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Original Article

Pharmcognostical standardization and HPTLC fingerprint of *Averrhoa bilimbi* (L.) fruits

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ABSTRACT

The fruits of *Averrhoa bilmbi* L. are used to treat skin disorders, fever, for scurvy and beneficial in diarrhoea, hepatitis and in inflammatory condition. It is also used to treat hyperlipidaemia and possess potential antibacterial and antioxidant activity. Pharmacognostical standards on bilimbi fruits are not yet available for correct identification of plant material and to ascertain its quality and purity. The present investigation was therefore undertaken to determine the requisite pharmacognostical standards according to the Pharmacopoeial guidelines for evaluating the fruit. Pharmacognostical evaluation included examination of morphological and microscopical characters, physicochemical properties, phytochemical analysis, fluorescence study and HPTLC fingerprint. The powder microscopy showed the presence of simple and glandular trichomes and spiral thickening of vessels. Phytochemical screening reported the presence of carbohydrates, proteins, amino acids, flavonoids, tannins and hydrolysable tannins. The HPTLC fingerprint developed for the separation of phytoconstituents is unique to *A. bilimbi* L. fruit powder. HPTLC fingerprint has been developed; as the chemical fingerprint obtained by chromatographic techniques are strongly recommended for the purpose of quality control of herbal medicines. This unique band pattern obtained from HPTLC fingerprint can be used for the identification of *A. bilimbi* L. fruits. These studies provide referential information for correct identification and standardization of *A. bilimbi* L. fruit.

1. Introduction

Since ancient times, plants and herbal preparations have been used as medicine. During the past few decades, traditional systems of medicine have become a topic of global importance. Current estimates suggest that, in many developing countries, a large proportion of the population relies heavily on traditional practitioners and medicinal plants to meet primary health care needs. Concurrently, many people in developed countries have begun to turn to alternative or complementary therapies, including medicinal herbs.[1]

Averrhoa bilimbi L. commonly known as cucumber tree, belongs to family Oxalidaceae is an under used fruit[2] despite of several medicinal properties. Bilimbi fruits are very sour and used in the production of vinegar, wine, pickles *etc.* The mature fruit can be eaten in *natura* or processed into jellies or

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jams other than act as preservative in food.[3] The ascorbic acid content of ripe bilimbi fruits was reported to be 60.95 mg/100 g.[4] The fruits are good remedy for scurvy and beneficial in diarrhoea, hepatitis and in inflammatory condition.[5] Syrup made from the fruits is used in febrile excitement, haemorrhages and internal haemorrhoids; also in diarrhoea, bilious colic and hepatitis.[6] The fruit is used as astringent, stomachic and refrigerant. The fruit in the form of curry is useful in piles and scurvy. In French Guiana the syrup of the fruit, or a decoction of the fruit are prescribed in inflammatory conditions, chiefly in hepatitis; they are also administered to relieve fever; diarrhoea and bilious colic.[7] Ambili et al. (2009), suggested that the fruit can be used as a dietary ingredient to prevent as well as treat hyperlipidaemia.[8] *A. bilimi* fruits possess antibacterial activity against human pathogenic bacteria.[9] According to Kolar et al. (2011), the fruit extract of *A. bilimbi* has potential antioxidant capacity and its consumption may contribute substantial amount of antioxidants to the diet.[2] In spite of the numerous medicinal uses attributed to this plant, there is no detailed pharmacognostical report on the macroscopy, anatomical markers, microscopy etc. Therefore, the present investigation of *A. bilimbi* L. fruit was

