



## **Biological control of weeds by using Allelopathic potential: REVIEW**

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### **Abstract**

Allelochemicals have an effect similar to that of synthetic herbicides, as these liberated compounds can be utilized from some crops grown with weeds, to control weeds that are liberated by washing, root secretions and volatilization, or by decomposing plant residues in the soil.

There are many types of crops that showed an inhibitory effect on the bush from these crops: corn, wheat, barley, sunflower, cucumber, rice, lupine and beet . Through this article, we hope that this will inspire weed control workers to take advantage of this phenomenon to reduce environmental pollution as well as reduce the financial cost by using plant waste to control weeds as they are environmentally friendly, available and easy to use.

**Key Words:** Biological control , weeds, Allelopathy, Wheat

### **Introduction**

The weed is defined as "the plant growing in a place that is not suitable for humans and competing beneficial plants for water, habitat and food, as well as sunlight" (Al-Juburi, 2002, Mandel ,2000,)

The damages caused by bush plants to agricultural production are numerous and grave, the most important of which is the decrease in the quantity and quality of the outcome. These damages have attracted attention to the importance of combating bush plants whose damages exceed the losses caused by other agricultural pests such as diseases and insects.

On this basis, controlling the bush is one of the issues that must be taken care of in order to increase production per unit area and improve the quality of the crop. The weed control process varies according to the type of weed and the environmental conditions, including chemical, mechanical and biological control. The interest of the agricultural developed countries increased in

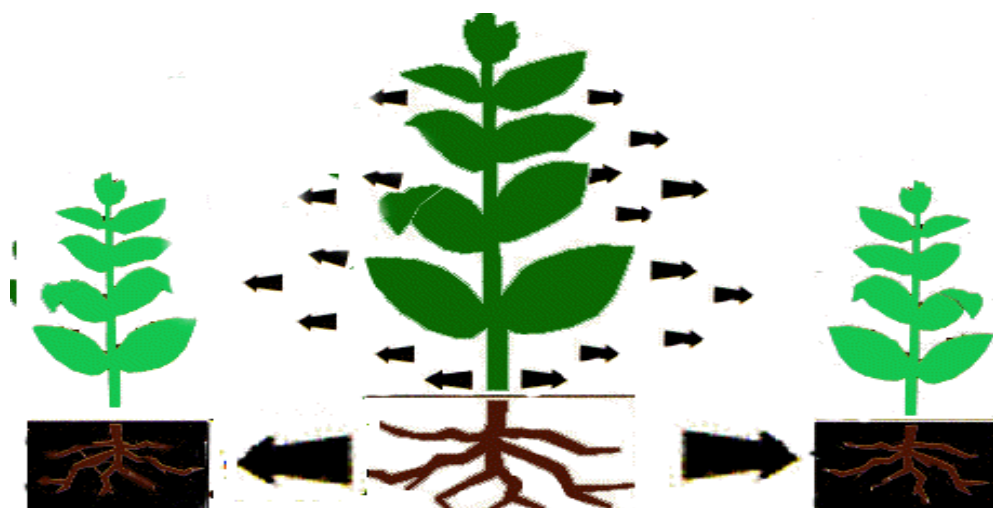
Combating the weed, especially using chemical pesticides, until their use has now become one of the basic agricultural operations because of their great economic importance. However, the widespread use of chemical pesticides increased the risk of environmental pollution, as they were found to cause harmful effects on human health due to their indiscriminate use Xuan *et al.* (2004). The continuous use of pesticides produces generations of weeds that are resistant to these pesticides, in addition to being polluting the environment. For these reasons, research in recent years has tended to find an alternative that is more beneficial.

To the presence of plant species that produce secondary metabolites, which are chemical compounds that play an important role through the interaction between the plant and other organisms., An *et al.* (1997), which was used as an alternative to weed and insecticides (Razavi, 2011). These compounds are called allelochemicals, which are released from the different plant parts, and this phenomenon is known Allelopathic (includes the harmful and beneficial effects on the plant that neighbors or follows it in agriculture).

Biological weed control using Allelopathic phenomenon has been widely accepted as a practical safe and environmentally beneficial method of weed management, And that the increased interest in this method is due to the negative impact of alternative methods on the environment and human health.

### **Competition and allelopathy**

Rivalry between plants. Plants compete with each other just as animals do for survival. But this competition is through the plants' secretion of chemicals that may be mainly metabolites of these plants, with which they inhibit the growth of other plants. In a process known as Allelopathy, this inhibition may be non-chemical, such as what happens when tall trees block sunlight from the short grassy plants that grow under it.



