secunda (42.21+0.02). Lipid was found to ne most abundant in J. carnea (8+0.01) as compared to the total value in J. secunda (0.91+0.02) (Table 1).

Table 1: Proximate compositions of the leaves of *J. carnea and J. secunda*

| Parameters | *J. carnea* | *J. secunda* |
|---|---|---|
| Carbohydrate(%) | 3.57±0.03 | 6.79±0.01 |
| Protein(%) | 17.53±0.02 | 22.33±0.02 |
| Moisture(%) | 13.55±0.16 | 12.21±0.02 |
| Ash(%) | 15.01±0.01 | 15.62±0.03 |
| Lipid(%) | 8±0.01 | 0.91±0.02 |
| Fibre(%) | 42.53±0.00 | 42.21±0.02 |

Results are mean of triplicate determination ± SD

### 3.2. Phytochemical Screening

The result of phytochemical constituents of the leaves of Justicia carnea and Justicia secunda as presented in Table 2 revealed the occurrence of alkaloid, saponin, tannin, flavonoid, phytate and cyanogenic glycoside to be present in the leaves of both species.

Table 2: Result of phytochemical constituents present in *J. carnea* and *J. secunda*

| Parameters | *J. carnea* | *J. secunda* |
|---|---|---|
| Alkaloid | ++ | + |
| Saponin | ++ | + |
| Tannin | + | ++ |
| Flavonoid | ++ | + |
| C. Glycoside | + | ++ |
| Phytate | ++ | + |

++ denotes Highly present, + denotes present

The results of the phytochemical constituents and their quantities are presented in Table 3.

**Alkaloid:** The result of alkaloid for J. carnea and J. secunda, as revealed that there was higher quantity of alkaloid in the leaves of J. carnea which was 11.17 % than in J. secunda which was 10.45 %. Analysis of variance indicated that there was significant difference between the quantity of phytochemical parameters assessed for both species at $p < 0.05$ (Table 3).

**Saponin:** The result of saponin showed that there was higher quantity of saponin in the leaves of J. carnea which was 6.75 mg/kg than in J. secunda which was 0.8 mg/kg. Analysis of variance indicated that there was significant difference ($p < 0.05$) between the quantity of phytochemical parameters assessed for both species (Table 3).

**Tannin:** The result of tannin for J. carnea and J. secunda showed that there was lesser quantity of tannin in the leaves of J. carnea which was 132.58 mg/kg than J. secunda which was 195.22 mg/kg. Analysis of

variance revealed that there was significant difference ($p < 0.05$) between the quantity of tannin assessed for both species (Table 3).

**Flavonoid:** The result of flavonoid for J. carnea and J. secunda showed that there was lesser quantity of flavonoid in the leaves of J. secunda which was 4.33 % than in J. carnea which was 7.53 %. Analysis of variance showed that there was significant difference ($p < 0.05$) between the quantities of phytochemical parameter assessed for both species (Table 3).

**Cyanogenic Glycoside:** The result of cyanogenic glycoside for J. carnea and J. secunda showed that there was higher quantity of cyanogenic glycoside in the leaves of J. secunda which was 230.01 mg/kg than in J. carnea which was 140.01 mg/kg. Analysis of variance indicated that there was significant difference between the quantity of phytochemical parameter assessed for both species $p < 0.05$ (Table 3).

**Phytate:** The result of phytate for J. carnea and J. secunda showed that there was higher quantity of phytate in the leaves of J. carnea which was 98.25 mg/kg than in J. secunda which was 63.28 mg/kg. Analysis of variance indicates that there is no significant difference ($p < 0.05$) between the quantity of phytochemical parameter assessed for both species (Table 3).

