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Nutritional value estimation of the leaves and seeds of *Solanum surattense*

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Abstract
The nutritional value estimation of the leaves and seeds of *Solanum surattense* was assessed by determining proximate and phytochemical composition. The result indicates that the protein content of the leaves and seeds and 11.11% and 12.83%, respectively other finding are carbohydrate, 75.08% and 71.74%, crude fiber 33.91% and 20.24%, Total Ash 11.85 and 11.24% of the leaves and seeds respectively. Mineral analysis revealed the order Ca>P>K>Na in the leaves and seeds. Phytochemical analysis revealed high levels of Ascorbic acid.

Keywords: *Solanum surattense* proximate and phytochemical composition.

1. Introduction
The wild plant serves as an indispensable constituent of the human diet supplying the body with minerals, vitamins and certain hormone precursors, in addition to protein and energy [14, 15, 24]. However, many of these inexpensive nutritive wild plants are yet to be adequately studied and utilized.

Solanum surattense is an herbaceous prickly perennial herb with prominent nodes and internodes, young branches covered with numerous hair (trichomes). Leaves are petiolate, exstipulate, alternate and some what ovate with irregularly toothed wavy margin. The flowers usually blue or bluish purple in colour, have five regular parts and are up to 1-2 cm wide. The fruit is round fleshy berry upto 2 cm in diameter and yellowish when ripe. The seeds are brown and numerous. It is a common species, grows everywhere; *Solanum surattense* has medicinal value. Stems, flowers and fruits are bitter and carminative. It is employed in cough, asthma, and pain in the chest, being used in the form of a decoction. The leaves serve as fodder and browse for domestic herbivorous animals. *Solanum surattense* is also useful in dengue fever, acute bronchitis and fever accompanied by a chest infection. The extract of its fruits has anticancer and stimulates the cardiovascular system. Though information on the pharmacological properties seems to abound in literature, there is little information on this plant. The present study, therefore aimed at assisting in closing this gap in knowledge on *Solanum surattense*. The information will highlight the usefulness or otherwise of this underutilized plant.

2. Material and Methods
For the estimation of nutritional value different protocol was used. The leaves and seeds were cleaned destalked weighed and oven dried at 60 ^{o}C for 24 hours.

After drying, the leaves and seeds were ground separately in a fine powder form and stored in an airtight container, kept in a desiccator until analyzed.

Moisture content determination involved drying a known weight of the sample to a constant weight at 60 ^{o}C in an oven (Gallen Kamp hot box) Determination of Ash content involved incineration in a muffle furnace (Gallen Kamp box) at 55 ^{0}C for 8 hours. Crude fat determination involved soxhlet extraction of a known weight of sample with petroleum ether and methanol mixed properly in the ratio 1:1. Determination of crude protein was done using the micro Kjeldahl nitrogen method which involves the digestion of a given weight of the sample with concentrated H_2SO_4 and a catalyst to convert any organic nitrogen to ammonium sulfate, $(NH_4)_2SO_4$ in solution followed by the decomposition of ammonium sulfate with NaOH. The ammonia liberated was distilled into 5% boric acid. The nitrogen from ammonia was reduced from titration of the trapped ammonia with 0.05N HCl using methylene red and methylene blue (double indicator solution) indicator. The value of nitrogen obtained was

multiplied by the general factor (6.25) to give the % crude protein.

Crude fiber was obtained from the loss in weight on ignition of dried residue remaining after digestion of fat free samples with 1.25% each of sulfuric acid and sodium hydroxide solutions under specified condition i.e.

$$\%\,\text{crude fibre} = \frac{\textit{Loss of weight of ignition}}{\textit{Weight of sample used}} \times 100$$

Carbohydrate content was determined by subtracting the total ash content, crude fat, crude protein and crude fiber from the total dry matter. For the Phytochemicals, Alkaloids, and Flavonoids were determined by the method of [16]. The mineral element constituents (Ca, K, Na, P) in *Solanum surattense* leave and seed were analyzed separately using atomic absorption spectrophotometer (Hitachi 26100 model) after acid digestion of sample.

Table 1: Proximate Composition of *Solanum surattense* (leaves and seeds)

Parameter	% Dry matter of Leaves	% Dry matter of Seeds
Ash content	11.85	11.24
Crude fat	1.96	4.19
Crude protein	11.11	12.83
Crude fibre	33.91	20.24
Carbohydrate	75.08	71.74
Moisture Content	48.89	52.22

Table 2: Phytochemical Composition of *Solanum surattense* (leaves and seeds)

Phytochemical	Composition (mg/100 g) of Leaves	Composition (mg/100 g) of Seeds
Alkaloids	2.62	1.07
Flavonoid Kaempferol	0.67	0.72
Flavonoids Quercetin	0.79	0.28
Amino Acid	37.18	25.38
Ascorbic Acid	79.18	96.41

Table 3: Element Composition of *Solanum surattense*

Mineral Element	Composition (mg/100 g) of Leaves	Composition (mg/100 g) of Seeds
Calcium, Ca	1.17	1.52
Potassium, K	0.19	0.22
Sodium, Na	0.10	0.02
Phosphorus, P	0.39	0.51

3. Result and Discussion

Proximate composition of leaves and seeds of *Solanum surattense* is as presented in Table 1. Ash content, crude fiber and carbohydrate, higher in leaves and crude fat, crude protein and moisture content is higher in seeds. Mineral element analysis as shown in Table 3 indicates that *Solanum surattense* contains high levels of calcium and result of phytochemical evaluation are presented in Table 2. The result indicates that Ascorbic acid level were high in *Solanum surattense*.

4. Conclusion

This study showed that the leaves and seeds of *Solanum surattense* contain appreciable levels of nutritive content. The study further revealed that it is a good source of mineral content. In summary, therefore, the plant has high nutritional values and is recommended as a cheap source of plant protein, energy and mineral element such as calcium, sodium, magnesium and phosphorus.

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