### **Use Allelopathic phenomenon in weed control:**

The phenomenon of allelopathy plays an effective role in the biological control of the bush through the use of compounds that have the ability to inhibit and reduce the growth of the bush and that are freed from some plants that (Mandel 2000)

One of the important strategies to reduce the use of pesticides and improve and protect the environment (Farooq *et al.* 2008) this phenomenon was used as natural herbicide by means of biochemical interference between plant types using the compounds released from different plant parts( Samad *et al.* 2008).

The purpose of using these crops is to benefit From the allelopathy phenomenon in controlling the jungle by taking advantage of the inhibitory property of Allelopathic compounds in the natural control of the jungle in the agricultural system Weih *et al.* (2008) The allelopathy phenomenon has received great attention through multiple studies in this field (Kamal 2011).

The Allelopathic ability of different crop residues was tested to reduce weed germination. Several observations also appeared on the existence of weeds free areas in the form of rings up to 20 cm in diameter in the rice fields. The decrease in problems arising from the growth of weeds with some crops is due to the inhibition of the germination and development of many types of weeds by Allelopathic released from these crops.

Among these crops are wheat, barley, and oats, Maize ,Sorghum, sunflower, rice and others Known to own Allopathic potential to limit and control the growth of species of weeds, Nawaz *et al.* (2014), and that the

chemical nature of Allelopathic compounds and the different mechanism of their effect have been developed to be used as weeds and insecticides, and we will look at some studies that are concerned in this field:

### **1.Wheat**

Use of biological methods that have less impact on the environment; Studies have tended to take advantage of the allelopathic property to control weeds, and among the plants that have been shown to have an allylopathic inhibitory effort is wheat.

Many factors influenced in biological effect of wheat suchas age, soil pH, carbon and nitrogen content as well as soil this is by a water content (Alsaadawi, 2008).

a lot of research is being carried out in latest years to use allelopathy for increasing crop production with improved food quality. In the North of Iraq, where wheat (*Triticum aestivum* L.) is the chief field crop, weeds reason in loss around 45–50% of yield (Ali, 2013).

Hussein et.al (2018) found that wheat residues had the highest reduction rate in the germination rate of *Sochus oleraceus* L., and that the inhibitory effect of wheat @ due to It contains Salicylic acid, P-hydroxy benzoic acid, which are known to inhibit the germination and growth of the recipient plant.

in another study that Hussain(2020) show When sparying with aqueous extract of Wheat at( 10%w:v) decreased the dry weight of *Sonchus oleraceus* L .

### **2.Sunflower**

The sunflower crop has been known to inhibit the germination and growth of weeds (Einhellig *et al.* 1985, Putnam; 1982. Hall *et al.* 1983) found that the plant residues of sunflower have an inhibitory effect on the growth and dry weight of *Amaranthus retroflexus* L.

The compound heliannuols isolated from the sunflower plant and diagnosed as a phenolic compound inhibited the growth of broad-leaved jungles at low concentrations while causing a stimulatory effect in thin-leaf jungles (Vyvyan,2002; Weidenhamer, 1996).

It was found that the sunflower residues inhibited (seed germination, feather length, root length , and dry weight) of the *Sonchus oleraceus* L weed and the reason is the inhibitory effect of the allelopathic compounds

released from the residues of the sunflower, which included a number of phenolic compounds that included "Vanillin, Resorcinol, Rutin , Quercetin" (AL-Jehaishy2017)

### **3.Barley**

Allelopathy is important in weed control through crop rotation and overlap among them also by spraying these weeds with aqueous extracts of crop residues, Farooq et al. (2011), In a study conducted by Goran & Sakri (2009) on the effect of residues of two varieties of barley, they observed a decrease in the germination of four types of weeds: *Brassica nigra* L., *Cephalaria*, *Avena fatua* L., *Echinochto crasa*.

Al-Jehaishy (2017) results showed that barley residues gave the highest reduction in the length of the root system of weeds( *Lolium rigidum* L. *Sonchus oleraceus* L. ,*Panicum repens*. L) growing in soils containing these residues, and the reason for the reduction was attributed to their containment of caffiec acid.

### **4. Maize**

Maize (*Zea mays* L.) is important cereal crops in the world, mainly in ( India, Pakistan, China, etc.) its used as human food grain.

Maize is known an allelopathic plant but has always taken less attention than others crops such :wheat, Brassica, rice, etc. (Mahmood, 2009).

Narwal & Haouala (2013) observed that some summer crops: maize, sorghum, sunflower, and winter crops: wheat, barley, and oats have the ability to reduce the germination and growth of Brassica Spp.

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