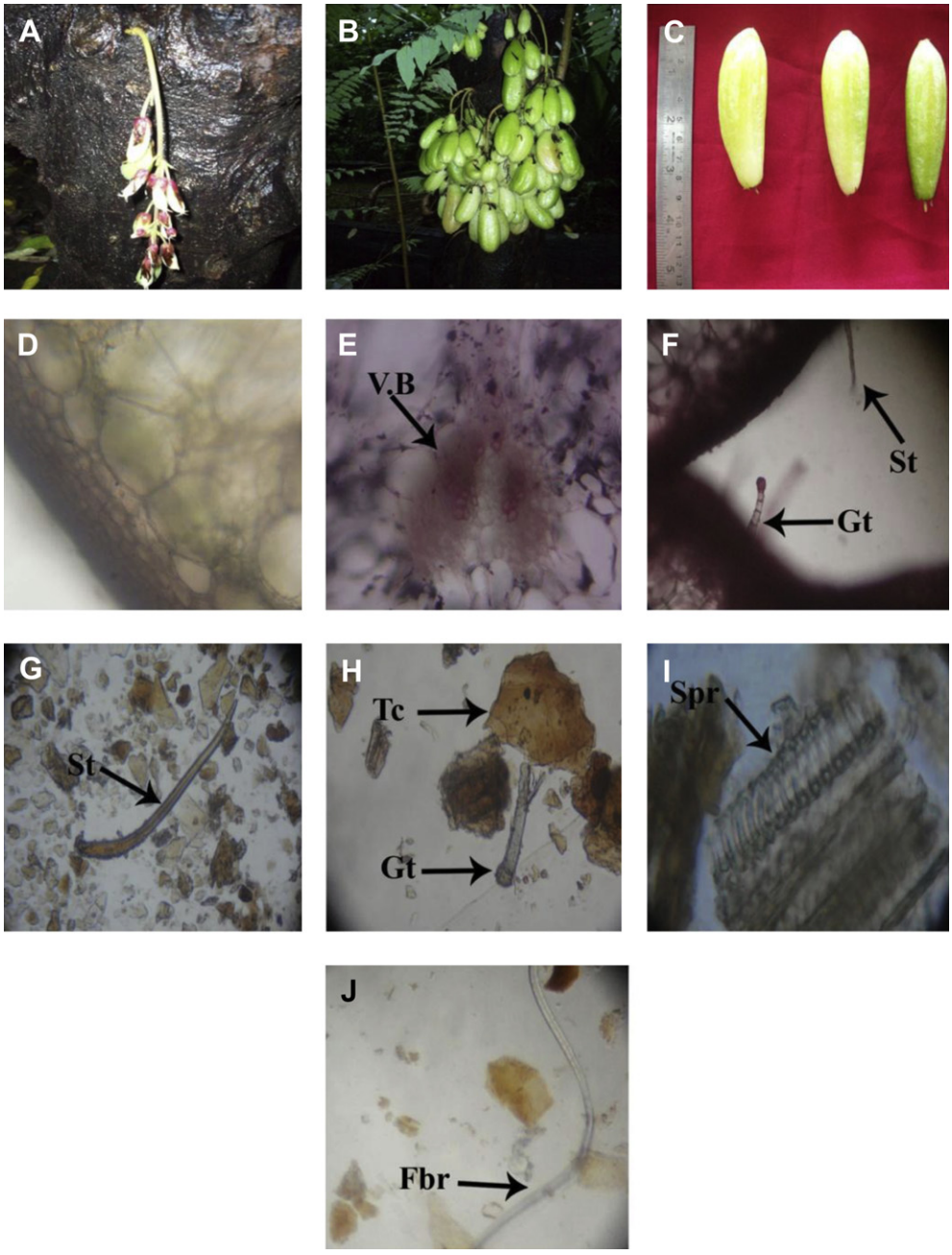

Fig. 1 – Macroscopic, microscopic and powder characteristic of *Averrhoa bilimbi* L. fruits. A: Flowers, B: Fruits, C: Fruits, D: T. S. of fruit, E: T. S. of fruit showing vascular bundle (V. B.), F: T. S. of fruit showing simple trichome (St) and glandular trichome (Gt), G: Powder microscopy showing simple trichome (St), H: Powder microscopy showing glandular trichome (Gt) and tannin filled cells (Tc), I: Powder microscopy showing spiral thickening (Spr), J: Powder microscopy showing fibre (Fbr).