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### RESEARCH ARTICLE

## MEDICINAL PLANTS HIGHLY ADULTERATED AND SUBSTITUTED IN THE TELANGANA STATE, INDIA

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### Abstract

targeted for large scale cultivation, introduction, phytochemical screening, pharmacognostical studies and for discovery of various drugs in traditional and modern system of medicines. In the urgency, with the demand and shortage of raw material leads to the adulterating and substituting many of the medicinal plants. Adulteration and substitutions are not only with shortage of raw material also with wrong taxonomic identity of the species and identity confusion with same local, vernacular and common names for the different species. While exploring the medicinal plant wealth of Telangana State, we have noticed some of the medicinal plants which are similar in morphology and with has same local and common names highly substituted and adulterated are discussed in detail in the present paper.

Post covid-19, across the  
globemedicinal plants are

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### Introduction:-

The studies on the exploration and documentation of medicinal plant wealth of Telangana State is undertaken as a part of the doctoral degree from the 2018 to 2024. With intensive explorations, and based on published literature (Gamble 1915 – 1936; Nandakarni 1982; Basu&Kirtikar 2006; Pullaiah 2015) a total of ca. 350 medicinal plants naturally (wild) growing in the Telangana State reported. Many of the medicinal plants introduced from various places for commercial cultivation (native and exotics) excluded from the list. For intensive collection and gathering the detail information along with natural habitats, also visited medicinal plant nurseries, general nurseries, research institutes and local traditional medical practitioners, local markets to find out the region or local medicinal plants, which are under high demand and under large scale cultivation for commercial purposes. With visiting's and consultation many things observed and noticed mainly the wrong taxonomic identity, wrong labeling, providing wrong images, adulteration and substitution of raw materials. After post-covid there is a sudden increase in usage of herbal drugs and their raw materials (fresh and dried form) (NMPB 2020a,b). For production of large scale commercial herbal drugs introduction, cultivation and the photochemical screening of the medicinal plants is the burning and focused issue among the researchers in India and outside. With the urgency and demand many of the problems are arising such as wrong taxonomic identity, adulteration and substitution of many of the medicinal plants. The adulteration is a practice of substituting the original crude drug partially or fully with other plants material which is either free from or inferior in therapeutic and chemical properties or addition of low grade or spoiled drugs or entirely different drug similar to that of original drug substituted with an intention of enhancement of profits (Om Prakash et al. 2013, Rajeswara Rao, 2010). Adulteration may also be defined as mixing or

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substituting the original drug material with other spurious, inferior, defective, spoiled, useless other parts of same or different plant or harmful substances or drug which do not confirm with the official standards (Mukherjee, 2014.). The present study focused on the wrong taxonomic identity of the medicinal plants which are morphologically similar, identity confusion with same common/vernacular/local names for different species described here: The exotic potted aquatic ornamental herbs Marshpennywort **Hydrocotyle umbellata** L. and Pennywort **Hydrocotyle vulgaris** L. (Araliaceae) against native medicinal herb Indian Pennywort **Centella asiatica** (L.) Urb. (Apiaceae); **Brahmi, Jala Brahmi Bacopa monnieri** (L.) Wettst. (Plantaginaceae) against medicinal herb **Centella asiatica** (L.) Urb. (Apiaceae); Galijeru (White and red) **Trinathema portulacastrum** L. (Aizoaceae) against medicinal herb Punarnava **Boerhavia diffusa** L. (Nyctaginaceae); **Wrightia tinctoria** (Roxb.) R.Br. (Apocynaceae) against medicinal tree palakodisha **Holarrhena pubescens** Wall. ex G. Don (Apocynaceae); Spiral flag **Costus pictus** D. Don (Costaceae) against **Hellenia speciosa** (J. Koenig) S.R. Dutta (*Costus speciosus*, *Cheilocostus speciosus*); American Aloe **Agave americana** L. (Asparagaceae) against **Maerua oblongifolia** (Forssk.) A. Rich. (Capparaceae); **Rauvolfia tetraphylla** L. Against **Rauvolfia serpentina** (L.) Benth. ex Kurz (Apocynaceae). The adulteration and substitution of above said species discussed in detail in the present paper. The updated and accepted scientific and family names are provided as per the plant database (POWO, 2024).

