

Allelopathic Effect of Extracts of Medicinal Plants on Mungbean in Vivo Conditions

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ABSTRACT

The experiments were conducted at Chaudhary Sarwan Kumar Krishi Vishavidhyalaya, Palampur, Himachal Pradesh, India to see the allelopathic effect of medicinal leaf extracts of *Ocimum sanctum L.*, *Calotropis procera*(Ait.) Ait.f and *Astragalus tribuloides* Delile on the plumule length of mungbean (*Vigna radiata L. Wilczek*) in vivo conditions. The results indicated that different extracts such as alcoholic, aqueous acidic and alkaline extract of *Ocimum sanctum L.*, *Calotropis procera*(Ait.) Ait.f and *Astragalus tribuloides* Delile showed different plumule length of mungbean in vivo conditions. All the extracts of *Ocimum sanctum L.* showed no effect in comparison of control. The alcoholic extract of *Calotropis procera*(Ait.) Ait.f, produce considerably higher as compared to control followed by aqueous, acidic but alkaline extract showed negative effect on plumule length of mungbean. However, the alcoholic and alkaline extracts of *Astragalus tribuloides* Delile showed positive effect than aqueous acidic extract on the plumule of mungbean.

Keywords: Extracts of Medicinal Plants, Plumule Length, and Vivo Condition.

INTRODUCTION

Allelopathy is the ability of plant to inhibit the germination of other plant through the production of allelochemicals that may be present in leaves, root, fruits, stems and rhizome etc. The history of allelopathy is an area of research has been reviewed^{1,2}. In allelopathy three criteria are followed to provide the proof of allelopathy i.e there must be production and release of chemicals by the donor or aggressor plants. They are released to the soil thorough volatilization, root exudation, leaching and decomposition of plant residues³ and affect on germination and growth of other species of plant^{4,5}. The effect of allelopathy when one plant strikes upon another for a common resource. Many organism species regulate the production and release of chemical attractants.

stimulators or inhibitors⁶1986. Allelopathic compounds regulate plant growth and developmental

processes like photosynthesis, respiration, transpiration, biochemical metabolism, protein and nucleic acid synthesis⁷ Chou,2006. *Ocimum sanctum L.*, *Calotropis procera* and *Astragalus tribuloides* has medicinal values. These plants show the allelopathic effect on *Vigna radiata L. Wilczek*^{8,9,10}.

The importance of allelopathy in crop productivity has been highly recognized^{11,12,13}. The number of crop species has been reported to possess the allelopathic effect on growth of other plant species³. These plant species has been reported to have some plants^{14, 15}. The extracts of plants have medicinal value for treatment of antifungal activity, Antibacterial activity and stopped the replication process of HIV virus in human being^{16,17,18}. The Extracts of *Ocimum sanctum* curing viral, bacterial and fungal infections of the respiratory system gives miraculous relief in congestion due to presence of Eugenol and Cineole in its essential oils. It is effective in curing

almost all varieties of respiratory disorders including bronchitis, both chronic and acute. It also reduces the chances of ulcers and removes cough from lungs and nasal passage. *Calotropis procera* is known to contain cardioactive glycoside calotropine which has shown an antitumor effect in vitro on human epidermoid carcinoma and diuretic the rhinopharynx¹⁹. It also produce a strong cytotoxic effect on COLO 320 tumour cells against human colon cancer cell line²⁰. Alkaline extracts is used to reduce stress and fight aging and enhanced the function of T-cells to play specific roles in the immune system and for its adaptogenic effect on the heart and kidneys²¹. Hence, the present study was carried out to determine the allelopathic effect of different medicinal plant extract on plumule length of *Vigna radiata L. Wilczek* under laboratory conditions.

MATERIALS AND METHOD

Collection of Plant Material

From some preliminary survey and review of prior works by other workers, it was noted that the leaf extract had the strongest allelopathic effects on plumule length, thus leaves were selected for the present experiment. Fresh leaves of medicinal plants namely *Ocimum sanctum L.*, *Calotropis procera* (Ait.) Ait. f and *Astragalous tribuloides Delile* was collected in their vegetative growth stage from the nearby experimental fields. Extraction of plant leaves was done following the method of ²² as modified by ²³.

Alcoholic Extract

Take 0.2 gm of the leaves sample was crushed in 1ml of 80% aqueous methanol. The sample were centrifuged at 5000 rpm for 10 minutes and supernatant was collected which is concentrated with vacuum concentrator.

Aqueous Acidic Extract

Take 1 gm of leaves were boiled in 0.2M Hcl for 25-30 minutes. It was filtered with muslin cloth and separated out with ethyl acetate. Shake well and kept for five minutes and concentrated with vacuum concentrator, this separation was done three times with ethyl acetate. Finally, it was dissolved in 80% aqueous methanol.

Alkaline Extract

Take 0.2 gm of the leaves was boiled in 0.2 M HCl for 25-30 minutes, centrifuged at 5000 rpm for 10 minutes. Pellets kept in 2M NaOH for overnight. Then, again centrifuged at 5000 rpm for 10 minutes. Filtered with muslin cloth and pH was adjust to 2.0 with concentrated 1N HCl and separated it out with ethyl acetate and finally dissolve it in 80% methanol.

