Chromatographic Evaluation of Terpenoids of some medicinally important barks

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ABS TRACT

Thin layer Chromatographic analysis of bark of Anogeissus latifolia, Crataeva religiosa, Pterocarpus marsupium and Terminalia arjuna was carried with respect to the terpenoid pool of the plants. The three bark samples (Apical bark, middle bark and mature inner bark on main trunk) of each plant were analyzed and maximum terpenoids were recorded in the apical bark of Terminalia arjuna stem bark.

Key words: Chromatographic analysis, terpenoids, Anogeissus latifolia, Crataeva religiosa, Pterocarpus marsupium, Terminalia arjuna

INTRODUCTION

Terpenoids constitute the largest class of biologically active product and play defensive role against predators, pathogens, and competitors, maintaining antagonistic and beneficial interactions among organisms.[1] The important classes of terpenoids present in plants are the volatile essential oils, triterpenoids, steroids and carotenoids.[2] These oils are secondary metabolites that are highly enriched in compounds based on an isoprene structure is C10H16 and they are called terpenes. The isoprene unit, which can build upon itself in various ways, is a five-carbon molecule. The single isoprene unit, therefore, represents the most basic class of terpenes, the hemiterpenes. An isoprene unit bonded with a second isoprene is the defining characteristic of terpene, which is also a monoterpene (C10). Their general chemical structure occur as diterpenes, triterpenes and tetraterpenes (C20, C30 and C40), as well as hemiterpenes (C5) and sequiterpenes (C15). When the compounds contain additional elements, usually oxygen, they are termed as terpenoids. While sesquiterpenes contain three isoprene units (C15), diterpenes (C20) and triterpenes (C30) contain two and three terpene units, respectively. Tetraterpenes consist of four terpene units and polyterpenes are those terpenes containing more than four terpene units (i.e., more than eight isoprene units).[3]

Plant A. latifolia has been used to treat epileptic fits and cough.[4] Anogeissus latifolia bark shows wound healing potential[5], anti-ulcer potential[6] and hepatoprotective activity.[7] Bark of Crataeva religiosa is especially useful in kidney bladder stones, fever, vomiting and gastric irritation.[8] The bark possesses antimicrobial activity[9], anti-nociceptive property[10], anti-inflammatory activity[11] and anti-oxalic effects[12]. Pterocarpus marsupium is useful in diabetic anemia.[13] Bark is useful in vitiated condition of kapha and pitta, elephantiasis, erysipelas, urethrorrhea, rectalgia, ophthalmopathy, hemorrhages, dysentry, cough and grayness of hair.[14,15] Terminalia arjuna is known for its use in heart trouble[16] and wound healing potential.[17] This plant is effective in many cardiac disorders like angina, myocardial infarction, hypertension, hypercholesteremia, cardiac arrest etc.[18-19].

MATERIAL AND METHODS

The plant material was collected from the Radhanagari, Kagal, Panahala and adjoining areas of the Kolhapur district. Plant material was separated into three categories as 1) Bark harvested from the apical branches from the top of the tree regarded as Young bark, 2) Bark harvested from branches, 10-20 feet away from the apical branches regarded as middle bark, and 3) Bark harvested from main trunk of the tree regarded as mature bark. Different bark samples were sun dried and then in oven maintained at 50°C. Methanol extract of the powdered bark sample was used for the TLC analysis. Terpenoids were separated on TLC plates according to the method described by Wagner and Bladt.[20]
RESULTS AND DISCUSSION

Results of the present investigations are shown in Figure 1 and Table 1. From the figure it is clear that all plant samples showing difference in the terpenoid composition. Young and middle bark of *A. latifolia* shows similar terpenoid bands (8) while, mature bark contain less number (5) of bands as compare to young and middle. In case *C. religiosa*, young and middle bark contains equal number (8) of terpenoid bands but with different Rf values whereas mature bark contains one additional terpenoid band than young and middle bark with different Rf values. In case of *P. marsupium*, middle bark contains maximum number of terpenoid bands (12) than young (11) and mature bark (9). Young bark of *Terminalia arjuna* contains the maximum number of terpenoid bands (19) than the middle (15) and mature bark (14). Thus, among all the bark samples studied, *Terminalia arjuna* constitutes maximum number of Terpenoids than the other three plants. Kessler and Baldwin[21] have shown role of terpenes in plant defense. A terpenoid constituent, capsaicin, has a wide range of biological activities in humans, affecting the nervous, cardiovascular and digestive systems[22] as well as an analgesic.[23] Kwon-Ghung and Bennette,[24] studied the pathogenic aspects of *Aspergillus*, responsible for most human systemic infections. Matura et al.[25] investigated the role of some terpenes play as causative agents of contact dermatitis and fragrance allergies. Our results indicate that, there is decrease in terpenoid pool with ageing of the bark. There are different terpenoids present among the three bark

![Figure 1: Chromatographic analysis of different bark samples. 1: Apical bark; 2: Middle bark and 3: Mature inner bark](image)

![Table 1: Rf values of Terpenoids from barks of *A. latifolia*, *C. religiosa*, *P. marsupium* and *T. arjuna*](table)
samples of the same plant and it is evidenced from the chromatogram shown in the Figure 1. The diversity of these bioactive compounds might have formed one of the active principle(s) in theses crude drugs which have been reflected through their various pharmacological activities and claims their use in various Ayurvedic remedies since ancient times.

REFERENCES

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