Plants have been used throughout history in traditional medicine for the treatment of a wide range of illnesses and diseases. Different parts of plants contain secondary metabolites that are part of the plants defense mechanism to fight against various environmental threats (1) and some of these secondary metabolites are known to have medicinal benefits. The consumption of plants by humans, particularly fruits and vegetables, for their antioxidant value is common practice (2). Natural antioxidants counter the effects of free radicals that promote oxidative damage and are involved in the pathogenesis of many diseases such as cancer, Alzheimer’s and diabetes (3, 4). In developing countries, high levels of infectious diseases and the high mortality rate during pregnancy and childbirth in addition to cancer and chronic respiratory diseases account for most deaths (5). Most people in these countries usually turn to natural products for treatment and cure when faced with health-related problems due to accessibility and cost effectiveness.

*Bridelia micrantha* (known as ‘uMhlalamagwababa’ in isiZulu) is a fast growing shade tree from the plant family Euphorbiaceae. *B. micrantha* is generally found along the swamp forests in the Eastern Cape, KwaZulu-Natal and Limpopo Province in South Africa. *Sideroxylon inerme* (known as ‘uMhlalamagwababa’ and ‘Amasethole-amhlophe’ in isiZulu) is a slow growing, evergreen tree that belongs to the plant family that comprises 1100 species and 53 genera (6). *S. inerme* is found along the coast of South Africa from the Cape Peninsula to Northern Zululand. Both these plant species have similar looking berry-like fruits that ripen in summer, turn black when ripe and produce milk sap. These two plant species are often confused due to morphological similarities, even by traditional healers who use these species interchangeably.

Different parts of *B. micrantha* and *S. inerme* are used traditionally to treat a variety of ailments; the bark is used to treat burns, wounds, venereal diseases, tapeworms, toothache and diarrhea (7). The leaf sap is used to treat sore eyes and the roots are used to treat stomach pains, gastric ulcers and headaches. The herbalists of Western Nigeria use the stem bark to prepare decoctions that are used to prolong pregnancy to full term (8).

Phytochemical studies have not been done on *S. inerme* despite its role in traditional medicine. However, preliminary screening of crude extracts...
has indicated the presence of two phytochemicals, epigallocatechin gallate and procyanidin B (9). Previous studies done on *S. inerme* species have indicated the presence of triterpenoids and sterols which are used as chemotaxonomic markers (10). The main aim of this study was to isolate, characterize and identify the phytochemicals in the leaves, stem bark, roots and fruits of the two plant species, *B. micrantha* and *S. inerme*, to evaluate if they can be used interchangeably in traditional medicine. The isolated compounds were also assessed for their antioxidant activity to determine the plants potential as natural antioxidants.

**EXPERIMENTAL**

**General experimental procedures**

Nuclear magnetic resonance (NMR) spectra were recorded using a Bruker AVANCE III 400 MHz or 600 MHz spectrometer in deuterated chloroform (CDCl₃) or deuterated methanol (MeOD) with tetramethylsilane (TMS) as the internal standard. Ultraviolet – Visible (UV-Vis) spectra were obtained on a UV-Vis-NIR Shimadzu UV-3600 spectrophotometer. Infrared (IR) spectra were recorded using a Perkin Elmer Universal ATR spectrometer. Gas chromatography – mass spectrometry (GC-MS) data were recorded on an Agilent GC-MSD apparatus equipped with a DB-5MSIL MS (30 m × 0.25 mm i.d., 0.25 µm film thickness) fused silica capillary column. Helium (2 mL/min) was used as a carrier gas and methanol (MeOH) or dichloromethane (DCM) were used to dissolve the samples. The injector was kept at 250°C whilst the transfer line was at 280°C. The column temperature was held at 50°C for 2 min, and then ramped to 280°C at 20°C/min where it was held for 15 min.

**Sample collection**

The stem bark, leaves, roots and fruits of both plants (*S. inerme* and *B. micrantha*) were collected from various sites in KwaZulu-Natal, South Africa. The plants were identified by a taxonomist, Prof A. Nicolas, from the School of Life Sciences, University of KwaZulu-Natal (UKZN), Westville campus and voucher specimens (Shelembe B1 and Shelembe B2) were deposited in the ward herbarium.

