Chemical And Biological Studies On Plant Natural Products With Pesticidal Activity

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ABSTRACT

The study investigated activity of different extracts of 26 local plant species belonging to 18 plant families against two phytopathogenic bacteria, *Erwinia carotovora* and *Ralstonia solanacearum* the pathogens of soft rot and brown rot diseases of many important cultivated plants together with phytophagous mite, twospotted spider mite, *Tetranychus urticae* which feed on numerous food and fiber crops causing serious damage and crop loss worldwide. The results indicated that *Schinus terebinthifolius* and *Myrtus communis* were the most potent plants to combat these pests. Bioactivity-guided separation of the methanol extracts of the dried leaves of *Schinus terebinthifolius* and *Myrtus communis* resulted in the isolation of two chromatographically pure compounds **I** and **II** respectively. Based on spectroscopic methods (^{1}H, ^{13}C-NMR, UV and MS) as well as chemical methods (detection tests and acidic hydrolysis) the isolated compounds which isolated for the first time from these plants were characterized as **I**: methyl gallate, which exerted antibacterial effects against both *Erwinia carotovora* and *Ralstonia solanacearum* (MLC=250 and 500 $\mu g.ml^{-1}$ respectively) and a miticidal action against the twospotted spider mite (LC_{50} =58 $mg.l^{-1}$) and compound **II** as: 3-methoxy myricetin 7-O- α-L-rhamnopyranoside. Compound **II** also exerted a bactericidal activities against both *Erwinia carotovora* and *Ralstonia solanacearum* (MLC= 200 and 100 $\mu g.ml^{-1}$ respectively) along with a miticidal activity against the tested mite (LC_{50} = 67 $mg.l^{-1}$).

Laboratory evaluation results indicated that *Pittosporum tobira* met most of the criteria proposed by WHO for viable plant molluscicides. The chromatographic separation, guided by molluscicidal activity, of methanolic extract of *Pittosporum tobira* roots led to the isolation of two pure compounds **III** and **IV** which isolated for the first time from this plant. Their structures were determined to be **III**: 9- isopropyl-2,6-dimethyl cyclodecanyl (1`-1), (2`-10)- 3`-angeloyl xylopyranoside and **IV**: 9-isopropyl -2,6-dimethyl cyclodecanyl (1`-1) (2`-10) –3` acetyl 4`-keto β-D-glucouronic acid. The isolated sesquiterpene glycosides showed molluscicidal activity against *Biomphalaria alexandrina* with LC_{100} values of 10 and 8 $mg.l^{-1}$ within 24h respectively.

Key words: Phytopathogenic bacteria, Botanical bactericides, Twospotted spider mite, Botanical acaricides, Methyl gallate, Flavonol glycosides, Germacrane-type sesquiterpene, Sesquiterpene glycosides, Plant molluscicides, *Schinus terebinthifolius*, *Myrtus communis*, *Pittosporum tobira.*