Neem (Azadirachta indica) in the management of Macrophomina phaseolina, the causal pathogen of charcoal rot

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Neem has been hailed as the \textit{kalpataru} of modern times and a tree for solving global problems. Ten neem products comprising of hexane-extracted neem seed kernel oil (HENSK), cold-pressed neem oil, dewaxed oil, odour-free oil, neem fat, unsaturated fraction of the oil, steam volatile fraction (NIM-76), bitter fraction, neem isoprenoids containing 10\% azadirachtins and a novel neem bitter formulation at 1 per cent concentration were screened \textit{in vitro} for their antifungal activity against \textit{Macrophomina phaseolina} (Tassi) Goid. (Holliday and Punithalingam, 1970), the pycnidia stage of \textit{Rhizoctonia bataticola} (Taub.) Butl. the causal agent of charcoal rot/ stem blight, seed rot, pre and post-emergence damping off. \textit{M. phaseolina} is responsible for causing extensive global losses to various crops. The pathogen is both seed- and soil-borne. Among the enriched fractions, both NIM-76 and neem bitter fraction had shown higher efficacy over the parent cold-pressed neem oil. The highest percent of inhibition was observed in case of the formulation NEEM 5 EC (91.87\%) followed by azadirachtin (81.25\%), neem bitters (75.0\%), NIM-76 (61.25\%), HENSK (43.12\%), odour-free neem oil (56.25\%), cold pressed unsaturated oil (50\%), saturated fat (25\%), lipid associates (56.25\%). Thus the formulation NEEM 5 EC, azadirachtin and the odour-free neem bitter could find application in seed treatment to control a very common pathogen in tropics.

The importance of medicinal and aromatic plants as source of therapeutic agents for new drug discovery

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Natural resources have formed the basis of traditional medicinal systems throughout the world. Since time immemorial, mankind has known about the benefits of medicines from plants. The medicines used in ancient civilizations were either raw powder and/or crude extracts of the plants and animal products with few inorganic salts. Medicinal and aromatic plants synthesise number of chemical compounds for their survival under the different environmental conditions on the earth during their life. Many of these chemical compounds in their different parts have been explored and identified as useful to human being for healthcare. Hence, biodiversity of the medicinal plants has been considered to be very important source for the discovery of new and novel compounds of therapeutic values. The plant based indigenous knowledge passed and documented from generation to generation globally has significantly contributed to the development of different traditional systems of medicine and serves as the basis of novel plant based drug discovery. Out of about 2,50,000 flowering plant species known globally, approximately half of these have been found in the tropical forests but only 15\% of total flowering plant species and 1\% of tropical species have been chemically and pharmacological investigated in systematic manner.

Since the advent of plants as medicines, plants as whole and/or their parts have been consumed in crude forms for the treatment of the various ailments but understanding of use of the pure active compound as therapeutic molecules started with the isolation and identification of morphine from \textit{Papaver somniferum} for the treatment of pain in 1806 and quinine from \textit{Cinchona} bark in 1820 for the treatment of malaria. However, natural product research has passed through a phase of reduced interest in drug discovery because of enormous efforts and facilities needed to isolate the active principle and to elucidate their structures and the easy availability of synthetic drug molecules. Latter, taxol in 1960 from \textit{Taxus brevifolia} for the treatment of ovarian and breast cancers was isolated followed by identification of artemisinin as a plant based drug...