Biochemical studies on some plant extracts and its effect on the infestation of sinoxylon sudanium wood borer

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Lemon grass (Cymbopogon citrates) belonging to family Gramineace was obtained from Genetic and Breeding of Medicinal and Aromatic plants group and Lantana camara family Verbenaceae was obtained from Orman Botanic Garden. Plant materials were extracted successively in Soxhlet apparatus by using four solvents of ascending polarity (Petroleum ether, chloroform, acetone and ethanol, respectively). Also, the volatile oils was obtained by hydrodistillation .Evaluation of the biological effect of the botanical extracts and volatile oils from the two plants on the wood borers Sinoxylon sudanicum was conducted .The chemical composition of the fatty acids, unsaponifiable matter, volatile oils and photo-chemical screening and the active components were determined. Also, mortality percentages, lethal concentration toxicity (LCn) and lethal time toxicity (LTn) after seven days of treatment of the different extracts and volatile oils were determined.The percentages of the volatile oils and the different gradual extracts of Lantana camara and lemon grass leaves indicated that the percentage of lemon grass leaves volatile oil was higher (1.25%) than that of Lantana camara leaves (0.2 %). The total lemon grass solvent extracts (dry basis) was in the same ratio as that of Lantana camara (12.83 and 12.81%).Fatty acids composition :The GLC chromatogram of Lantana camara oil indicates the presence of five saturated fatty acids and seven unsaturated fatty acids. The saturated fatty acids represented 50.65%. while the unsaturated represented 49.32%. Also, Lantana camara characterized by the presence of long chain unsaturated fatty acids as eruic, docosadienoic and docosat rienoic acids .Lemongrass GLC chromatogram indicates the presence of seven saturated fatty acids and five unsaturated fatty acids. The saturated fatty acids represented 33.63% while the unsaturated fatty acids represented 63.37%. Palmetic (18.31 and 37.32%) and lenolenic acids (31.25 and 21.21%) were the predominant acids in both oils.Residue matter content :Lantana camara residue matters chromatogram shows the presence of 16 compounds undecane was the major hydrocarlon (35%) followed by decane (12.84%), cymene (7.26%), dodecane (6.48%), decane-2-methyl (5.21%), decane —4-methyl (5.10%), cyclohexane-butyl (3.65%) and transcaryophellene (3.30%).Other compounds contained less than 3.00% sterols including compsterol, p-sitosterol and stigmasterol represent 9.08% of total residue matter.Lemon grass residue matters indicate the presence of 14 compounds. Geranial was the major component (39.64%) followed by phytol (12.24%), juniper camphor (8.17%) geranial (7.57%), Caryophyllene oxide (3.90%), caryophyllene (3.89%),a-cis-bergamotene (3.52%), 2-pentadecanone 6,10,014 trimethyl (3.17%), linalool (2.74%) and 6-met hyl-5-heptane-2 one (2.09 %). Sterols as 13-sitosterol and stigma sterol (2.13 and 2.45%)were found in ratio of 4.58%.GC/MS of volatile oilsGC/MS Lantana Camara volatile oil shows the presence of thirty one compounds p-caryphellene (10.1%), j3-phellandrene (7.81%), pentana-3-methyl (7.22%), a-caryophellene (6.89%), 1,8cineole (eucalyptol 6.59%), nerolidol (5.25%) and germacrene D(4.42%) were the main components. Also, Lantana camara characterized by high percentage of sesquiterpenens.Lemon grass volatile oil showed the presence of thirteen compounds. Geranial, neural and myrcene were the prevalent constituents (49.14, 37.76 and 8.20% respectively) representing 95.1% of the total volatile oil pulegone was found in 1.52% while other

