



## Full Length Review Article

### ALLELOPATHIC EFFECT OF EXTRACTS OF MEDICINAL PLANT ON MUNGBEAN (*VIGNA RADIATA L. WILCZEK*) IN VITRO CONDITIONS

\*Priyanka Gupta

Department of Biotechnology, Banasthali University, Banasthali (Rajasthan)-304022, India

#### ARTICLE INFO

##### Article History:

Received 22<sup>nd</sup> June, 2016  
Received in revised form  
18<sup>th</sup> July, 2016  
Accepted 13<sup>th</sup> August, 2016  
Published online 30<sup>th</sup> September, 2016

##### Key Words:

Allelopathy, *Ocimum sanctum L.*,  
*Calotropis procera* Decne, *Astragalus  
tribuloides* Delile, Radical length,  
Vitro condition.

#### ABSTRACT

The allelopathic effect of medicinal leaf extracts of *Ocimum sanctum L.*, *Calotropis procera*(Ait.) Ait.f and *Astragalus tribuloides* Delile on the radical length of mungbean (*Vigna radiata L. Wilczek*) in Vitro 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 radical length of mungbean in Vitro conditions. Alcoholic extract of *Ocimum sanctum L.* showed highest radical effect in comparison of other extracts. The aqueous acidic extract of *Calotropis procera*(Ait.) Ait.f, produce considerably higher as compared to control followed by alcoholic but alkaline extract showed negative effect on radical length of mungbean. However, the alcoholic extracts of *Astragalus tribuloides* Delile showed positive effect than aqueous acidic extract and alkaline on the radical length of mungbean.

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#### INTRODUCTION

The word *allelopathy* has been derived from the Greek words "Allelo" means "mutual" and "pathy" means "suffering" by one plant, that have some type of effect on another plant was first used in 1937 by the Austrian professor Hans Molisch in the book "Der Einfluss einer Pflanze auf die andere- Allelopathie" (Einhellig, 2002). Allelopathy is a phenomenon that involve either direct or indirect and either beneficial or adverse effects of a plant or another plant through the release of chemicals in the environment over 2000 years (Rice., 1974). It is the detrimental effect of higher plant of one species on the germination and growth of other species (Putnam and Duke, 1978). It is also an important component of plant interference capability in a variety of natural and artificial ecosystem (Jose S., 2002). Additionally, weeds exhibit allelopathy against crop plants providing a competitive advantage (Singh *et al.*, 2001; Aschehoug, 2000; Ridenour and Callaway, 2000). Allelopathy was first detected by (Davis, 1928) in Blackwalnut tree (*Juglans nigra*). In (Phlomis and Srivasuki., 1996) reported the leaf leachates of five

multipurpose tree species (*Sesbania grandiflora*, *Derris indica*, *Casia siamea*, *Eucalyptus camaldalensis* and *Acacia nilotica*) had varying degrees of inhibitory and stimulatory effects on radical length (Mahall and Callaway 1991; Indrejit, 1996 and Ashrafi *et al.*, 2007, Al. Charchafchi *et al.*, 2007, Salam and Noguchi., 2010) suggested the allelopathic effect on Neem (*A. indica*) plant and many other plants especially in radical length. There are many other plants which is traditionally used for the medicinal purpose shown. Some allelopathic effect in Basil (*Ocimum sanctum L.*) on some crops (Verma *et al.*, 2010). The above view, some observation were made on allelopathic effect of some medicinally plant species i.e *Ocimum sanctum. L.*, *Calotropis procera*(Ait.) and *Astragalus tribuloides* Delile on *Vigna radiata L. Wilczek* i.e. an economically important pulse crop.

#### MATERIALS AND METHODS

**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 radical length, thus leaves were selected for the present experiment. Fresh leaves of medicinal plants namely *Ocimum sanctum L.*, *Calotropis procera*(Ait.) Ait. f and *Astragalus tribuloides Delile* was collected in their vegetative growth stage from the

\*Corresponding author: Priyanka Gupta,  
Department of Biotechnology, Banasthali University, Banasthali  
(Rajasthan)-304022, India.

nearby experimental fields. Extraction of plant leaves was done following the method of (Harborne. 1998) as modified by (Chakraborty *et al.*, 2007).

**Alcoholic Extract:** Take 0.2 gm of the leaves sample was crushed in 1ml of 80% aqueous methanol (80 ml Methanol 20 ml Distilled water). 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 was boiled in 0.2 M Hcl(9ml and 834ul Distilled water and 0.166ul Hydrochloric acid) for 25-30 minutes. It was filtered it with muslin cloth and separated out with ethyl acetate Shake well and kept it for five minutes and concentrate with vacuum concentrator, this separation is 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 it at 5000 rpm for 10 minutes. Pellets kept in 2M NaOH(8gm of NaoH in 100ml Distilled water) for overnight. Then, again centrifuged it at 5000 rpm for 10 minutes. Filtered it with muslin cloth and adjust its pH=2.0 with concentrated 1N HCl and separate it out with ethyl acetate and finally dissolve it in 80% methanol.

