EFFECT OF LEAF LEACHATES OF PONGAMIA PINNATA ON THE GROWTH AND DIOSGENIN CONTENT OF *COSTUS SPECIOSUS*

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Pongamia pinnata is a common tree in West Bengal, where *Costus speciosus* (Koening) Sm. is a major under storey crop. *Costus speciosus* is a herb grown abundantly under partial shade particularly in moist areas in West Bengal, as the rhizomes contain diosgenin, a steroid precursor. The study was conducted to determine the effect of leaf leachates of *Pongamia pinnata* on the growth and diosgenin content of *Costus speciosus.*

Fresh leaves of *Pongamia pinnata* were collected at juvenile (15-20 days), mature (40-45 days) and senescent (showing signs of chlorosis) stages for leaf leachates preparation. Leachates from those leaves were prepared by immersing 100 g leaves in one litre distilled water in the flask for 24 h at room temperature (30 ± 2^0C). These leachates of 10% concentration were further diluted to give 2.5% and 5% concentration. Uniform slices of rhizome weighing 35 g and each having at least one bud were planted at a plant to plant spacing 50 cm and in rows 50 cm apart in a plot of 2 x 2 m. The experimental plots were partially shaded with two layered opaque polythene sheets. The light intensity, temperature and relative humidity were 510-620 mol $m^{-2}s^{-4}$, 30-35^{0}C and 60-95% respectively.

The leaf leachates of *P. pinnata* at 50 ml/plant were sprayed at seven days interval continued up to 70 days from date of planting where distilled water was used as control. The experiment was started on May 18, 2003 and continued up to October 28, 2003. At 80 days, chlorophyll, total nitrogen of the leaves were determined and at 90 days diosgenin content was analysed. Above ground and below ground biomass of *C. speciosus* were determined at harvest in October. The data were statistically analysed.

The leachates of juvenile, mature and senescent leaves showed a wide variation in the promotion of the growth of *C. speciosus* over the control. The 10% leachates of mature leaves of Juvenile leaves of *P. pinnata showed* maximum growth promotion, in contrast to the effects of the leachates of mature and senescent leaves which produced this effect when diluted 2.5% . The chlorophyll and total nitrogen contents in *Costus* were highest with 10% leachates of juvenile leaves followed by 2.5%

Table –1. Effect of leaf leachates of *P. pinnata* on biomass production of *Costus speciosus*

Source of leaf leachates	Concentrations (%)	Chlorophyll concentration (mg g^{-1} dry wt.)	Shoot biomass (gm g^{-1} dry wt.)	Root biomass (gm g^{-1} dry wt.)	Total biomass (gm g^{-1} dry wt.)
Juvenile	2.5	4.88	557.16	402.43	959.59
	5.0	4.81	551.32	398.69	950.01
	10.0	4.75	544.21	391.34	935.55
Mature	2.5	4.71	539.06	389.14	928.20
	5.0	4.76	545.97	393.54	939.51
	10.0	4.81	551.82	398.71	950.53
Senescent	2.5	4.69	531.17	382.09	913.26
	5.0	4.74	537.84	387.53	925.37
	10.0	4.79	545.58	392.61	938.19
Control		4.56	458.12	371.16	829.28
CD at 5%		0.071	2.465	1.854	3.232

leachates of mature and senescent leaves. Higher chlorophyll and nitrogen contents showed a gradual increase with increasing dilution of leachates of mature and senescent leaves as compared to control. Biomass production was achieved higher by the leaf leachate treatment of juvenile leaves and mature leaves whereas lesser amount was found with senescent leaves. Diosgenin content was not influenced by the leaf leachate treatment of *P. pinnata* .

