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Allelopathic Effect Of *cassia tora* Extract On Transpiration Rate In *Mangifera indica* And *Syzgium cumini*

KEYWORDS: Allelochemicals, *Cassia tora*, transpiration rate

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ABSTRACT *Cassia tora L. is an obnoxious weed. it is one of the well-known anthraquinone containing plant and has been used in Chinese and Ayurvedic medicine. Aqueous leaves extract of different concentrations of Cassia tora was used to reduced transpiration rate in Syzgium cumini and Mangifera indica. The bioassay indicated that the transpiration rate decreases it is inversely proportionate to concentration of extract. Closed number of stomata increase with increasing concentration. Therefore Cassia tora can be used as an anti transparent. Mangifera indica is more sensitive to Cassia tora treatment than Syzgium cumini .*

1. Introduction

Cassia tora L. is an obnoxious, aggressive, annual, herbaceous weed. Cassia tora Linn. (Family Caesalpiniaceae) is generally distributed throughout India, Sri Lanka, West China and tropics. It is known as *Charota. The plant is an annual herbaceous foetid herb, almost an under shrub, up to 30-90 cm high, with pinnate leaves. In India it occurs as wasteland rainy season weed. C.tora grows very aggressively, competing with crops for environmental resources and releasing toxic chemicals into the surrounding soil.*

Allelochemical treatment frequently resulted in a decrease in stomatal conductance together with loss of leaf turgor. Many phytotoxic allelochemicals have been isolated, identified, and found to influence a number of physiological reactions. Mode of action of some allelochemicals have been described (Weir et al, 2004), and this biotic stress known as allelochemical stress, can have an indirect or direct effect on receiver plant (Cruz-Ortega et al, 2002).

Zhou and Yu (2006) reported it is tempting to ascribe the reduced CO_2 assimilation to the reduction in stomatal conductance since both stomatal and non-stomatal factors could result in a reduction in CO_2 assimilation. In the case of stomatal limitation, reduced stomatal conductance is generally accompanied by decreased intracellular CO_2 concentration and we found that a decrease in stomatal conductance coincided with the decline in CO_2 assimilation rate and a decrease in intracellular CO_2 concentration, suggesting the decrease in photosynthetic

These allelochemicals affected many cellular processes in target plant species, including disruption of membrane permeability (Galindo *et al*, 1999), ion uptake (Lehman and Blum, 1999), inhibition of electron transport in both photosynthesis and the respiratory chain (Calera *et al*, 1995, Abarahim *et al*, 2000). The rate of transpiration is directly related to the evaporation of water molecules from plant surface, especially from the surface opening or stomata, on leaves..

The objective of the present study was to determine for the the allelopathic effects of different concentrations of *Cassia tora* leaf extract on transpiration rate of *Mangifera indica* and *Syzgium cumini*.

2. Material and Method

The leaves were detached and washed with distilled water to remove the adherent dust particles. Aqueous extract of *Cassia tora* leaves was prepared as under 200g of fresh leaves chopped in small pieces and crushed in the mixture grinder after grinding the material of leaf were soaked in 1000 ml of distilled water for 24 hour, the aqueous extract was filtered through the muslin cloth and then some of the extract was diluted to make the concentrations to 10% , 20% , 30%, 40% , 50% , 60%, 70%,80%,90%,100% (on the basis of volume) and distilled water as a control treatment. *Cassia tora* was considered as the donor plant and the plants selected were *Syzgium cumini* and *Mangifera indica.*

3. Results and Discussion

According to the result recorded in table- 1 and 2 after the spray of different concentration of aqueous leaf extract of *Cassia tora* on the transpiration rate of *Syzgium cumini* and *Mangifera indica* .

