

Establishing Taxonomic Relationship Between *Senna sulfurea* And *Senna bicapsularis* Using Four Taxonomic Markers**Dr. J. K. EBIGWAI**

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Two members of the genus *Senna* (*Senna bicapsularis* and *Senna sulfurea*) Vahl. In the Caesalpinoideae sub-family were analyzed for taxonomic relationships using four taxonomic markers (Anatomy, Palynology, Phytochemistry and Molecular). Five anatomical characters of epidermal cell type, presence/absence of trichome, arrangement of vascular bundles (phloem & xylem tissues), membrane type and stem type were used while surface type, exine sculpturing, aperturalmorphoforms, grain arrangement and pollen type were the pollen characters used. Eleven qualitative phytochemical tests were conducted for each of the two species. A plant plastidial gene, Materase -K (MAT-K gene for short) usually applied to taxonomic studies was used in the DNA extraction, quantification and sequencing of the two plants from which a phylogenetic relationship was obtained, by comparing the sequence with that in the NCBI bank. The results for the transverse Sections of the stem anatomy revealed *Senna bicapsularis* showing a single layered epidermal cell (EC), a single trichome (Tr), closely packed phloem (CPP) with the xylem tissues (XT) both arranged in a circular manner and surrounding the phloem (Amphivasal arrangement). *Senna sulfurea* on the other hand, showed the presence of a thick bi-layered membrane (TBLM), angular stem formation (AS), a thin layer of xylem tissue (XT), a thick epidermal cell (TEC) and a loosely packed phloem cell (LPP) occupying a greater portion of the stem. The longitudinal section through the stem of *Sennabicapsularis* revealed a thin epidermal cell (TECL), vascular bundle (VB) and about three strands of trichomes (Tr) about 5mm long compared to the stem of *Senna sulfurea* with a thick bi-layered membrane (BLM) on both sides and a band of vascular bundle (VB) between them. In terms of pollen character, the equatorial and polar views of the pollen micrograph showed Triangular and Oblate shape respectively for *Senna bicapsularis* against a convex and a prolate shape for the equatorial and polar view respectively for *Senna sulfurea*. A tricolporate pollen type was however, observed for the two *Senna* species. A reticulate exine was observed for *Senna sulfurea* against a striate/scabrate pattern for *Senna bicapsularis*. The two species had monad grain arrangement. For exine thickness, the sexine and nexine were same for *S. sulfurea* while a thicker sexine compared to nexine was observed for *S. bicapsularis*. Psilate/Scabrate surface type was observed for *S. bicapsularis* and reticulate pattern for *S. sulfurea*. Phytochemically, eight of the phytochemical tests yielded similar results. However, acidic test for flavonoids, tri-terpene test and steroid test showed discrimination between the two species in spite of significant differences among soil types where triplicate samples were obtained. Molecularly, the species exhibited a similar DNA sequence and same type and number of amino acids. However, there were only similar in twelve positions out of the 170 bps observed representing about 7.3% homology. When the DNA sequences were compared, with those in the NCBI data bank, a 100% match was observed for *S. bicapsularis* and a 95.8% for *S. sulfurea*. When all the 30 characters (6anatomy, 7palynology, 11phytochemistry and 6molecular.) states employed in this study was converted to numerical taxonomy, an overall similarity index of 50% was observed between both species. The study concludes by recommending the use of acidic test for Flavonoids, tri-terpene test and test for steroid/phytosterols, DNA quantification as well as pollen morphophorm for the authentication of these species.