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Photo and Thermo Stability of Root and Shoot Extracts of *Acalypha Indica* L and Their Effect on Hypocotyl and Root Length af Soybean (*Glycine Max* L)

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ABSTRACT

Soybean provides a major world source of plant protein, vegetable oil and animal feed. Its products are important and commercially used in many parts of the world. The fields of Soybean are infested by number of weeds, among which Acalypha indica is noted repeatedly in all the experimental sites. In the present investigation photo and thermo stability of root and shoot extracts of Acalypha indica on hypocotyl and root length of Soybean was studied.

KEYWORDS Allelopathy, Soybean, weeds.

Introduction:

Soybean (Glycine max L) is a member of the family Leguminosae, sub family Papilionatae. Soybean provides a major world source of plant protein, vegetable oil and animal feed. Its products are important and commercially used in many parts of the world. Soybean crop is encountered by a variety of weed species which reduced crop productivity, either by producing bio-physical disturbances i.e., competition or by bio-chemical interactions with the crop plant i.e. Allelopathy.

Allelochemicals are released by the weeds from living leaves as volatiles or leachates or from roots through exudation or sloughing off of dead tissue or decaying plant litter or leaching from leaf litter on the soil surface (Putnam, 1983). Weed residues left on the ground have generally been found to cause phyto toxicity.

The fields of Soybean are often infested by several weeds such as Panicum javanicum Poir, Meliolotus alba Milletc, Acalypha indica L, Impatiens balsamina L, Commenlina kurzii, Commelina bengalensis L, Euphorbia geniculata L, Justicia diffusa wild, Parthenium hysterophorus L, Tridax procumbens L , etc.,

These weeds adversely affect the crops by way of direct competition and also through their allelopathic effects.

Material and Methods:

The weeds present in the Soybean fields were identified with the help of a standard published flora Duthie (1960) and Oommachan (1976). Thus family Asteracea, Euphorbiacea and Poaceae are represented by three species each and Commelinaceae with only two species each where as families Acanthaceae, Balsaminaceae and Papilonaceae have only one species each. From among these weeds Euphorbia geniculata, Commenlina bengalensis, Commenlina kurzii, Acalypha indica, Lagascea mollis and Cynodon dactylon occurred consistently in all sites so these weeds were selected for the present investigation. In the above six weeds the most commonly and abundantly found weed Acalypha indica was selected for the present investigation to see their Teletoxic effect on Soybean seedlings.

The extracts were also tested for their thermo stability and were heated to a temperature ranging from 50-70 degree C and their effect on seed germination was compared likewise with that of fresh extracts.

Observation and Results:

Photo and Thermo stability of root and shoot extracts of Acalypha indica and their effect on hypocotyl and root length of Soybean was studied under the laboratory conditions.

A brief account of the light exposed and thermo exposed extracts of weeds and their impact on hypocotyl length as well as the root length of Soybean seedling was carried out.

The hypocotyl length of the Glycine max seedling was measured on the sixth day of the seed germination. In controlled condition the length of the hypocotyl was measured and it was found to be 9.76cm, whereas the hypocotyl of seeds exposed to 0.25% conc. Of the shoot extract of Acalypha indica measured 9.65cm and 9.70cm under 0.50% concentration9.70cm and 9.63cm under 0.75% conc. of the extracts its value is 8.90cm and 9.60cm. Thus indicating that 0.50% conc. of the shoot extracts was promotary so far as the hypocotyls length is concerned. Both under 0.25% and 0.75% there was slight decline in the hypocotyls length.

Table 1: Effect of Acalypha indica extracts exposed to light and high temp (50-70 degree C) on the seedling growth of Soybean

Treatment	Control	Shoot extract						Root extract					
		0.25%		0.50%		0.75%		0.25%		0.50%		0.75%	
		Photo	Thermo	Photo	Thermo	Photo	Thermo	Photo	Thermo	Photo	Thermo	Photo	Thermo
Hypocotyl (cm)	9.76	9.65	9.70	9.70	9.63	8.90	9.60	9.25	9.60	8.90	9.53	8.70	9.49
Root (cm)	9.24	9.00	9.01	8.90	9.00	8.63	8.90	9.50	9.20	9.13	9.19	8.60	9.18

The length of the root under Control was 9.24cm, whereas it was 9.00, 8.90 and 8.63cm under 0.25%, 0.50% and 0.75% if the light exposed shoot extracts. There by indicating a decreasing trend with the increase of concentration and thus exhibiting an inhibitory effect so far as the root length is concerned.

Seeds treated with the root extracts and exposed to light also exhibited decreasing trend in the hypocotyls length compared to control. The trend of decrease was more pronounced with the increasing concentration of the extracts. The same trend was followed for root length.

Seedling treated with the shot extract heated to a temperature of 50-70 degree C exhibited a decreasing trend in the hypocotyls length as well as the root length compared to control. Here also the decrease in these parameters increased with the increasing concentration. The root extract also followed the same trend in the case of root length; however the decrease in root length under various concentrations of Acalypha indica extracts exposed to the temperature cited earlier was not very significant.

Conclusion:

The photo exposed shoot and root extract of Acalypha indica were found to be less inhibitory to hypocotyl and root length compared to the seedlings exposed to various concentrations of the fresh and untreated extracts. These results indicated that the photo exposed extracts undergo certain chemical changes which suppressed the inhibitory action of the chemicals which are responsible for the decreased hypocotyl and root length of Soybean seedlings. It is also probable that the inhibitors themselves undergo a change which makes them unable to exercise their inhibitory action on these parameters.

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