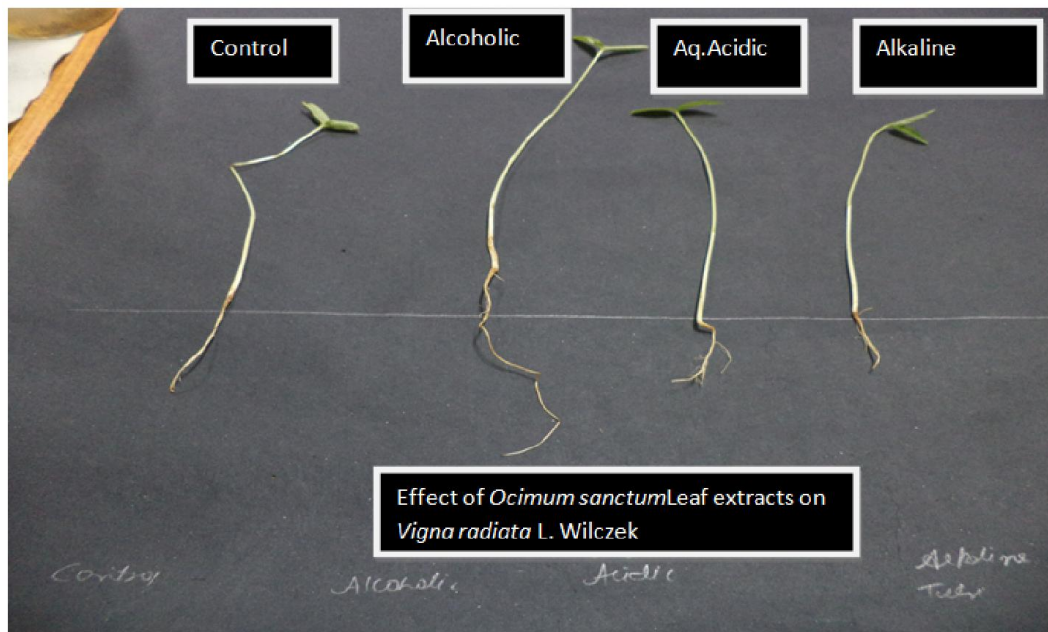
**Uses of Extracts on Radical length:** Radical length was performed for the Alcoholic, Aqueous acidic and Alkaline extract of donor plants. Healthy and uniform sized seeds were selected and pre-soaked in distilled water for 2 hrs, then imbibed in different extracts of medicinal plants for 3 hrs and 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. Radical length of mungbean in different extracts of medicinal plant was measured *in vitro* condition. These extracts show different radical length in vitro condition. These extracts help in antidiabetic and used in treatments of chemotherapy, radiotherapy to provide partial and transient relief and also help in enhancement the level of antioxidant on the chronic stress.