The transpiration rate was decreased over control with the increasing concentration of extract.Maximum transpiration rate was observed 28ml/hour in *Mangifera indica* at control treatment followed by *Syzgium cumini* 26 ml/hour. The maximum decrease transpiration rate were found in 100% treatment in *Mangifera indica* 78.57% (6 ml/hour) followed by *Syzgium cumini* 61.53 (10 ml/hour). Therefore *Mangifera indica* is more sensitive to *Cassia tora* treatment than *Syzgium cumini* .

Table- 1 : Effect of *Cassia tora* leaf extract on *Syzgium cumini* (Black Berry).

S No	Concentration of Cassia tora solution	Number of stomata in 25mm² area of leaf (a prox.)		Total area of leaf of Blackberry (cm.²)	Amount of water transpirated in ml.	% Decrease in transpiration rate over control
		Open stomata	Close stomata			
1	Control	73	08	37	26	
2	10%	62	18	37	21	19.23
3	20%	61	20	37	20	23.07
4	30%	58	22	37	19	26.93

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S No	Concentration of Cassia tora solution	Number of stomata in 25mm² area of leaf (a prox.)		Total area of leaf of Blackberry (cm.²)	Amount of water transpirated in ml.	% Decrease in transpiration rate over control
		Open stomata	Close stomata			
5	40%	56	23	37	18	30.76
6	50%	54	25	37	18	30.76
7	60%	49	28	37	16	38.46
8	70%	45	30	37	16	38.46
9	80%	39	31	37	15	42.30
10	90%	35	31	37	12	53.84
11	100%	34	32	37	10	61.53

Table- 2 : Effect of *Cassia tora* leaf extract on *Mangifera indica.*

S No	Concentration of Cassia tora solution	Number of stomata in 25mm² area of leaf (approx.)		Total area of leaf of Blackberry (cm.²)	Amount of water transpirated in ml.	% Decrease in transpiration rate over control
		Open stomata	Close stomata			
1	Control	78	09	52	28	
2	10%	72	15	52	19	32.14
3	20%	68	18	52	19	32.14
4	30%	67	20	52	17	39.28
5	40%	60	22	52	16	42.85
6	50%	56	25	52	16	42.85
7	60%	54	28	52	14	50
8	70%	51	30	52	12	57.14
9	80%	48	32	52	10	64.28
10	90%	41	35	52	8	71.42
11	100%	39	37	52	6	78.57

Prasad et al (2006) reported that leaves of the plant have been found to be rich in phenols, tannins, and glycosides. A large number of chemicals were found to be present in different organs of the C. tora plant. The presence of ketones, alcohols, and sterols in the root, as well as phenols, alcohols, terpenes, and acids in the leaf and lactones, ketones, and phenols in the seeds of C. tora, throws a light on its inhibitory activity (Patil et al., 2004; Thapar & Singh, 2006).

Lantana camara has many allelochemicals. Aqueous leaves extract of different concentrations of *L.camara* was used to reduced transpiration rate in *Syzgium cumini, Ficus religiosa* and *Ficus benghalensis* (Mishra, 2015). *L. camara* extract can be used as an anti transparent in *Mangifera indica and Psidium guajawa* (Singh et al, 2014). Leaf extracts showed inhibitory effect of *L.camara* on the growth of *P. hysterophorus* in fruiting stage (Mishra, 2013). Mishra (2012) reported that Phytotoxic effect of *L.camara* leaf, stem and root aqueous extract on chlorophyll contents of *P.hysterophorus* in seedling stage.

Overall inhibition may be due to the activity of a single chemical having multiple phytotoxic effects (Einhellig & Rasmussen, 1979) or to an interaction of various chemicals of C. tora with those of mustard.

Allelochemical treatment frequently resulted in a decrease in stomatal conductance together with loss of leaf turgor). In the present investigation, thus concludes that all the concentrations of leaf aqueous extract of *C. tora* can be used as an anti-transpirent. This activity can reduced the water requirement in plants. Therefore the bio anti transparent can protect the toxicity of which are used by the farmers in traditional practices.

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