Cibtech Journal of Bio-Protocols ISSN: 2319–3840 (Online)
An Open Access, Online International Journal Available at http://www.cibtech.org/cjbp.htm
2016 Vol. 5 (1) January-April, pp.1-3/Patil
Research Article

EFFECTS OF LONG CHAIN FATTY ALCOHOL ON SUGARCANE VAR. Co.740 AND Co. 8014.

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ABSTRACT
During present investigation anti transparent action on intact sugarcane plants under both controlled and water stressed conditions were studied. It was found that long chain fatty alcohol reduces transpiration rate under control condition and facilitates maintaining the cell turgor under stress condition thereby helps in conserving the water inside the leaf tissue and protect plants form desiccation to some extent.

INTRODUCTION
In recent years, much efforts has been expanded to discover and ideal chemical antitranspirent for wide on crops in dry regions of the world. Antitranspirants are applied to the plant foliage to curtail water loss. It is well known that antitranspirants can inhibit stomatal opening thereby possibly be used for chemical control of transpiration. Since antitranspirants increase plant water potential (Srinivasa Rao 1985), changes in water potential that results from antitranspirant treatment need to be measured accurately, R.W.C. is perhaps the most widely accepted method of expressing the quantity of water in plant tissue. R.W.C. under stress could also be used as a measure of tolerance to stress. Proline is stress product. Accumulation of proline in leaves has been shown to be an adaptive mechanism of stress tolerance (Singh *et al*., 1972). The stomatal diffusive resistance is increased by reducing the transpiration rate and by increasing leaf temperature.
Several of the antitranspirants except ABA capable of inducing stomatal closure have proved unsuitable as an ideal antitranspirants, mainly for toxicological reasons and because of undesirable side effects.
Hence, suppression of stomatal opening by long chain fatty alcohol (LCFA), prompted me to test for its antitranspirant action on intact sugarcane plants under both controlled and water stressed conditions.

MATERIALS AND METHODS
The well established (2 months) plants of sugarcane var. Co. 740 and Co. 8014 in earthen pots were used for investigation. ABA (10 – 4 M) and long chain fatty alcohol (HICO-110R) (1000 ppm) used as foliar spray. The plants sprayed with antitranspirants up to run off. Some plants were treated as control by spraying distilled water and irrigated daily. After spray the pots were divided into i) sprayed and irrigated, ii) sprayed and water stressed, iii) water stressed. The water stress gained by withholding the irrigation for 8 and 12 days.
The study of stomatal behavior is carried out with help of steady state porometer (LI-1600) and proline (Bates *et al*., 1973).

RESULTS AND DISCUSSION
Table 1 shows the effect of long chain fatty alcohol (LCFA) in stomatal conductance and transpiration rate. It is very clear from the table that diffusive resistance was found to be increased in treated plants and transpiration rate is reduced in non-stressed plants. But under sprayed and stressed condition the diffusive resistance of sugarcane var. Co. 740 was found to be reduced so that the transpiration rate was increased. This clearly indicate that LCFA reduces transpiration rate under control condition and facilitates maintaining the cell turgor under stress condition thereby helps in conserving the water inside the leaf tissue and protect plants form desiccation to some extent.

The reduction in transpiration of potted plants with different types of antitranspirants has been reported by several workers (Srinivasarao, 1986). The treatment, reduced transpiration relatively more than dry matter accumulation and hence there was an increase in water use efficiency (Jones and Mansfiled, 1972).

Our reports of reduced rate from both stressed and non-stressed plants are in support of Marahi *et al*., 1970. In the leaves of sprayed and non-stressed, sprayed and stressed plants LCFA reduces the level of transpiration to that of control.

The effects of LCFA as an antitranspirant on proline contents are shown in Table 2. Significant differences were observed for proline. The stressed plants showed significant increased proline content over control. On the other hand sprayed and stressed plants showed significant reduced proline level. While LCFA showed much reduced pattern of proline accumulation in both sprayed-control and sprayed-stress plants. So we can conclude LCFA enhances the Kreb cycle reaction and hence the accumulation of ά-ketoglutamate, a substrate for glutamic acid synthesis which in turn form the precursor for proline (Shiozaki *et al*., 2005).

Table 1: Effect of LCFA on Diffusive Resistance and Transpiration Rate in Sugarcane Var. Co. 740 and Co. 8014

	Co. 740				**Co. 8014**			
	Lower	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**
Treatment	**DR**	**TR**	**DR**	**TR**	**DR**	**TR**	**DR**	**TR**
Control	1.24	16.5	3.56	6.72	1.47	14.77	3.4	6.6
Sprayed Control	4.27	5.02	5.31	3.83	1.82	8.22	0.55	1.72
Stress	10.82	1.49	32.43	0.537	23.9	0.714	30.3	0.554
Sprayed Stress	6.21	2.8	13.51	1.54	10.63	1.69	45.14	0.414

DR: Diffusive Resistance (s/cm) TR: Transpiration Rate (µg/cm^2/ s)
The values are mean of three determinations
Average relative humidity 52 % Leaf area exposed 1 cm^2
Time: 10.30 a.m. to 12.30 noon. Quantum 1575 µE/m^2/s

Table 2: Effect of LCFA on Proline in Sugarcane Var. Co. 740 and Co. 8014

Treatment	**Co. 740**	**Co. 8014**
Control	1.22 ±0.13	0.816 ± 0.01
Sprayed Control	0.409 ± 0.014	0.715 ± 0.007
Stress	10.24 ± 1.45	9.633 ± 1.18
Sprayed stress	0.614 ± 0.011	2.869 ± 0.88

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