Plant materials were dried at room temperature for three weeks, thereafter, ground samples were sequentially extracted exhaustively with hexane, DCM and MeOH. The aqueous MeOH extract was partitioned with equal volumes of DCM followed by ethyl acetate (EtOAc). All extracts were concentration by rotatory evaporation, dried, and then subjected to column chromatography (Merck Kieselgel 60, 0.063-0.200 mm, 70-230 mesh ASTM). Fractions were profiled using thin layer chromatography (TLC) (Merck silica gel 60, 20 × 20 cm F254 aluminium sheets) and spots were visualized using 10% H₂SO₄ in MeOH and anisaldehyde spray reagent (12.5 mL anisaldehyde and 25 mL H₂SO₄ in 1 L of distilled water).

**Screening of plant extracts**

**Test for steroids and triterpenoids**

About 2 mg of dry plant extract was dissolved in acetic anhydride, heated to boiling then cooled. Concentrated H₂SO₄ (1 mL) was added to the mixture and the formation of a green color indicated the presence of steroids whilst a reddish pink color indicated the presence of triterpenoids.

**Tests for alkaloids**

**Dragendorf’s test**

The formation of an orange or orange to red precipitate on addition of 5 mL of distilled water, 2 M HCl (till a reaction is observed) and 1 mL of Dragendorf’s reagent to approximately 2 mg of methanolic extract indicated the presence of alkaloids.

**Mayer’s test**

The formation of a white or pale yellow precipitate on addition of a few drops of Mayer’s reagent to approximately 2 mg of methanolic extract indicated the presence of alkaloids.

**Test for phenols**

The appearance of a bluish green color on addition of FeCl₃ to approximately 2 mg of methanolic extract indicated the presence of phenolic compounds.

**Test for flavonoids**

The appearance of a pink color on addition of 5 mL of 95% ethanol, a few drops of concentrated HCl and 0.5 g of Mg turnings to approximately 2 mg of methanolic extract indicated the presence of flavonoids.

**Isolation and purification of compounds from *S. inerme***

The hexane extract (10.66 g) and DCM extract (7.58 g) of leaves were combined due to similar TLC profiles. The combined extract was subjected to column chromatography and separated using a hexane : ethyl acetate step gradient starting with
100% hexane and stepped by 10% to 100% ethyl acetate. Ten mL fractions were collected for each solvent system and the purity of each fraction was examined by TLC. Fractions with similar retention factors (Rf) were combined and concentrated using a rotatory evaporator. Two compounds were isolated, compound \( A1 \) (10.23 mg) in fractions 10-17 and compound \( A2 \) (10.66 mg) in fractions 55-57.

The same procedure was followed for the combined hexane and DCM extracts of the stem bark (11.50 g) and roots (9.5 g). After elution, fractions 35-37 from the stem bark yielded compound \( A2 \) (16.23 mg), fractions 42-43 yielded compound \( A3 \) (12.70 mg) and fractions 56-60 yielded compound \( A4 \) (20.50 mg). After elution, fractions 22-24 from the roots yielded compound \( A2 \) (5.33 mg) and fractions 31-32 yielded compound \( A3 \) (4.99 mg).

Approximately 100 mL of the aqueous methanol extract of the stem bark was partitioned with an equal volume of DCM, in triplicate, to afford the DCM fraction (10.34 g). This fraction was subjected to column chromatography using a hexane : ethyl acetate step gradient, starting with hexane (80%): ethyl acetate (20%) and stepped by 20% to 100% ethyl acetate. Fifty fractions of 20 mL each were collected and fractions 1-26 were combined to yield compound \( A5 \) (23.01 mg).

**Isolation and purification of compounds from B. micrantha**

The MeOH extract of the leaves and stem bark were combined due to similar \( Rf \) values on the TLC plate. The combined extract (124 g) was subjected to column chromatography using silica gel as the stationary phase and a hexane : ethyl acetate solvent system starting with hexane (10%) : ethyl acetate (90%) and stepped by 10% to 100% ethyl acetate. Fifty fractions, 5 x 20 mL for each solvent system, were collected and fractions 34-44 were combined and further purified using Sephadex as stationary phase to produce two compounds \( B1 \) (5.12 mg) and \( B2 \) (10.20 mg).

The hexane and DCM extracts from the roots (10.66 g) were combined due to similar \( Rf \) values on the TLC plate and subjected to column chromatography. The compounds were eluted with a hexane : ethyl acetate solvent system starting with 100% hexane that was stepped by 20% to 100% ethyl acetate. Sixty fractions, 10 x 20 mL for each solvent system, were collected and profiled using TLC. Fractions with similar profiles were combined and concentrated using a rotatory evaporator. Fractions 9-10 produced compound \( B3 \) (7.55 mg) and fractions 54-55 produced compound \( B4 \) (8.04 mg).