constituents were found in low percentages (less than0.5%).Phytochemical screening :The crude organic extracts of Lantana camara and lemon grass leaves were screened for the detection of the active components saponins and alkaloids were not detected in the two plant extracts. Petroleum ether and chloroform extracts of the two plants contained terpenene and sterols. Acetone extracts contained flavonoids and tannins only while, the ethanol extracts comprised flavonoids, tannina, carlohydrates and for glycosides and proteins. Also Lantana camara ethanol extract showed thepresence of terpenoids.The percentages of the major constituents of lantana camara and lemon grass leavesLantana camara had higher percentage of total sterols 12.23% than that of lemon grass 6.91%. Total flavonoids werehigher in Lantana camara 29.19 mg/g than that of lemon grass 17.54 mg/g. also tannins showed the same trend as sterols andtannins content were 72.88 and 58.79 mg/g in the two plants under investigation .On the contrary, total carborhydrates, proteins and fatcontents were higher in lemon grass than that in Lantana camara.To determine the toxicity of the tested plant extracts some pieces of healthy Poinciana wood were pulverized as sawdust and divided to piles (10 g each). The concentrations (1,2 and 4 %) of each extract solvent and volatile oils we re prepared and the piles of saw dust were treated with the prepared concentrations as well as control plus solvent only. Piles treated with the extracts at different concentrations were put in plastic tubes well compacted and provided with 20 of newly emerged beetles. The tubes were examined daily, the number of dead beetles was recorded upto 7 days after treatment. The percentage of mortality was calculate d for slop, while LC50, LC90 andtoxicity index were calculated according to Abbot formula (1952) and Fenny (1952).Biological evaluation :Lantana Camara extractsThe percentage of corrected mortality of Sinoxylon sundanicum was in the decreasing order as a result of using various solvents of different polarity at 1,2 and 4% levels:Acetone > ethanol > petroleum ether > chloroform.Acetone and ethanol as polar solvents extracted the polar compounds from Lantana camara and induced the highest mortality while, the non polar solvent (petroleum ether and chloroform extracted the least levels of polar compounds which responsible for Sinoxylon sundanicum mortality .Lantana camara volatile oil induced the same effect of mortality (88.96 and 96%) as ethanol extract.Lemon grass extracts :Volatile oil induced mortality percentage lower than that obtained by chloroform (56.64 and 82%) but higher than that of petroleum ether.The percentage of corrected mortality of Sinoxylon sundanicum mortality were in the decreasing order as a result of using various solvents of different polarity at 1,2 and 4% level, Chloroform > petroleum ether > acetone > ethanol .Lethal concentration toxicity (LCn) :Of seven days after treatment with Lantana camara extracts, petroleum ether extract . On basis of the slope of the toxicity, petroleum ether.Lethal concentration toxicity (LCn) of seven days after treatment with Lantana camara extracts .Peteroleum ether extract : at the 7th day of treatment was the most toxic at LC50 level and was used as a standard in calculating the toxicity index while, that of the third day was the least and was used as a standard in calculating the relative potency.On basis of slope of the toxicity line, petroleum ether extract of the 7t h day recorded the highest slope value (0.435) while, the lowest slope value (0.172) was recorded at the 1st day.Chloroform extract : the slope values indicate that the 2”d exhibited the flattest line (0.189) while, the 7th day showed the steepest one (0.304).Acetone extract : at both the 7th and 6th day was the most effective towards the Sinoxylon sundanicum at LC50 level whereas that of 1St day was the lowest one at the same level. On basis of slope, the acetone extract of the 7th day recorded the highest slope value (0.960).Ethanol extract: the slope values of toxicity data indicate that the steepest toxicity line (slope = 0.982) was at the 7th day while, the 2”d day was the flattest (0.201).Volatile oil: the seventh day possessed the highest slope value (0.961) while, at the 1st day recorded the lowest slope value (0.239).Lethal concentration toxicity (LCn) of seven days after treatment with lemon grass extracts :Petroleum ether extract : it is clear that the 7th day exhibited the steepest line (0.422) while the 1St day showed the flattest one (0.162).Chloroform extract : slope values toxicity showed that the 7th day had the steepest value (0.767) while, the 1St day has the lowest value (0.190).Acetone extract : the slope values ranged between 0.179 for the 2nd day and 0.327 at the 7t h day.Volatile oil : at the 7th day of t treatment the volatile oil recorded the highest slope value (0.491) while, at the 2nd day recorded the lowest slope value (0.247).Comparison between lethal concentration toxicity of different extracts of lemon grass :The lethal concentration of different lemon grass extracts show e d

that the lowest values of LC50 we re 1.03 for chloroform extract followed by 1.4g for the volatile oil at the seventh day .. While, the highest values of LC50 (10.69 and 9.36) were recorded for petroleum ether and acetone at the first day of treatment.Lethal time toxicity (LTn) of different concentration for various Lantana Camara extracts :Pteroleum ether extract : the highest slope value of toxicity w as 0.341 at 4% concentration. Also, LT50 and LT90 values we re 4.43 and 8.18 daysChloroform extract: the highest slope value of toxicity was 0.252 at 4% concentration. The LT50 and LT90 were 6.09 and 11.07 days.Acetone extract: the highest slope value of toxicity was 0.452 at 4% concentration and LT50 and LT90 were 3.05 and 5.88 days.Ethanol extract: slope values increased with increasing the concentration. At 4% concentration, slope value showed the highest value (0.412). LT50 and LT90 were 3.55 and 6.46 days.Volatile oil : the volatile oils gave close slope values at the different concentrations 1,2 and 4% (0.317, 0.376 and 0.392).Lethal time toxicity LT50 we re 3.88, 3.39 and 2.88 and LT90 were 7.92, 6.80 and 6.14 days respectively.Lethal time toxicity (LTA of different concentration for various lemongrass extracts :Petroleum ether extract : the highest slope value of toxicity was 0.298 at 4% concentration LT50 and LT90 were 4.77 and 9.06 days .Chloroform extract : the highest concentration (4%) had 0.375 slope value. LT50 and LT90 had the values of 2.99 and 6.41 days respectively.Acetone extract : had the same trend, 4%extraction showed the value of 0.202. the respective values of LT50 and LT90 were 6.65 and 12.99 days.Volatile oil : the slope values indicated that 4% concentration had the steepest value (0.329) while 2% concentration had the flattest value (0.217). the respective values were 6.29, 5.75 and 3.97 days for LT50 and 11.26, 10.29 and 7.85 days for LT90 at 1,2 and 4% concentration respectively.