



## EVALUATION OF PROXIMATE AND PHYTOCHEMICAL COMPOSITION OF LEAVES *ANNONA SENEGALENSIS* PERS.

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### ABSTRACT

Phytochemistry and nutritional composition of *Annona senegalensis* pers leaves was investigated. The proximate analysis (carbohydrates, fats, crude protein, moisture, dry matter, crude fiber, nitrogen free extract and ash) of the leaves were determined using standard methods. The proximate analysis results reveals the presence the percentage of dry matter is 92.3%, moisture content is 7.79%, crude fibre is 33.0%, crude protein 2.7%, ash content is 2.0%, ether content is 2.0% and carbohydrate is 55.0% in the leaf of *annona senegalensis*. The air-dried plant material was extracted using 85% ethanol. The percentage yield of the extract was estimated to be 8.3%<sup>w/w</sup>. The phytochemical screening reveals the presence saponin, terpenoid, cardiac glycoside, tannins, flavonoid, carbohydrate while anthraquinone and alkaloids were not found in the ethanolic extract of *annona senegalensis*. The presence of these important nutrients could be used as a nutritionally valuable and healthy ingredient to improve poultry health and growth performance. The phytochemicals found in the ethanolic extract have been implicated in having many medicinal and toxicological importance

**Keywords;** anonna, proximate, elemental, phytochemistry, extract

### INTRODUCTION

The diversity of forests especially in plant life is an essential assets to both human and animals as they depend directly or indirectly on these forests for survivals<sup>1</sup>. Humans currently use tens of thousands of plant species for multiple purposes such as food, fuel, fibers, oil, forage and medicine. Forest ecosystem renders services of industrial, pharmaceutical cultural and socio-economic important to man contribution to the world economy. In the tropic alone, it has been estimated that 25000 plants species are used in traditional medicines<sup>2</sup>. Medicinal plants are of great importance to the health of individual and communities. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body. The most important of these bioactive constituents of plant are alkaloid, tannins, flavonoids and phenolic compounds<sup>3</sup>. Many of these indigenous medicinal plants are used as species and food plants. They are also sometimes added to food meant for pregnant and nursing mothers for medicinal purposes<sup>4</sup>. The family *annonaceae* commonly known as the "sour sop family" has for long utilize by communities in forest areas where it is found<sup>5</sup>. The economic importance of the *annonaceae* is derived from the considerable range of non-timber product obtainable from its species. The non-timber products include kernel edible fruits and medicines. *Annona senegalensis* pers (*Annonaceae*) is a perennial shrub widely grown in Nigeria where it is commonly known as gwandan daji among the hausa speaking people and abo ewe-aso by the Yorubas<sup>6,7</sup>. The plant is used in folk medicine for the treatment of several ailments like guinea worm, diarrhea, snakebite, headache and respiratory infection. The leaves are used for treatment pneumonia; white gum from the bark is used in sealing cuts and wound<sup>7</sup>

### MATERIALS AND METHODS

#### Sample Collection and Identification

Fresh leaves of *Annona senegalensis* pers used in this study were collected in December, 2011 in Durum village of Bauchi state of Nigeria. The plant specimen was identified by a plant taxonomist, Prof. S. S. Sanusi, Department of Biological Science, while it was ethically cleared by the Chemistry Department and the voucher specimen No. 9961A was deposited at the Post-Graduate Research Laboratory, Department of Chemistry, and University of Maiduguri.

#### Extraction and Phytochemical analysis

The air dried plant material (about 300g) were pulverized into fine powder of was soxhlet extracted with 85% ethanol and the extract was concentrated in vacuo at 40°C using a rotary evaporator. The extract concentrate was labeled and the percentage yield was calculated in w/w. The ethanolic extract was further subjected to qualitative chemical screening for identification of the secondary metabolites such as flavonoids, alkaloids, sterols, triterpenes, saponins, anthraquinones, tannins, polyuronides, emodol, etc as described by Ioan, Sofowora, a&b; Trease and Evans<sup>8,9,10,11</sup>.

#### Proximate Composition determination

The air-dried leaves were and ground into fine powder. About 10.0g of the grounded leaves was exhaustively processed for various parameters according to the Association of Official Analytical Chemists methods<sup>12</sup>. The proximate analysis (carbohydrates, fats, crude protein, moisture, dry matter, crude fiber, nitrogen free extract and ash) of the leaves were determined using AOAC methods. Using weight difference, moisture and ash were obtained. The fiber content was estimated from the loss in weight of crucible and its content on ignition. Carbohydrate was determined when the sum of the percentage of moisture, ash,

crude protein and fats were subtracted from 100. The nitrogen value, which is the precursor for protein of a substance, was determined by microkjeldahi method, involving digestion, distillation and finally titration of the sample<sup>12,13</sup>. The nitrogen value was converted to protein by multiplying with a factor of 6.25. The determination of crude lipids content of the sample was done using soxhlet type of direct solvent extraction method. The solvent used was petroleum ether (boiling range 40-60°C). While the nitrogen free extract was calculated indirectly by difference as the sum of crude protein, fibre, fats and ash subtracted from 100. The result of proximate value was all estimated as percentage<sup>12,13</sup>.