**Antioxidant activity**

**Radical scavenging activity by 2,2-diphenyl-1-picrylhydrazyl (DPPH)**

The scavenging ability of the crude extracts of \( S. inerme \) and \( B. micrantha \) and compounds \( A5, B1 \) and \( B2 \) was measured using the DPPH stable free radical method outlined by Murthy (3) with few modifications. This method is one of the quickest methods of evaluating antioxidant activity because of its widely used index and stability (2). A volume of 300 µL of methanolic solution of crude extract at different concentrations ranging from 15 µg/mL to 1000 µg/mL was mixed with 900 µL of a methanolic solution of DPPH (0.10 mM) and kept in the dark for 30 min. The absorbance was then measured at 517 nm against MeOH and DPPH as a control using a spectrophotometer. Each sample was evaluated in triplicate. The percentage scavenging activity of the radical was determined by the following formula:

\[
\% \text{ Scavenging} = \left( \frac{A_{\text{Control}} - A_{\text{Sample}}}{A_{\text{Control}}} \right) \times 100
\]

A good indicator of the strength of the radical scavenging activity is the IC\(_{50}\) value which is the amount of antioxidant necessary to decrease the initial DPPH absorbance by 50% (11). The IC\(_{50}\) value was determined graphically by plotting the absorbance of DPPH as a function of sample concentration in µg/mL for the standard and samples.

**Radical scavenging activity by hydrogen peroxide**

The scavenging activity of the extracts and isolated compounds towards hydrogen peroxide radicals was determined according to the method of Khan et al. (12) with some modifications. A solution of hydrogen peroxide (2 mM) was prepared in phosphate buffer (50 mM, pH 7.4). Plant extracts or isolated compounds of various concentrations (0.4 mL) were added into a test tube containing 0.12 mL of 50 mM phosphate buffer, to which, 3.6 mL of the hydrogen peroxide solution was added then vortexed. The absorbance of hydrogen peroxide at 230 nm was measured after 15 min. Phosphate buffer with hydrogen peroxide was used as a blank and ascorbic acid as a positive control. The percentage scavenging activity of hydrogen peroxide was determined by the following formula:

\[
\% \text{ Scavenging} = \left( \frac{A_{\text{Control}} - A_{\text{Sample}}}{A_{\text{Sample}}} \right) \times 100
\]

where \( A_s \) is the absorbance with sample and \( A_0 \) the absorbance without sample.

**Reducing power using the ferric ion reducing antioxidant power (FRAP) assay**

Different extracts and isolated compounds of both \( B. micrantha \) and \( S. inerme \) in different concen-
trations ranging from 15 to 1000 µg/mL were mixed with 2.5 mL of 0.2 M phosphate buffer and 2.5 mL of 1% potassium ferricyanide. The solutions were incubated at 50°C for 20 min. Thereafter, 2.5 mL of 10% trichloroacetic acid (TCA), 2.5 mL of a previously prepared solution and FeCl₃ were added and the solutions were kept aside for 10 min. The absorbance was measured at 700 nm with ascorbic acid as a positive standard.

Statistical analysis
All experimental measurements were carried out in triplicate. Analysis of variance (ANOVA) was performed on data and p-values < 0.05 were considered significant. The means were separated by Tukey’s post-hoc test to determine significant differences. All statistical analyses were performed using the Statistical Package for the Social Sciences (PASW Statistics, Version 22, IBM Corporation, Cornell, New York).

RESULTS AND DISCUSSION
Phytochemical screening of secondary metabolites
The phytochemical screening of S. inerme and B. micrantha revealed the presence of the different classes of compounds present in the extracts (Table 1). The results indicate the presence of triterpenes in both plant species. S. inerme tested positive for sterols and alkaloids and B. micrantha tested positive for flavonoids.

Structure elucidation of compounds from S. inerme
Compound A1 was isolated as a dark yellow oily solid with a mass of 10.23 mg. The IR spectrum showed a broad absorption band at 3462 cm⁻¹ (O-H stretch) and 1648 cm⁻¹ (C=C). GC-MS data showed molecular ion peak [M⁺] at m/z 568.9 which is in agreement with the molecular formula C₃₀H₄₆O₂. This data together with ¹H-NMR and ¹³C-NMR data that corresponded with those in the literature (13-15) confirmed compound A1 to be lutein. Lutein is one of the major carotenoids known for its antioxidant activity. Previous studies have shown that lutein prevents age-related macular degeneration (16-18).

