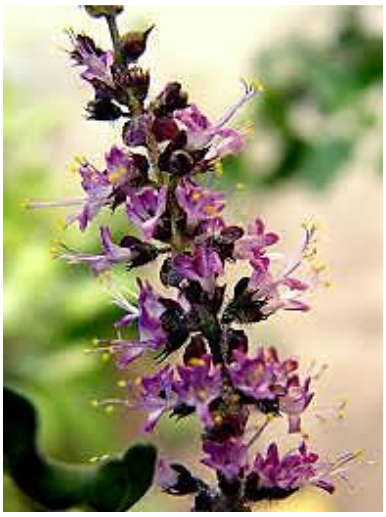
About flowers on the cover page

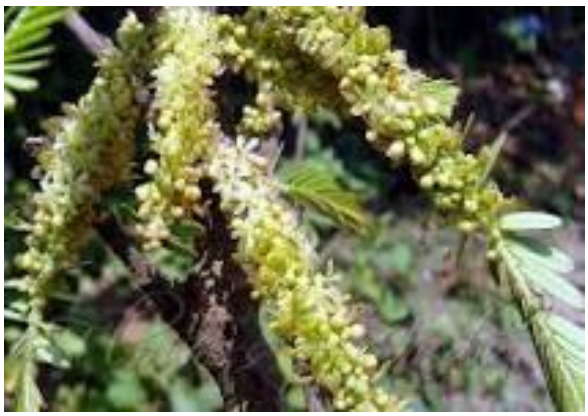
Herbal Non-antibiotics to combat AMR

1. Ocimum sp. -Tulsi



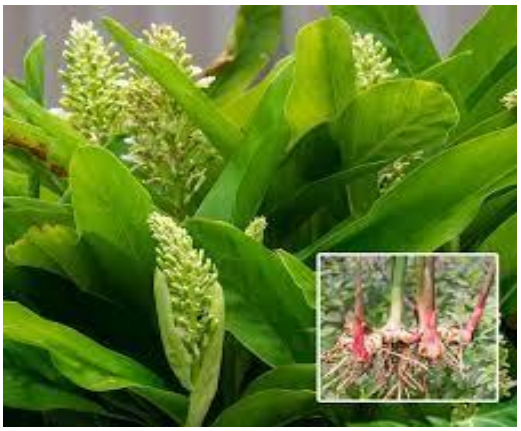
Ocimum sanctum L. (also known as *Ocimum tenuiflorum*, Tulsi) has been used for thousands of years in Ayurveda for its diverse healing properties. Tulsi, the Queen of herbs, the legendary 'Incomparable one' of India, is one of the holiest and most cherished of the many healing and healthy giving herbs of the orient. The sacred basil, Tulsi, is renowned for its religious and spiritual sanctity, as well as for its important role in the traditional Ayurvedic and Unani system of holistic health and herbal medicine of the East. It is mentioned by Charaka in the Charaka Samhita; an Ayurvedic text. Tulsi is considered to be an adaptogen, balancing different processes in the body, and helpful for adapting to stress. Marked by its strong aroma and astringent taste, it is regarded in Ayurveda as a kind of 'elixir of life' and believed to promote longevity. Tulsi extracts are used in Ayurvedic remedies for common colds, headaches, stomach disorders, inflammation, heart disease, various forms of poisoning and malaria. Traditionally, *O. sanctum* L. is taken in many forms, as herbal tea, dried power or fresh leaf. For centuries, the dried leaves of Tulsi have been mixed with stored grains to repel insects.

2. Emblica officinalis-Amla / Phyllanthus emblica



Phyllanthus emblica L. (Family: Phyllanthaceae), commonly known as Amla, is arguably one of the most important plants in various traditional and folk systems of medicine in the world. It is used for the treatment of various ailments such as oxidative stress, peptic ulcer, cancer, memory loss, dyspepsia, anemia, heart diseases, and hyperglycemia The fruit is rich in ascorbic acid (vitamin C) and contains several bioactive phytochemicals, of which majority are of polyphenols (ellagic acid, chebulinic acid, gallic acid, chebulagic acid, apeigenin, quercetin, corilaginetc.

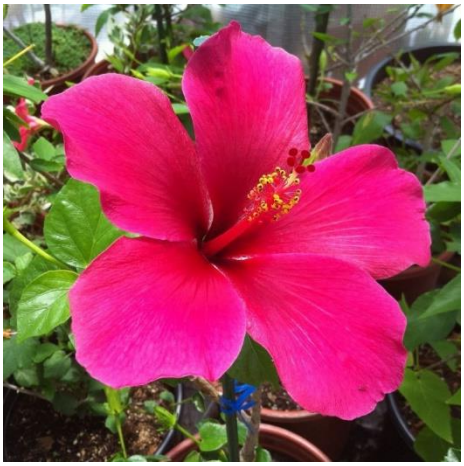
3. Alpinia galanga-Kulanjan



Alpinia galanga (L.) Willd. and *Alpinia officinarum* Hance, commonly known as greater galangal and lesser galangal, respectively, belong to the family of Zingiberaceae (ginger). Due to their spicy flavor and aromatic odors, both of the two rhizomes have long been used as flavoring ingredients and spices in Asia. They also were well-known traditional Chinese medicine and have been widely used as a remedy for gastrointestinal diseases, such as stomachache, dyspepsia, and gastrofrigid vomiting. Previous phytochemical investigations have shown that they have some similar chemical constituents, such as diarylheptanoids, flavonoids, volatile oil, terpenes, phenylpropanoids, and glycosides, but the main chemical components are different. *A. galanga* is rich in a variety of

phenolic compounds and essential oils, whereas *A. officinarum* is rich in flavonoids and diarylheptanoids. Investigations have shown *A. galanga* and *A. officinarum* have many biological activities, including effectiveness as antiinflammatory, antitumor, antiviral, antimicrobial, antioxidant, antiallergic, and gastroprotective agents. This chapter will give an exhaustive review of the botanical properties of these plants. In addition, the phytochemical and pharmacological properties and the adulterant identification of these two plants will also be discussed.

4. Hibiscus rosa-sinensis



Hibiscus rosa-sinensis is one such medicinal plant which has been known to be traditionally used for the management of bronchial asthma. *H. rosa-sinensis* is a bushy, evergreen shrub or small tree growing 2.5–5 m tall with glossy leaves and red flowers in summer and autumn. Active constituents include β-sitosterol, stigmasterol, taraxeryl acetate, and three cyclopropane compounds and their derivatives, cyanidin glucoside, flavonoids, vitamins, thiamine, riboflavin, niacin, ascorbic acid, quercetin-3-diglucoside, 3,7-diglucoside, cyanidin-3,5-diglucoside, 6-cyanidin-3-sophoroside-5-glucoside, and kaempferol-3-xylosylglucoside. *H. rosa-sinensis* has been shown to have antiinflammatory properties in experimental models of arthritis . Moreover, *H. rosa-sinensis* has traditionally been used for bronchial asthma in most parts of northeastern India). *H. rosa-sinensis* has been shown to contain vital essential nutrients such as calcium, magnesium, zinc, and potassium, which can help in the management of bronchial asthma .