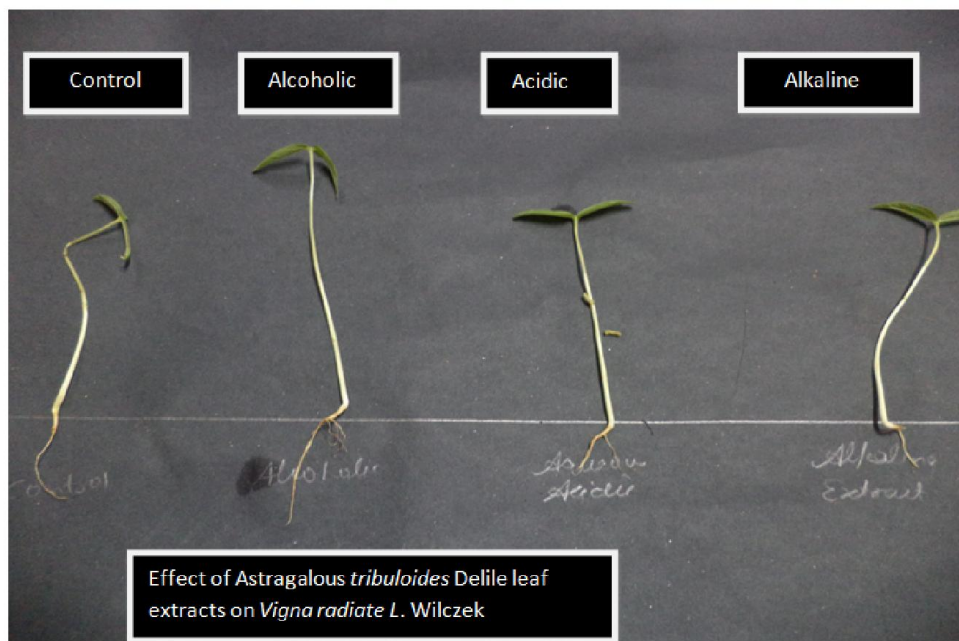
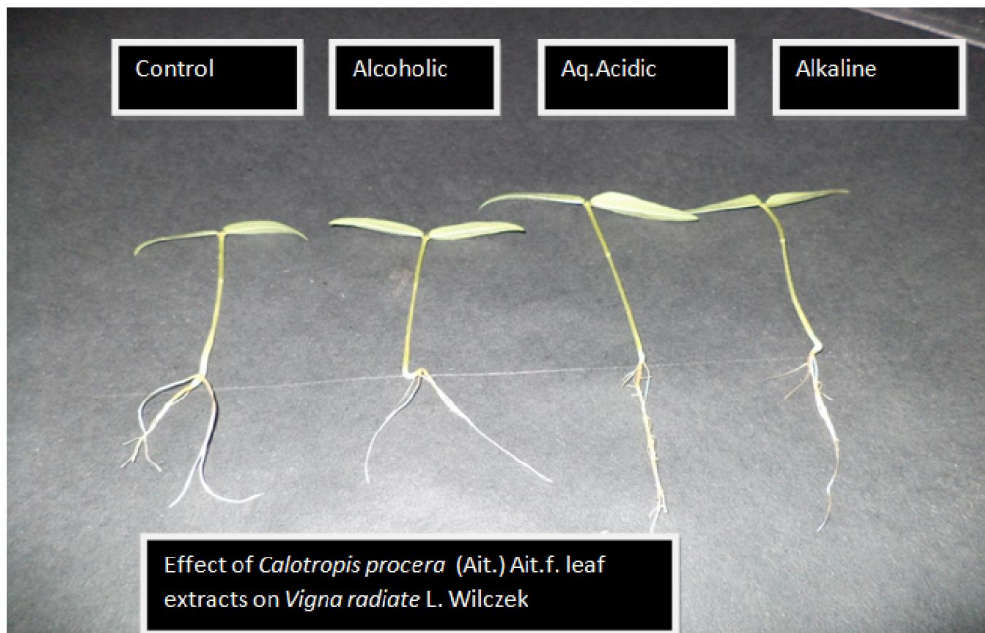
**RESULTS AND DISCUSSION**

The effect of alcoholic, aqueous acidic and alkaline medicinal leaf extracts on radical length of mungbean. There are significant differences in radical length in each setup were observed. The different leaf extracts showed different radical length of mungbean. During the present study, among the donor plants highest allelopathic effect on radical length of mungbean was showed by *Ocimum sanctum* L., *Calotropis procera*(Ait.) Ait. f and *Astragalous tribuloides* Delile.

**Table 1. Radical Length of Mungbean treated with different medicinal plant extracts**

Varieties of Medicinal plants	Control	Alcoholic	Aqueous Acidic	Alkaline
<i>Ocimum sanctum</i>	6cm	14cm	8cm	3cm
<i>Calotropis procera</i> Decne	9cm	11cm	18cm	15cm
<i>Astragalous tribuloides</i>	11cm	17cm	8cm	6cm





In *Ocimum sanctum* L., (Figure 1) showed that alcoholic extract produce highest radical effect in comparison of other extracts. In *Calotropis procera* (Ait.) Ait. f, (Figure 2) showed that Aqueous acidic extract produce considerably higher as compared to control followed by alcoholic but in *Astragalous tribuloides* Delile (Figure 3) showed positive effect on Alcoholic extract than aqueous acidic and alkaline extract on the radical length of mungbean.

### Conclusion

The present investigation reveal that three different crude extracts were the most common type of extracts used in experiment conducted by researchers. Methanol was the best solvent compared to water and other organic solvents. Plant extracts of *Ocimum sanctum* L., *Calotropis procera* (Ait.) Ait.f. and *Astragalous tribuloides* Delile shows changes in radical

length of mungbean. The results also indicated that morphological changes in radical length of mungbean are different, when they are treated with different extracts of medicinal plants. This indicates that the effect of alcoholic extract is more effective than other extracts. In *Calotropis procera* (Ait.) Ait.f. Aqueous acidic extract is more effective than other extracts but in case of *Astragalous tribuloides* Delile alcoholic extract is more effective than other extracts to enhance the radical length of mungbean.

### Acknowledgements

The work was supported by Dr. R.K.Mittal and Dr. Harinder Choudhary (Department of Plant Breeding and Crop Improvement, Chaudhary Sarwan Kumar Himachal Pradesh Vishvidhayalaya) for providing the facilities for research work. We are highly indebted to this place.

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