Lutein has previously been isolated from many plant species including Sideroxylon spinosum of the Sideroxylon species (19).

Compound A2 was isolated as a white crystalline solid with a mass of 32.22 mg. The ¹H-NMR spectrum showed characteristic resonances for a pentacyclic triterpene with seven methyl resonances between δH 0.7-1.20 ppm but no double bond or carbonylic proton resonances. The ¹³C-NMR spectrum showed a carbonyl resonance at δC 213.14 ppm which was assigned to C-3 due to HMBC correlations. The carbonyl group was further confirmed by the IR spectrum which showed an absorption band at 1714 cm⁻¹ (C=O). GC-MS data showed molecular ion peak [M⁺] at m/z 426 which is in agreement with the molecular formula C₂₉H₄₈O. This data together with NMR data that corresponded with those in the literature (20, 21) confirmed compound A2 to be friedelin. This compound has previously been isolated from Maytenus ilicifolia (22) and Quercus suber (1).

Compound A3 was isolated as a white powder with a mass of 17.69 mg. The ¹H-NMR spectrum showed characteristic resonances for sterols at δH 5.33 ppm (H-6) and a multiplet at δH 3.50 ppm (H-3). The double doublets at δH 4.98 ppm (H-21) and δH 5.12 ppm (H-20) indicated the sterol to be stig-
masterol. The IR spectra showed a broad absorption band at 3432 cm⁻¹ (OH group) and a band at 1459 cm⁻¹. GC-MS data showed molecular ion peak [M⁺] at m/z 426 which is in agreement with the molecular formula C₃₀H₄₈O₆. This data together with NMR data that corresponded with those in the literature (20, 23) confirmed compound A3 to be stigmastanol. Stigmastanol is one of the most ubiquitous phytosterols and has been isolated from numerous plant species (24).

Compound A4 was isolated as a white powder with a mass of 20.50 mg. The ¹H-NMR spectrum showed characteristic resonances for the oleanane-type pentacyclic triterpene with a vinylic proton resonance at δ₇ 5.10 ppm (H-12), a carboxylic proton resonance at δ₇ 3.20 ppm (H-3), a double doublet at δ₇ 2.81 ppm (H-18) and eight methyl resonances. Resonances at δ₇ 145.1 and δ₇ 121.6, δ₇ 139.5 and δ₇ 124.3 ppm in the ¹³C-NMR spectrum were assigned to C-13 and C-12, respectively. This corroborated the presence of a δ⁸-double bond of the olean-12-ene-type and indicated the presence of a mixture of α and β-amyrin in a ratio of 80 : 20%. The IR spectrum showed a broad absorption band at 3263 cm⁻¹ (OH group) and a band at 1459 cm⁻¹ (C=O). GC-MS data showed molecular ion peak [M⁺] at m/z 426 which is in agreement with the molecular formula C₃₀H₄₈O₆. This data together with NMR data that corresponded with those in the literature (20, 23) confirmed compound A4 to be a mixture of α and β-amyrin.

Compound A5 was isolated as a brown oily liquid with a mass of 23.01 mg. The ¹H-NMR spectrum showed 3 methyl singlets resonating at δ₇ 0.82 ppm (H-13), 1.09 ppm (H-12) and 1.23 ppm (H-10). Vinylic proton resonances were observed at δ₀ 6.06 ppm (s, H-4), 5.81 ppm (d, H-7) and 5.80 ppm (dd, H-8). Two doublets resonating at δ₀ 2.26 ppm and 2.42 ppm integrated to one proton each. The HSQC spectrum correlated these 2 protons to the same carbon at δ₇ 49.80 ppm (C-2). The HSQC spectrum correlated protons resonating at δ₀ 4.21, 4.38, 5.80, 5.81 and 6.06 ppm to carbon resonances at δ₇ 62.7 ppm (C-11), 68.0 ppm (C-9), 135.7 ppm (C-7), 129.6 ppm (C-8) and 124.6 ppm (C-4), respectively. The ¹³C-NMR and DEPT spectra showed 3 quaternary carbons resonances at δ₇ 41 (C-1), δ₇ 78 (C-6) and δ₇ 162 (C-5) ppm; 4 olefinic carbon resonances between δ₇ 124 and 163 ppm, of which 3 were methine resonances (C-4, C-7, C-8) and one was a quaternary carbon resonance (C-5); a methylene at δ₇ 62.5 ppm (C-11) bearing a hydroxyl group that correlated with the proton at δ₀ 4.22 ppm and a methine at δ₀ 68.0 ppm (C-9) that correlated with the doublet at δ₀ 4.37 ppm. GC-MS spectral data showed molecular ion peak [M⁺] at m/z 239 and base peak at m/z 207 which was in agreement with molecular formula C₁₃H₂₂O₄. The fragmentation pattern as well as spectroscopic and physical data of compound A5 were consistent with those reported in literature for apocynol B (25) confirming compound A5 to be apocynol B.