**RESULT AND DISCUSSION**

The proximate analysis results reveals the presence the percentage of dry matter is 92.3%, moisture content is 7.79%, crude fibre is 33.0%, crude protein 2.7%, ash content is 2.0%, ether content is 2.0% and carbohydrate is 55.0% in the leaf of *Annona senegalensis*. The result is summarized in table 1 below. The protein content in leaves could have supplementary effect for the daily protein requirement of the body.. The symptoms of protein energy malnutrition such as kwashiorkor and marasmus. The presence of these important nutrients like carbohydrate, protein in the leaves of *annona senegalensis* means that leaves could be used as a nutritionally valuable and healthy ingredient to improve poultry health and growth performance.

**Table 1: Proximate composition of *Annona senegalensis* pers**

| S/N | Parameters       | % content |
|-----|------------------|-----------|
| 1.  | Dry matter       | 92.3      |
| 2.  | Moisture content | 7.7       |
| 3.  | Crude fibre      | 33.0      |
| 4.  | Crude protein    | 2.71      |
| 5.  | Ash content      | 2.0       |
| 6.  | Ether content    | 2.0       |
| 7.  | Carbohydrate     | 55.5      |

The percentage yield of the extract was estimated to be 8.3%<sup>w/w</sup>. The phytochemical screening reveals the presence saponin, terpenoid, cardiac glycoside, tannins, flavonoid, carbohydrate while anthraquinone and alkaloids were not found in the ethanolic extract of *annona senegalensis*,. Phenolic compounds are a class of antioxidant agents which act as free radical terminators<sup>14</sup> and are considered as a major group of compounds that contribute to the antioxidant activities of plant materials because of their scavenging ability on free radicals due to their hydroxyl groups<sup>15</sup>. Flavonoids are a group of polyphenolic compounds with known properties of free radical scavenging, antibacterial and anti-inflammatory action<sup>16</sup>. Tannins are plant polyphenols, which have ability to form complexes with metal ions and with macro-molecules such as proteins and polysaccharides<sup>17</sup>. Dietary tannins are said to reduce feed efficiency and weight gain in chicks<sup>18</sup>. Saponins also have haemolytic activity against RBC<sup>19</sup>. Saponin-protein complex formation can reduce protein digestibility<sup>20</sup>. The phytochemicals found in the ethanolic extract have been implicated in having many medicinal and toxicological importances

**Table 2: Phytochemical analysis of ethanolic leaf extract of *Annona senegalensis***

| S/N | Phytochemical                                  | Inference |
|-----|--|-----------|
| 1.  | <b>Test for Alkaloids</b>                      |           |
|     | Dragendorff Reagent                            | -         |
|     | Mayers Reagent                                 | -         |
| 2.  | <b>Test for flavonoid</b>                      |           |
|     | Shinoda test                                   | +         |
|     | Sodium Hydroxide test                          | +         |
|     | Lead acetate test                              | +         |
|     | Ferric Chlorides test                          | +         |
| 3.  | <b>Test for carbohydrate</b>                   |           |
|     | General Test (Molish test)                     | +         |
|     | Test of monosaccharide (Barfoed test)          | +         |
|     | Test for reducing sugar (Fehling test)         | +         |
|     | Combine reducing sugar test                    | -         |
|     | Test for ketoses                               | -         |
|     | Test for pentose                               | -         |
| 4.  | <b>Test for tannins</b>                        |           |
|     | Ferric chloride                                | +         |
|     | Lead acetate                                   | +         |
|     | Hydrochloric acid test                         | -         |
| 5.  | <b>Test for free Anthraquinones (Bontrase)</b> | -         |
|     | <b>Test for combine Anthraquinones</b>         | -         |
| 6.  | <b>Test for cardio-active glycoside</b>        |           |
|     | Salkowski test                                 | -         |
|     | Liebermann Burchard test                       | -         |
| 7.  | <b>Terpenoid test</b>                          | +         |
| 8.  | <b>Test for soluble starch</b>                 | -         |
| 9   | <b>Test for phlobatannins</b>                  | +         |
| 10. | <b>Test for saponins</b>                       | +         |

Key - Absent, + Present


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