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Mini Review

Weeds control through allelopathic extracts from different plants

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Increasing costs in the agricultural sectors is nowadays with the use of herbicides on weeds control that need to use non chemical methods to reduce the environmental impact of chemical herbicide, insecticides and weedicide to prevent weed resistance, use of allelochemical natural herbicide for weed control to reduce the costs. In integrated weed management programs allelopathic chemicals as an alternative for weeds control. These chemicals inhibit the weeds growth and as a weapon to be used against these unwanted plants. Allelopathic crops species relationship, genetic diversity is very extreme and genetic control of these compounds to be seems. The main aims of this review paper are to find out the efficient allelopathic nonchemical control of weeds from crops and best way of controlling the noxious weeds with these plants extract.

Key words: *allelopathic, chemicals, crops, weeds*

INTRODUCTION

Release of chemicals and affect other plant called allelopathic effect of a plant. These chemicals unintentionally applied and work as a weapon to suppress the growth and performance of related species used (Kohli et al., 2001). To reduce the environmental impact of chemical herbicide, insecticides and weedicide to prevent weed resistance, use of allelochemical natural herbicide. Extraction of chemicals from leaf, stem and root was higher inhibitory effect on weeds (Peterson et al., 2001). These are different in plants and other wise these chemical compounds will vary in different parts of the plant. Higher number of allelochemical plants, which significantly control weeds such as Cineole, Benzoxazinone and Quino Linic acid are leptospirosis (Pester et al., 2000). A wide variety of these natural chemical products show and using them as biological herbicide and small amount are extracted from plants should be consumed before their effect on crops, human and livestock evaluation (Peterson et al., 2001). Use of allelopathic effects allelopathic properties in rotation approaches to date have been obtained (Putnam, 1985) and plants in cultivated system (Rice, 1984) and biosynthesis in microorganisms and higher plants, which is important for which is useful for usual herbicides in nowadays. Many researcher use allelopathic plants due to direct effect on weeds management (Rahimiyan et al., 1994). Allelopathic interaction of natural utilization directly and or allelochemical as a natural herbicides use for controlling weeds. Many crops having the potential to use as a cover, mulching, green manure and smother for controlling of weeds and that's plants has allelopathic characteristics. These crops grown within the main crops as a intercropping or rotation to restrict the growth of targets weeds, even the crop residues can also compete with weeds.

Allelopathic plants and their effect on weeds

Many invasive plant species interfere with native plants through allelopathy. A famous case of purported allelopathy is in desert shrubs. One of the most widely known early examples was *Salvia leucophylla*, because it was on the cover of the journal *Science* in 1964 (Craig et al., 2011). Bare zones around the shrubs were hypothesized to be caused by volatile terpenes emitted by the shrubs. However, like many allelopathy studies, it was based on artificial lab experiments and unwarranted extrapolations to natural ecosystems (Douglass et al., 2011). In 1970, *Science* published a study where caging the shrubs to exclude rodents and birds allowed grass to grow in the bare zones. A detailed history of this story can be found in Halsey, 2004. Garlic mustard is another invasive plant species that may owe its success partly to allelopathy. Its success in North American temperate forests may be partly due to its excretion of glucosinolates like sinigrin that can interfere with mutualisms between native tree roots and their mycorrhizal fungi. Allelopathy has been shown to play a crucial role in forests, influencing the composition of the vegetation growth, and also provides an explanation for the patterns of forest regeneration (Muller et al., 1964). The black walnut *(Juglans nigra)* produces the allelochemical juglone, which affects some species greatly while others not at all. However, most of the evidence for allelopathic effects of juglone come from laboratory assays and it thus remains controversial to what extent juglone affects the growth of competitors under field conditions. The leaf litter and root exudates of some *Eucalyptus* species are allelopathic for certain soil microbes and plant species. The tree of heaven, *Ailanthus altissima*, produces allelochemicals in its roots that inhibit the growth of many plants (Cipollini, 2016).