Apocynol B has not previously been isolated from plant extracts, but was obtained from enzymatic hydrolysis of apocynoside II. Apocynoside II was isolated from the roasted leaves of *Apocynum venetum* L. by Murakami and co-workers (25). Biological testing has not been done on these compounds, but compounds from this class are known to possess anti-obesity activity. They are good inhibitors of pancreatic lipase and adiposity differentiation which hydrolyzes and stores fats in the small intestines (26).

**Structure elucidation of compounds from *B. micrantha***

Compound B1 was isolated as a yellow solid with a mass of 5.12 mg and compound B2 was isolated as a yellow powder with a mass of 10.20 mg. The ¹H-NMR spectra of compounds B1 and B2 exhibited characteristic resonances for a flavonol. The aromatic region exhibited the ABX system with protons resonating at δ₀ 7.76 ppm (H-2′), δ₇ ppm 7.66 (H-6′) and δ₇ 6.91 ppm (H-5′) due to dissubstitution of ring B and a meta-coupled pattern with protons resonating at δ₀ 6.41 ppm (H-8) and δ₇ 6.21 ppm (H-6) due to dissubstitution of ring A. The ¹³C-NMR spectra indicated the presence of 15 and 21 carbon signals for compounds B1 and B2, respectively, which resolved 5 methylene and 10 quaternary carbon resonances in the DEPT90 and 135 experiments for compound B1. For compound B2, the resonance at δ₀ 4.9 ppm (H-1′) due to the anomeric proton indicated the presence of a glycosidic linkage. This was confirmed by resonances between δ₀ 3.2a3.7 ppm (H-2”- H-6”). The carbon resonance at δ₇ 6.25 ppm (C-6”) was shown to be a methylene indicating that the sugar is a glucose attached at position 3 as confirmed by HSQC and HMBC correlations.

The [M⁺] ion at m/z 302 for compound B1 is in agreement with the molecular formula C₁₃H₂₂O₄ for quercetin and the [M⁺] ion at m/z 465 for compound B2 is in agreement with the molecular formula C₁₃H₂₂O₄ for quercetin-3-O-glucoside. The physical and spectroscopic data for compounds B1 and B2 matched those published in the literature (27, 28) therefore, these compounds were identified as the
aglycone, quercetin and its glycoside, quercetin-3-O-glucoside, respectively.

Compound B3 was isolated as a white amorphous powder with a mass of 7.55 mg. The 1H-NMR spectrum showed characteristic resonances for the oleanane-type pentacyclic triterpene with a vinylic proton resonance at δ_H 5.23 ppm (H-12), a carbonylic proton resonance at δ_H 3.18 ppm (H-3), a double doublet at δ_H 2.21 ppm (H-18) and seven methyl resonances. The 13C-NMR spectrum showed resonances at δ_C 126.9 ppm (C-12), δ_C 139.6 ppm (C-13) and δ_C 180.8 ppm (C-28), which corroborated the presence of a δ^2-double bond and carboxylic acid functionality. The IR spectrum showed a broad absorption band at 3462 cm⁻¹ (OH group) and a band at 1703 cm⁻¹ (C=O). GC-MS data showed molecular ion peak [M⁺] at m/z 456 which is in agreement with the molecular formula C₂₀H₂₈O₅. These data together with NMR data that corresponded with those in the literature (20, 23) confirmed compound B3 to be oleanolic acid.