### Results and Discussions:-

In the present study adulteration and substitution of medicinal plants mainly with morphological similarity and with same common/local/vernacular names and few with shortage of original raw material. The exotic potted aquatic ornamentals **Hydrocotyle umbellata** (Marshpennywort) and **Hydrocotyle vulgaris** (Pennywort) are widely cultivating, adulterating and substituting on the name of native medicinal herb **Centella asiatica** (Saraswathi Aku). The foliage of **H. umbellata**, **H. vulgaris** resembles **C. asiatica** and with the same common english name “pennywort” for all the three species lead to the confusion in identity. **C. asiatica** also confused with the native medicinal herb **Bacopa monnieri** (Plantaginaceae) with their same local vernacular names Brahmi/JalaBrahmi in usage for both the species. Similarly, the another weed **Trinathema portulacastrum** (Tellagalijeru/Erragalijeru) adulterating and substituting instead of medicinal herb **Boerhavia diffusa** (Punarnava). The foliage of both the species resembles similar lead to the confusion for common man. Though the local names are different with morphological similarity there is a confusion in the identity. Another tree species “Ankudu” **Wrightia tinctoria** bark is adulterated and substituted with the Palakodisha/Kodishapala **Holarrhena pubescens** due to their follicles similar in appearance and confusion with local names palakodisha and kodishapala also in usage for **Wrightia tinctoria**. The Roots of **Rauvolfia tetraphylla** (Snake root) cultivated as an ornamental and naturalized at many places adulterated and substituted with the important and rare medicinal herb **Rauvolfia serpentina** (Sarpagandha). Due to shortage of raw material of original plant **Rauvolfia serpentina** and with the same common name “Snake rate” for both the species there is a confusion in the identity. The Spiral flag **Hellenia speciosa** (Chengalvakosthu) (synonyms: *Costus speciosus*, *Cheilocostus speciosus*), adulterated and substituted with **Costus pictus** (Spiral flag/Insulin herb) due to same common name “Spiral flag” for both the species. An another highly adulterated species is **Maerua oblongifolia** (“Bhuchakragadda”) tuberous roots adulterated with the stems of “American Aloe” **Agave americana**. This is by the shortage and rarely availability of **Maerua oblongifolia** populations in the natural habitats. The adulteration is doing by the locals intentionally for revenue generation.

### Conclusions:-

In the present scenario the main reasons for the substitution and adulteration of medicinal plants is lack of a true taxonomists or botanists to correctly identify the species. In the present scenario for identification medicinal plants mainly depended on the Google resources. Comparing with the images available in the google, searching with the local, vernacular, and with the common names leads to the wrong taxonomic identity at species level. The common man/farmers, nursery man, gardeners etc., not aware of the scientific names. They distribute and sale the medicinal plants from their forms and nurseries labeled with the local/vernacular names also a big problem in correct identity. Along with local names scientific name also should be mentioned on the label as per the binomial nomenclature and ICN. The other problem is providing the common names (English names) to our native plants which already exist for exotic cultivars should be avoided. Even in the research and educational institutions for photochemical screening and pharmacognostic studies procuring the plant material of other species instead of the species they have chosen for their studies. The authentication and providing the live images with their geographic location should be mandatory in the research publications, project works, and Ph.D thesis concerned to phytochemical and pharmacognostic studies on medicinal and aromatic plants to avoid the confusion. The social media (mainly YouTube channels) to popularize and revenue generation providing wrong information and images of the medicinal



plants in their live programmes, news articles, websites etc., should be controlled.



*Boerhavia diffusa* (Punarnava)



*Trianthema portulacastrum* (Galijeru)



*Holarrhena pubescens* (Palakodisha)



*Wrightia tinctoria* (Ankudu)



*Bacopa monnieri* (Brahmi)



*Centella asiatica* (Sarasvati-aku)



*Centella asiatica* (Sarasvati-aku)



*Hydrocotyle umbellata* (Pennywort)



*Maerua oblongifolia* (Bhuchkra gadda)



*Agave americana* (American aloe)



*Costus speciosus* (Chengalvakosthu)



*Costus pictus* (Spiral flag)



*Rauvolfia serpentina* (Sarpagandha)



*Rauvolfia tetraphylla* (Snake root)

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