Table 3. Result of the quantitative phytochemical analysis of the sample (Composition in mg/100 g)

| Parameters | *J. carnea* | *J. secunda* |
|---|---|---|
| Tannin | 132.54±0.04 | 195.22±0.02 |
| Flavonoid | 7.53±0.03 | 4.33±0.01 |
| Alkaloid | 11.17±0.01 | 10.45±0.01 |
| Saponin | 6.75±0.05 | 0.8±0.00 |
| Phytate | 98.25±0.01 | 63.28±0.01 |
| C. Glycoside | 140.01±0.01 | 230.01±0.01 |

## 4. Discussion

### 4.1. Proximate Compositions

By and large, the healthful nature of food materials might be assessed by biochemical examination of the nourishment for general creation. The consequences of general examination (in %) of J. carnea and J. secunda leaves are displayed in Tables 1.

The leaves contained higher measure of rough fiber which were 42.53+0.00 in J. carnea and 42.21+0.02 in J. secunda. These plants are great wellspring of unrefined fiber when consumed on the grounds that sufficient admission of dietary fiber can bring down the serum cholesterol level, coronary illness, hypertension, stoppage, diabetes and bosom caner [29]. The unrefined fiber content acquired from this study recommends that the leaves of these plants are expected wellsprings of dietary fiber (roughages), and it additionally shows

that they might help processing, assimilation of water from the body and mass stool. Fiber mellow stool and consequently, forestalls blockage [29]. Significant degree of fiber is known as against tumorigenic and hypocholestrolaemic specialist [30].

The Proximate examination directed on the leaves showed that the leaves of J. secunda contained higher measure of carbs which was 6.79+0.01, higher than J. carnea which was 3.57+0.03. Sugar comprises a significant class of normally happening natural mixtures that are fundamental for the support and food of life in plants and creatures and furthermore give unrefined components to numerous businesses [31]. The leaf is a decent wellspring of carb when consumed in light of the fact that it meets the Recommended Dietary Allowance (RDA) values [32]. Sugars Provides energy and guideline of blood glucose in people, breakdown of unsaturated fats. Sugars are the human body's primary wellspring of energy.

The high dampness content in the leaves of J. carnea and J. secunda (13.55+0.16 and 12.21+0.02) individually, represents their short time span of usability as it falls apart effectively after gather in the event that additive measures are not utilized. This high-water content elevates powerlessness to microbial growth and proteins exercises. Nonetheless, dampness content of the leaves additionally relies upon their gathering time, development period and ecological circumstances, for example, stickiness and temperature in developing period and capacity conditions [33]. The dampness content showed the capacity of the leaves can be accomplished via cautious decrease in dampness content to keep away from microbial growth and decay. Dampness rich food varieties are effectively defenseless to microbial assault and go spoiled and harmed, henceforth the need to realize the dampness content of the plant to help human utilization. Low dampness food varieties typically delayed down growth of miniature living beings consequently the requirement for investigation and control of food dampness.

The rough protein content (%) of leaves of J. secunda was moderately higher than that of J. carnea, and it was given as 22.33+0.02 and 17.53+0.02 separately. Nonetheless, the leaves are considered as a decent wellspring of protein since they give us over 12% of caloritic esteem from protein [34]. Protein is a fundamental supplement required by every living thing and the essential primary material from which all body tissues are shaped. Protein is required for the inventory of energy and sufficient measure of required amino acids [35]. The human body needs protein for growth and upkeep of tissues, proteins additionally help biochemical response that happens inside and outside of the cells body, proteins for least globulins or antibodies to battle contamination, without these antibodies microorganisms and infections would be allowed to duplicate and overpower the human body with illnesses they cause.

The Proximate examination directed on the leaves showed shifting amounts in the structure of lipids as 8+0.01 and 0.91+0.02 in J. carnea and J. secunda individually. Leaves of J. carnea have more lipid substance than J. secunda. Lipids are significant in diet as energy sources and as wellsprings of fundamental unsaturated fats and fat-solvent nutrients, which will quite often connect with fats. Inside the body, lipids work as an energy

save, direct chemicals, communicate nerve driving forces, pad fundamental organs, and transport fat-dissolvable supplements. These plants can be handily consolidated in weight lessening diet.

