ABSTRACT

*Spondias pinnata* Kurz. and *Streblus asper* Lour. are two important medicinal plants of Assam and the North Eastern region. *Spondias pinnata* plants on maturity attains height of 27.4±2.302 m and girth of 2.42±0.449 m. The bark is thick and greyish brown in colour bearing longitudinal cracks. The leaf size varies from 16.20±2.084 x 6.98±0.923 cm to 18.70±2.350 x 7.92±0.526 cm. The leaf area ranges from 95.63±4.725 - 108.19±3.375 cm². Flowering starts from February and lasts till end of June. The inflorescence is a terminal panicle with a length 29.80±4.508 - 39.38±2.334 cm. A mature plant of *Streblus asper* with thick foliage attains the height of 7.96±1.533 m and the girth 0.88±0.216 m at maturity. The bark is warty, wrinkled and greyish white in colour. A sticky milky white juice is exuded by the bark on injury. Leaves are alternate, entire, obovate and acute. Leaf size ranges from 4.70±1.445 x 2.89±0.387 cm - 6.10±1.937 x cm 3.46±0.421 cm. The leaf area ranges from 11.40±1.733 - 15.84±2.683 cm². The dioecious plant flowers during February to May.

The per cent moisture content of *Spondias pinnata* fruit was 76.62± 0.785. A comparatively high percentage of crude protein 3.336±0.195 is available in the fruits. The mature fruits contains a high amount of reducing sugar, 69.56±1.060 mg g⁻¹ and crude fibre 23.07±0.780 mg g⁻¹. The composition of minerals like phosphorous, iron, calcium and potassium are 0.483±0.032, 0.043±0.005, 5.967±0.472 and 83.60±1.520 mg g⁻¹, respectively. The leaf moisture content of *Streblus asper* is 75.64±1.820 per cent where as crude protein and fat content 16.73±0.079 and 1.029±0.029 per cent, respectively. The starch, reducing sugar, crude fibre and ash content in leaves of the plant are 12.05±0.710, 1.15±0.060, 17.08±0.120 and 8.113±0.256 mg g⁻¹, respectively. The composition of
minerals like phosphorus, iron, calcium and potassium are 0.236±0.015, 0.040±0.010, 14.33±0.577 and 33.46±0.611 mg g⁻¹, respectively.

The methanolic extract of fruits (500 g powder) on partitioning with chloroform could produce a fraction which possessed antimicrobial activity against Bacillus subtilis, Escherichia coli, Staphylococcus aureus and Candida albicans, but not against Klebsiella pneumoniae. The antimicrobial chloroform extract following chromatography on a silica gel column with chloroform-methanol (9:1 to 1:9) could afford two fractions, fraction 1 (2.0 g) and 2 (1.4 g). On thin layer chromatography the fraction 1 on plates prepared with silica using chloroform-methanol (60:40) as the solvent could afford 3 pure compounds viz. 1a, 1b and 1c and the fraction 2 also different 3 compounds viz. 2a, 2b and 2c. Out of six compounds 1c (SP1) showed antimicrobial activity. The highest activity was against Staphylococcus aureus (19.0±0.2 mm) followed by Bacillus subtilis (18.0±0.40 mm) and Escherichia coli (15.0±0.40 mm). The IR, ¹H-NMR, ¹³C-NMR and HR-FAB mass analysis revealed the molecular formula of the compound SP1 (283 mg; yield 0.0566% and Rₜ-0.45) to be C₃₀H₄₈O₃ with molecular mass of 456 and is a pentacyclic triterpene with a double bond C_12-C_13. On the basis of IR, HRFABMS, ¹H NMR, ¹³C NMR spectroscopic data and available reference data, the structure of the compound was determined to be ‘3 β-hydroxyolean-12-en-28-oic acid’ commonly known as ‘oleanolic acid’.

The methanolic extract of the powdered stem bark of Streblus asper on partitioning with petroleum ether produced a fraction, which exhibited antimicrobial activity. The petroleum ether extract showed antimicrobial activity against all the tested organisms except Klebsiella pneumoniae. The petroleum ether extract on silica gel-based
chromatography afforded fractions 1 and 2. The thin layer chromatography revealed 3 pure compounds viz. 1a, 1b and 1c from that of fraction 1 and 2 viz. 2a and 2b from fraction 2. The compound 2b (SA2) showed antimicrobial activity against the test organisms. The highest activity was recorded against *Bacillus subtilis* (17.0±0.5 mm) followed by *Staphylococcus aureus* (14.0±0.60 mm) and *Candida albicans* (12.0±0.90 mm). The IR, $^1$H-NMR, $^{13}$C-NMR and HR-FAB mass analysis revealed the molecular formula of the compound to be $C_{30}H_{50}O$ with molecular mass 426 and the compound was a pentacyclic triterpene with an isopropenyl group. On the basis of all these data and references available the structure of the compound was determined to be ‘Lup-20(29)-en-3 β-ol’ commonly known as ‘lupeol’.

The 2C nuclear DNA content of the extracted nuclei of *Spondias pinnata* and *Streblus asper* was determined by flow cytometry using *Pisum sativum* as the external reference standard. The C-value of *Spondias pinnata* was estimated to be 2.36 pg or $2.30\times10^9$ bp and *Streblus asper* 3.93 pg or $3.84\times10^9$ bp.

Genome size of the plants was also determined using the simple and cost effective method developed by Konwar *et al* (2007). The yield of genomic DNA per gram of fresh leaf tissue was 43.1 μg in *Spondias pinnata* and 48.5 μg in *Streblus asper*. The purity as judged from A260 : A280 ratio was 1.77 in *Spondias pinnata* and 1.89 *Streblus asper*. Following the method, genome size or C-value of *Spondias pinnata* and *Streblus asper* was determined to be 2.36 pg or $2.25\times10^9$ bp and 3.93 pg or $3.72\times10^9$ bp. The C-value determined by this method possessed a minor variation of 0.04 pg in the case of *Spondias pinnata* and 0.12 pg in the case of *Streblus asper* from that determined by flow cytometry.