Chemical Profile of *Tridax procumbens* Linn

C. Ikewuchi Jude, C. Ikewuchi Catherine and M. Igboh Ngozi

Department of Biochemistry, Faculty of Science, University of Port Harcourt, P. M. B. 5323, Port Harcourt, Nigeria
Department of Biochemistry, Faculty of Science, Abia State University, P. M. B. 2000, Uturu, Nigeria

**Abstract:** The proximate, mineral and phytochemical composition of *T. procumbens* was investigated. The proximate profile included moisture (90.05±0.00% WW and 65.23±0.20% DW), crude protein (34.57±0.00% WW and 34.57±0.00% DW), crude fat (6.0±0.02% WW and 8.03±0.20% DW), total carbohydrate (5.10±0.02% WW and 51.26±0.20% DW), crude fibre (0.61±0.04% WW and 8.13±0.40% DW), total metabolizable energy value (39.56±0.26 kcal/100 g WW and 397.59±2.6 kcal/100 g DW) and a total ash content of 0.20±0.02% WW and 2.01±0.20% DW, which is rich in sodium (5.02 mg/100 g WW and 50.4 mg/100 g DW), potassium (3.18 mg/100 g WW and 31.82 mg/100 g DW) and calcium (2.09 mg/100 g WW and 20.96 mg/100 g DW). The phytochemical screening revealed the presence of alkaloids, carotenoids, flavonoids (catechins and flavones), saponins and tannins. It is richly endowed with carotenoids (9.41 mg/100 g WW and 94.57 mg/100 g DW) and saponins (10.30 mg/100 g WW and 103.52 mg/100 g DW). This result suggests the likelihood of this plant serving as a potential source of protein supplements and pro vitamin A (carotenoids) to the population. It also indicates that dehydration can improve the nutritional quality of *Tridax procumbens*.

**Key words:** Chemical profile, proximate composition, *Tridax procumbens*

**INTRODUCTION**

*Tridax procumbens* Linn (Composite) is a common grass found in the tropics. Traditionally, it is used for the treatment of bronchial catarrh, dysentery, malaria, stomach ache, diarrhoea, high blood pressure and to check haemorrhage from cuts, bruises and wounds and to prevent falling of hair. It possesses antiseptic, insecticidal, parasitical and hepatoprotective properties and has marked depressant action on respiration (Salahdeen *et al.*, 2004; Edeoga *et al.*, 2005; Ravikumar *et al.*, 2005; Saxena and Albert, 2005). In the present study, we investigated the proximate, mineral and phytochemical composition of *T. procumbens*.

**MATERIALS AND METHODS**

Samples of fresh *Tridax procumbens* plants were collected from within the Abuja Campus of University of Port Harcourt, Port Harcourt, Nigeria. They were identified at the University of Port Harcourt Herbarium, Port Harcourt, Nigeria. After rinsing them of dirt, the leaves and stems were separated and stored for subsequent use. Proximate analysis of the leaf and stem samples for moisture, crude protein, fat, ash, fiber and total carbohydrate contents were carried out in triplicates according to standard methods (AOAC, 2006). The energy value was calculated using the Atwater factors of 4, 9 and 4 for protein, fat and carbohydrate respectively (FAO/WHO/UNU, 1991; Chaney, 2006a). The phytochemical screening of a portion of the leaf samples was carried out as described by Sofowora (1980) and Harborne (1973). They were screened for alkaloids, carotenoids, flavonoids (catechins and flavones), saponins and tannins. Quantitative determination of carotenoids, saponins and tannins were carried out in triplicates, using the method of AOAC (2006). A portion of the leaf samples was dried and milled into fine powder, using a stainless steel miller. 1 g of the resultant powder was weighed into pyrex culture tubes after which 1 ml of redistilled concentrated nitric acid was added. The tubes were sealed with cling film and kept overnight at room temperature in a fume hood. They were transferred to a hot block at 120°C and heated to dryness. Another 1 ml of concentrated HNO₃ was added and the tubes were heated to dryness at 150°C. This was repeated twice, until the heated samples no longer gave off red brown (ferrous oxide) fumes and the sample was light brown to yellow in color. 1 ml of HNO₃/HClO₃ (50/50) solution was then added and the block temperature was increased to 180°C, to allow the samples digest for about 2 hours. As soon as the digests became clear to light yellow in color, the temperature was increased to 240°C and the samples were heated to dryness. The tubes were then removed from the block and allowed to cool. The resultant ash was dissolved in 0.25 ml of concentrated HCl. 20 ml of 5% HNO₃ was added to the resulting solution, and allowed to stand. Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES), Model TL 6000 Jarrell-Ash, was calibrated with standard reference solution of known concentrations to prepare a standard curve, after which the clear digests were drawn into the machine, to determine their mineral contents.
Table 1: Proximate composition of Tridax procumbens leaves and stems

