Antimycobacterial agents from the essential oil of *Vetiveria zizanioides* (L.) Nash

S. K. Srivastava*
Central Institute of Medicinal and Aromatic Plants, Lucknow–226015, India

Abstract

Since 1980s, the number of TB cases throughout the world has been increasing rapidly due to the emergence of multi-drug resistant Mycobacterium tuberculosis (MDRTB). There have been no anti-TB drugs introduced in past 30 years. Thus, there is an urgent need to search for and develop new, effective, and affordable anti-TB drugs. In this scenario, the plant kingdom with enormous chemical diversity may be looked as an important source of new anti-TB agents. Of 17,500 higher plant species occurring in India, only about 365 species have been evaluated so far for antimycobacterial activity.

Vetiveria zizanioides (L.) Nash (Poaceae), popularly known as Khus grass, has been known in India since ancient times. It is the major source of the well-known oil of vetiver, which is used in medicine and in perfumery. Over 150 compounds have been isolated and characterized from vetiver oil mainly consisting of sesquiterpenes and their derivatives. Among these, the major active constituents identified are khusimol, vetivone, eudesmol, khusimone, zizaene, and prezizaene. Roots are stimulant, tonic, cooling, stomachic, diuretic, antispasmodic, and emmenagogue, and used in fevers, inflammations, and irritability of stomach. Various tribal people in the subcontinent use different parts of the grass for many of their ailments, such as boils, burns, epilepsy, fever, scorpion sting, snakebite, and sores in the mouth. The root paste is used for headache and toothache, the leaf paste is used for lumbago, sprain, and rheumatism, the stem decoction for urinary tract infection, the leaf juice as an anthelmintic, the vapors for malarial fever, and the root ash is given for acidity relief.

To the best of our knowledge, no antimycobacterial compound has been identified from vetiver oil. The essential oil of *Vetiveria zizanioides* showed significant antimycobacterial activity in our hand against the drug-resistant strains of *Mycobacterium smegmatis*, which on activity guided fractionation afforded four bioactive fractions Vz-2, Vz-7, Vz-8, and Vz-9. Further purification of these bioactive fractions over preparative thin layer chromatography resulted in the characterization of six compounds. All these compounds showed significant antimycobacterial activity against the drug-resistant strains (MDR-R and MDR-40) of *M. smegmatis* and their MIC was in the range of 31.25–62.5 μg/ml. These results may be of great help in antimycobacterial drug development from a very common, inexpensive, and non toxic natural product. In this symposium activity-guided fractionation, isolation, and characterization of antimycobacterial agents from the oil of *V. zizanioides* will be discussed.