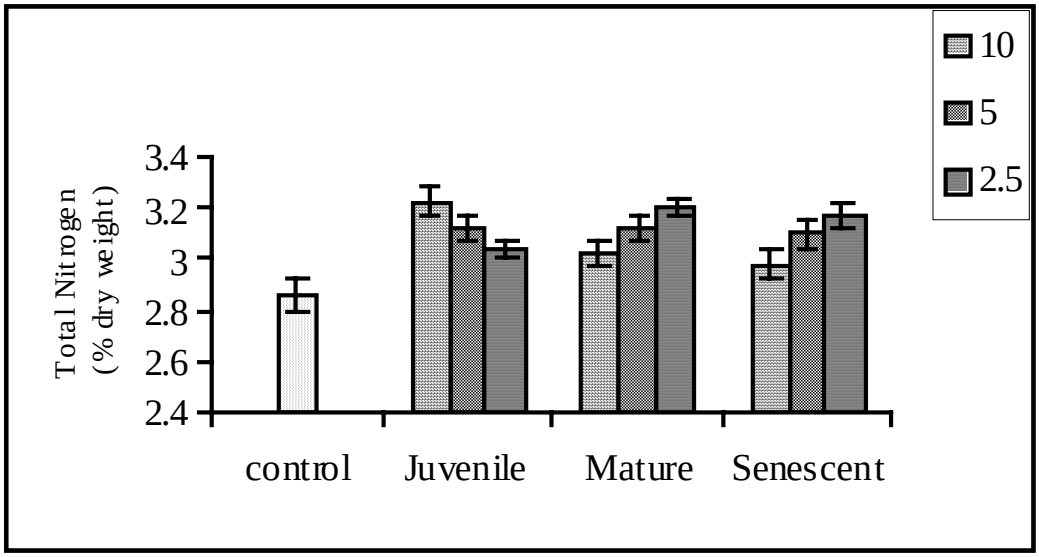

Fig. 1. Effect of leaf leachates of *P. pinnata* on the nitrogen content of *Costus speciosus*

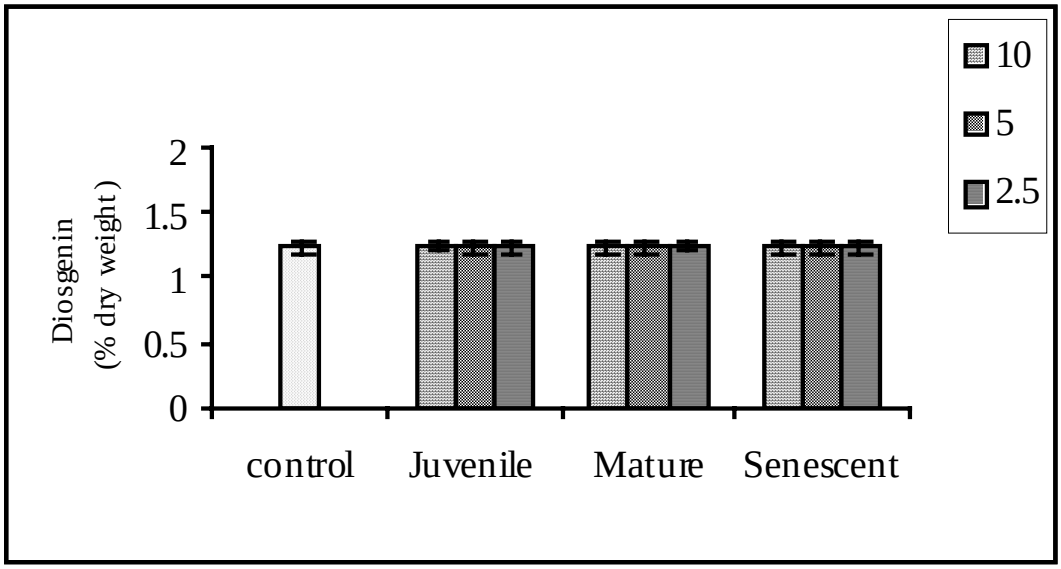

Fig. 2. Effect of leaf leachates of *P. pinnata* on the diosgenin content of *Costus speciosus.*