The rough Ash content (%) of the leaves was 15.62+0.03 and 15.01+0.01 in J. secunda and J. carnea separately. The Ash substance of the leaves showed that they are plentiful in mineral components, and as such smart for utilization for people. The investigation of debris content in food varieties is essentially the consuming with smoldering heat of natural substance, leaving inorganic minerals. This decides the sum and kind of minerals in food; It is significant on the grounds that how much minerals can decide physiochemical properties of food varieties, as well as retard the growth of microorganisms. Debris content addresses the complete mineral substance in food varieties, hence deciding the debris content might be significant for quite some time. Ashing is the initial phase in setting up a food test for explicit essential investigation. Since specific food varieties are high specifically minerals, debris content becomes significant.

### 4.2. Phytochemical Analysis

Alkaloid in the leaves of J. carnea was viewed as more prominent in amount than J. secunda. The presence of alkaloids in this verdant vegetable shows its utilization for restorative purposes like pain relieving, against uncontrollable, hostile to malignant growth and bactericidal effects [36]. Alkaloids are known for their harmfulness, yet not all alkaloids are poisonous, some of them are viewed as enemies of supplements because of their activity on the sensory system [38]. Certain mammalian enzymic exercises, for example, phosphodiesterase, which delays the activity of CAMP, are restrained by alkaloids [39].

Saponin was found in higher amount in the leaves of J. carnea. An extremely low amount was found in J. secunda. The outcome concurs with crafted by [8]. Saponins are phytochemical with underlying variety and organic exercises [39] answered to have antidiabetic [40], cell reinforcement [41], antiobesity, antimicrobial [42] and against hyperlipidemic jobs. Saponins were found in the leaves of J. carnea in copious amounts and this could serve as a natural source of the aforementioned pharmacological actions. An appreciable amount of tannin was found in the leaves of J. secunda and a lesser amount in J. carnea. Tannins are polyphenolic compounds that have astringent, diuretic, anti-inflammatory, antiseptic, antioxidant and haemostatic properties. They are also used for treatment of gastric and duodenal tumors [36,42]. A higher quantity of flavonoid was found in J.carnea whereas a reduced quantity was observed in J. secunda. The flavonoids are polyphenolic compounds and have been recognized to possess pharmacological properties like antioxidative, hepatoprotective, antibacterial, anti-inflammatory, anticancer and also potential antiviral properties [36,42], besides their well-known antioxidant activity. Cyanogenic glycoside was greater in quantity in J. secunda than in J. carnea. Hydrogen cyanides are released when fresh plant materials that contain cyanogenic glycosides are macerated permitting the reaction between enzymes and cyanogenic glycosides [43]. Phytate was found in higher quantity in J. carnea than in J. secunda. Phytate can inhibit polyphenol oxidase which causes oxidative browning in fruits and vegetables and reduces the oxidative reactions that are catalyzed by iron [44].

## 5. Conclusion

This review showed that J. secunda and J. carnea have incredible possibilities in supplementing protein and mineral insufficiencies pervasive in the emerging nations. They are additionally great wellsprings of dietary fiber to people. They ought to be joined into the human weight control plans to work on the quality and accordingly work on the general wellbeing and general prosperity of individuals. Plants have contributed monstrously to the clinical field. The species utilized in this study were found to contain the significant constituents expected to battle different sorts of lack in people. The phytochemical screening and quantitative investigation of the leaves of J. carnea and J. secunda showed that the presence and amount of these synthetic substances are entirely sensible, which proposed that the passes on of these plants can make important commitments to worked on broad wellbeing and prosperity of people. This study showed that J. carnea and J. secunda separates have alkaloid, saponin, tannin, flavonoids, cyanogenic glycosides and phytate. These phytochemicals have antianemic possibilities, loaning assurance to the utilization of these plant removes in people medication for the administration of hemolytic pallor.

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