Uses of Extracts

Plumule length was performed for the alcoholic, aqueous acidic and alkaline extract of donor plants. Healthy and uniform sized seeds were selected and pre-soaked in distilled water for 2 hrs, then imbibed in different extracts of medicinal plants for 3 hrs and control was treated as double distilled water. Seeds were eventually placed on two layers of seed germination paper in sterilized petriplates. Petri plates were kept at dark condition at 27°C in moistened condition. Each treatment has three replicas and one control was run with double distilled water. Plumule length of mungbean in different extracts of medicinal plant was measured *in vivo* condition after one week in comparison of control. These extracts show different plumule length in vivo condition. These extracts help in curing viral, bacterial and fungal infections and also curing respiratory disorders and help in reducing stress reaction.

RESULTS AND DISCUSSION

The effect of alcoholic, aqueous acidic and alkaline medicinal leaf extracts on Plumule length of mungbean. There were significant differences in plumule length in each setup. The different leaf extracts showed different plumule length of mungbean.

During the present study, among the donor plants highest allelopathic effect on plumule length of mungbean was showed by *Ocimum sanctum L.*, *Calotropis procera* (Ait.) Ait. f and *Astragalous tribuloides Delile*. In *Ocimum sanctum L.*, Figure 1 showed that all the extracts of *Ocimum sanctum L.* showed no effect in comparison of control. In *Calotropis procera* (Ait.) Ait. f, Figure 2 that the alcoholic extract of *Calotropis procera* (Ait.) Ait. f,

produce considerably higher as compared to control followed by aqueous, acidic but alkaline extract showed negative effect on plumule length of mungbean. In *Astragalus tribuloides Delile*, Figure 3 showed that the alcoholic and alkaline extracts of *Astragalus tribuloides Delile* showed positive

effect than aqueous acidic extract on the plumule of mungbean.

The present investigation reveal that three different crude medicinal plant extracts were used in experiment and methanol was the best solvent

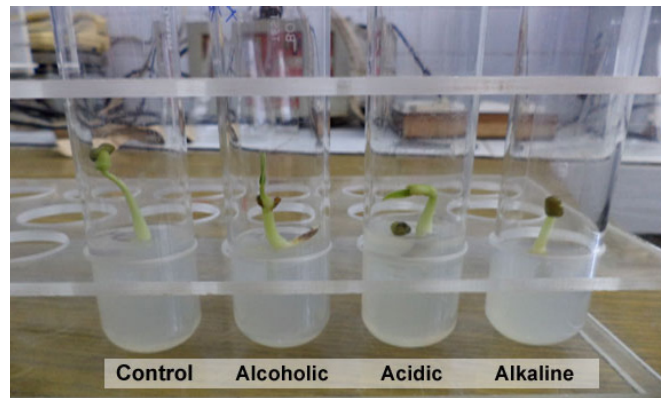


Fig. 1

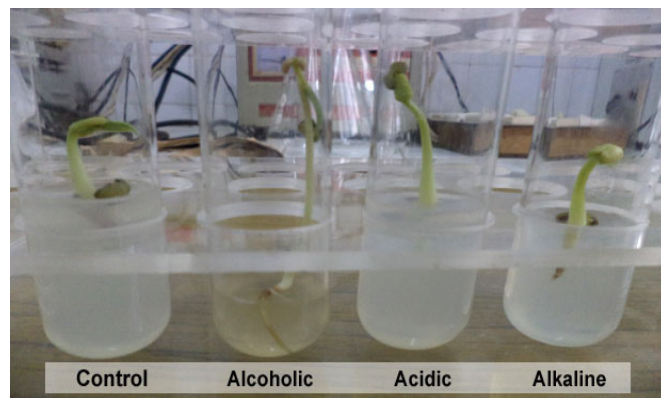


Fig. 2

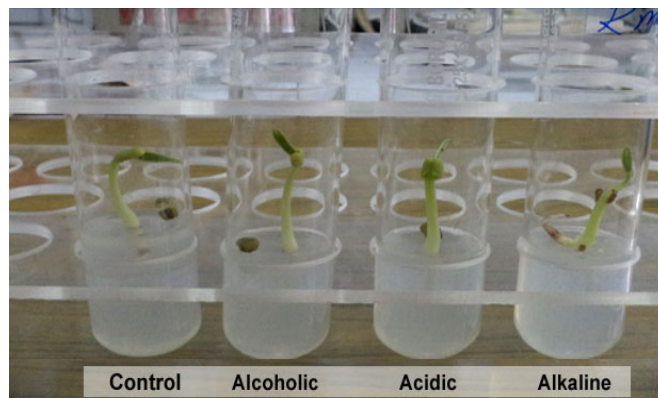


Fig. 3

Table 1: Plumule length of Mungbean treated with different medicinal plant extracts

Varieties of Medicinal plants	Control	Alcoholic	Aqueous Acidic	Alkaline
Ocimum sanctum L.	3.1 cm	2.7 cm	2.4 cm	2.2 cm
Calotropis procera	2.5 cm	3.8 cm	2.9 cm	2.1 cm
Astragalous tribuloides	2.2 cm	2.6 cm	2.0 cm	2.9 cm

compared to water and other organic solvents. Plant extracts of *Ocimum sanctum* L., *Calotropis procera*(Ait.) Ait.f. and *Astragalous tribuloides* Delille

showed changes in plumule length of Mungbean. This indicates that the effect of alcoholic extract of *Ocimum sanctum* L. and *Calotropis procera*(Ait.) Ait.f. is more effective than aqueous acidic and alkaline extract to enhance the plumule length of mungbean but in case of *Astragalous tribuloides* Delille alkaline extract is more effective than alcoholic and aqueous acidic extract to enhance the plumule length of mungbean.

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