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Stem (WW)</th>
<th>Stem (DW)</th>
<th>Leaf (WW)</th>
<th>Leaf (DW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture (%)</td>
<td>88.50±0.02</td>
<td></td>
<td>90.05±0.00</td>
<td></td>
</tr>
<tr>
<td>Total ash (%)</td>
<td>0.56±0.01</td>
<td></td>
<td>0.20±0.02</td>
<td>2.01±0.20</td>
</tr>
<tr>
<td>Crude protein (%)</td>
<td>4.38±0.03</td>
<td>37.4±0.26</td>
<td>3.44±0.00</td>
<td>34.57±0.00</td>
</tr>
<tr>
<td>Crude lipid (%)</td>
<td>0.10±0.01</td>
<td>0.65±0.09</td>
<td>0.09±0.02</td>
<td>0.63±0.20</td>
</tr>
<tr>
<td>Total carbohydrate (%)</td>
<td>4.8±0.01</td>
<td>41.0±0.09</td>
<td>5.10±0.02</td>
<td>51.2±0.20</td>
</tr>
<tr>
<td>Crude fiber (%)</td>
<td>1.92±0.03</td>
<td>16.4±0.26</td>
<td>0.61±0.04</td>
<td>6.1±0.40</td>
</tr>
<tr>
<td>Total metabolizable energy (kcal/100g)</td>
<td>37.6±0.81</td>
<td>321.5±5.21</td>
<td>39.5±0.28</td>
<td>397.5±2.81</td>
</tr>
</tbody>
</table>

Values are means ± SD of triplicate determinations.

RESULTS AND DISCUSSION

The proximate composition of the leaves and stems of Tridax procumbens is given in Table 1. Its moisture content is greater than those of Aamaranthus hybridus and Tefleria occidentalis, but comparable to those of Talinum triangulare (Oguntona, 1998) and Pennisetum purpureum (Okaraanya and Ikewuchi, 2009). The moisture content of food is an index of water activity (Olutola et al., 1991) and is used as a measure of stability and susceptibility to microbial contamination (Uraih and Izuagbe, 1990). The implication of this high moisture content is that:

- T. procumbens may have a short shelf-life due to its high moisture content.
- Dehydration would increase the relative concentrations of the other food nutrients and improve the shelf-life/preservation of the T. procumbens meal.

The ash content of T. procumbens is less than those of A. hybridus, T. occidentalis, T. triangulare (Oguntona, 1998) and P. purpureum (Okaraanya and Ikewuchi, 2009). The crude protein content in T. procumbens is less than those reported for A. hybridus and T. occidentalis, but greater than those of T. triangulare (Oguntona, 1998) and P. purpureum (Okaraanya and Ikewuchi, 2009). Our result (Table 1) also shows that the relative proportion of protein can even be increased further by dehydrating the T. procumbens sample. Thus when dehydrated, T. procumbens can serve as a good source of protein, with a 100 g dry sample being able to meet the daily protein requirement of 23-56 g (FAO/WHO/UNU, 1991; Chaney, 2006a). The total carbohydrate content is greater than those reported for T. triangulare and P. purpureum, but less than A. hybridus, (Oguntona, 1998; Okaraanya and Ikewuchi, 2009). Its crude fat content is less than those of A. hybridus, T. occidentalis, T. triangulare (Oguntona, 1998).

The mineral composition of T. procumbens leaves is shown in Table 2. The calcium content is less than that reported for Boerhavia diffusa and Commelina nudiflora (Ujowundu et al., 2008). It contains less sodium than that reported for B. diffusa and C. nudiflora (Ujowundu et al., 2008). Its potassium content is more than those of B. diffusa and C. nudiflora (Ujowundu et al., 2008). The level of magnesium recorded here is less than those of B. diffusa and C. nudiflora (Ujowundu et al., 2008). The phytochemical screening of the leaves of T. procumbens revealed the presence of alkaloids, carotenoids, flavonoids (catechins and flavones), saponins and tannins (Table 3). The result of the quantification of some of the phytochemicals is shown in Table 4. The carotenoid content is higher than that of Vernonina amygdalina (Ejoh et al., 2007). Carotenoids provide many brilliant animal colors, as in the flamingo, starfish, lobster and sea urchin and are precursors of vitamin A (Chaney, 2006b). β-Carotene is used as a food colorant. T. procumbens has very high saponin content. It is higher than that reported for V. amygdalina (Ejoh et al., 2007), but less than what we reported for P. purpureum (Okaraanya and Ikewuchi, 2009). Saponins are known to reduce the uptake of certain nutrients like glucose and cholesterol, and so may help in lessening the metabolic burden that would have been placed on the liver (Price et al., 1987). We found low tannin content in this plant. It is lower than those reported for Trichosanthes anguina fruits (Ojiako and Igwe, 2008).
Table 4: Quantitative Profile of Phytochemicals Found in Tridax procumbens Leaves

<table>
<thead>
<tr>
<th>Phytochemical</th>
<th>Composition (mg/100 g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wet weight</td>
</tr>
<tr>
<td>Carotenoids</td>
<td>9.41</td>
</tr>
<tr>
<td>Saponins</td>
<td>10.30</td>
</tr>
<tr>
<td>Tannins</td>
<td>0.47</td>
</tr>
</tbody>
</table>

Values are Means of triplicate determinations

and C. odorata (Apori et al., 2000). Processing methods such as soaking, boiling and fermentation lower the tannin contents of foods (Esenwah and Ikenebomeh, 2008).

**Conclusion:** our results indicate that *T. procumbens* can serve as a good source of plant protein and potassium supplement, as well as being potential source of pro vitamin A (carotenoids) to the population.

**REFERENCES**