Compound B4 was isolated as a white amorphous powder with a mass of 8.04 mg. The 1H-NMR spectrum showed characteristic resonances for the

Figure 1. Results of the antioxidant activity of the methanolic extracts and compounds isolated from S. inerme and B. micrantha as determined by the DPPH method. Different letters indicate mean separation by Tuckey’s post-hoc test at the 5% level

Figure 2. Results of the antioxidant activity of the methanolic extracts and compounds isolated from S. inerme and B. micrantha as determined by the hydrogen peroxide method. Different letters indicate mean separation by Tuckey’s post-hoc test at the 5% level
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An oleanane-type pentacyclic triterpene with the presence of a Δ12-double bond. Spectral data for compound B4 was similar to that of compound B3, except for the signals corresponding to the lactone ring at C-21. The IR absorption band at 1766 cm⁻¹ and the peak at δC 181.8 ppm in the ¹³C-NMR spectrum showed the presence of a γ-lactone ring. The formation of the lactone ring with the carboxyl group at C-17 was confirmed by the key HMBC correlation at δH 4.21 ppm (H-21) with the carboxyl carbon at δ 181.8 ppm (C-28). GC-MS data showed molecular ion peak [M +] at m/z 454.34 which is in agreement with the molecular formula C₃₀H₄₆O₃. These data together with NMR data that corresponded with those in the literature (20, 29) confirmed compound B₄ to be acacic acid lactone.

Antioxidant activity

The antioxidant activity of the crude MeOH extracts of the stem bark of B. micrantha and S. inerme and selected isolated compounds were measured by three assays namely DPPH, hydrogen peroxide and FRAP. For both plant species, the scavenging effect of the extracts and tested phytocompounds increased with increasing concentrations (Figs. 1 and 2). The higher antioxidant activity of the S. inerme stem bark extract could be attributed to the stabilizing effect of apocynol B that has four hydroxyl groups capable of donating protons thereby reducing the DPPH radical. The higher antioxidant activity of the B. micrantha stem bark extract could be attributed to the two flavonoids present in this extract. Of the two flavonoids, the activity of the glycoside for all concentrations is much higher than the aglycone and even ascorbic acid. This indicates that the sugar moiety enhances the antioxidant activity of the compound. It would appear that the effect of the compounds in the extract is additive as seen by the decreased antioxidant activity in the extract when compared to the individual activities especially that of quercetin-3-O-glucoside. The IC₅₀ values for the MeOH extract of the stem bark of S. inerme and B. micrantha were approximately 45 µg/mL and 150 µg/mL, respectively, and that for the standard ascorbic acid was 41 µg/mL indicating the high antioxidant potential of the plant, especially the stem bark. This was further verified by measuring the reducing power of the tested extracts and phytocompounds using the FRAP assay (Fig. 3).

The fruits of both plant species also exhibited good free radical scavenging activity (IC₅₀ values 800 µg/mL), therefore consuming fruits from these plants may be beneficial to human health in minimizing oxidative stress.

GC-MS profiling of fruit extracts from S. inerme and B. micrantha

GC-MS profiling led to the identification of 8 compounds from the fruit extracts of B. micrantha and S. inerme. The structures and names for each compound were obtained from the National Institute of Standards and Technology (NIST) library (30). The investigation of B. micrantha revealed the presence of mostly sterols including ergosterol, cycloartenol, cycloartenol acetate and stigmast-8(14)-en-3-ol while that of S. inerme revealed the presence of...
mostly triterpenes including fridelin, α-amyrin, β-amyrin and α-amyrin acetate. Triterpenes and plant sterols have previously been reported by many researchers to possess pharmacological activities such as anti-inflammatory, antioxidant, antiviral, antibacterial, gastro-protective, cytotoxic and anti-ulcerogenic activities (20, 31-33). GC-MS profiling indicates that the fruits of these two plant species possess different secondary metabolites.

CONCLUSIONS

The phytochemical investigation lead to the isolation of three pentacyclic triterpenes, one carotenoid and one megastigmane from S. inerme as well as two flavonoids and two triterpenes from B. micrantha. These compounds were not previously isolated from these plants. The MeOH extract of the stem bark of S. inerme appeared to have high antioxidant activity which was similar to that of ascorbic acid at higher concentrations whilst the antioxidant activity of the glycoside isolated from B. micrantha had the highest antioxidant activity, even higher than that of ascorbic acid. The phytochemical screening indicated differences in the classes of compounds found in the two plant species. Also, the secondary metabolites isolated from the stem bark, leaves and roots or those identified in fruits using GC-MS analysis of these two plant species were different. This shows that these two plant species, although morphologically similar, do not have chemotaxonomic similarities. This study corroborates the use of S. inerme and B. micrantha by traditional healers but does not support their use interchangeably.

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