The use of chemical pesticides, weedicides and herbicides, fertilizers in agriculture, resulting the loss of natural habitats, pollution, and risk of human health, food and water table quality has declined. For sustainable agricultural needed to developed new production techniques and management practices. The new approaches of allelopathic properties from some plants which inhibit the growth of surrounding plants and weeds (Baibordi et al., 2000). So far, some allelopathic plants effect, some of them are canola, rye, wheat, vetch, soya been and alfalfa release chemical substances from the organs and control weeds and pest also the following same year to. Moreover, bits and pieces of these plants can be regarded use as a natural source of organic matter; soil physical, chemical and biological properties improve the soil. Climatic factors and management affected decomposition of plant residues to improve soil and over time these debris toxic substances reduced (Koochaki et al., 1997). Rye is one of the important crop that have allelopathic substances release for suppression the weed growth (Miller D.A., 1996). Barnyard grass weed is suppress by shoot and root residue of rye crop (Kohli et al., 2001). Plant toxic substances acidity are contributes with Cyclic Hydroxamic 1 (Weston, 1996). Some weed grass such as barnyard grass, Ammonia coccinea, Heteranthera limosa and Cypress grass control with cover cropping of rye and reduces the use of pesticides (Weston, 1996). Residue of free chemical prevent the growth of weeds in ray crops, stem of these ray crop material are leakage into the soil and dissolved in water, and prevent germination of roots weeds (Gliessman, 1987). Wheat weeds has inhibitory effect to agronomic characteristics and the use of chemicals control methods, it is a proper way to avoid these control measure apply cover cropping and mulching (Weston, 1996). Legumes containing weeds species have highly competitive ability with legumes crops. Most of these weeds control with dance cropping of these crops have a high competitive ability with weeds. Living mulch of legumes species should be used (Miller, 1996). Subterranean clover (*Trifolium subtranium*) is used as a cover crop and living mulch, plant *Ipomoea hederacea* and *Panicum dichotomiflorum* is able to control the growth of weeds. Amaranthus genus prevent by cover crops of barley, rye, triticale, wheat and hairy vetch on seed germination and seedling emergence in the field (Kohli et al., 2001). Sorghum residues decrease the growth of Trifolium spp. In gardens and nursery establishment program (Weston, 1996). Report on allelopathic effect of water washing, steam and debris hemp (*Cannabis sativa*) on sorghum, mung beans, fenugreek and Castor bean are observed (Inam & Hussain, 1989). Seed germination of weed, chicken, Euphorbiaceous and Cypress grass destroy with the allelopathic effects of plant rue (*Ruta graveolens*) has been reported (Aliotta & Cafiero, 1999). Mitotic division of cells control with saturated solution of coumarin in roots and lily bulbs in the study of about 2 to 3 hours and colchicines procedure same like the use of coumarine first cell division has prevented (Mighati, 2003). Aqueous extract solution concentration of clover and vetch flower cluster decreased the weeds of the corn, cotton, mustard and wild morning glories crops and also germination and growth of wild mustard and rye were wide open (Mighati, 2003). In potatoes field cultivation of canola Sudan grass density decrease from 85 % to 73% respectively, over two year research (Rice, 1984). Reducing environmental risk and the use of synthetic weedicides allelopathic control has beneficial affect (Fuji, 2001 & Perry, 2009). The species of Brassica allelopathic chemicals inhibit the seed germination of many species, such as wild oat by releasing glucosinolates (Turk, & Tawaha, 2003). The use of synthetic herbicides cause serious problem to human, environment, water and air, also cause resistance against weeds (Lin et al., 2010). The use of water extracts of sorghum along with extracts of other crops provide an environmentally, cost effective and efficient weed control method (Mushtaq et al., 2010). The use of these herbicides sometime competes to resist against weeds population and this phenomenon urge upon the utilization of allelopathic potential of crop plants (Ferreira, & Reinhardt, 2010). Chung et al. (2003) observed that, allelopathic potential of rice (*Oryza sativa* L.) residues against *Echinochloa crusgalli,* in the field of paddy. In 113 varieties Duchungiong variety perform better among all 77.7% higher result in case of *Echinochloa crusgalli* weed control. Field and laboratory experiment significantly control both monocot and dicot weeds through rice allelopathic chemicals (Olofsdotter, & Navarez, 1996). Taichung native 1 cultivar of rice also active against most of the dangerous weeds including barnyard grass, desert horsepurslane (*Trianthema portulacastrum* L.), duck salad, and tooth cup (*Ammannia coccinea* Rottb.) (Olofsdotter, & Navarez, 1996; Dilday et al., 1998). In rice germplasm phenolic compound have been identified for weeds control (Rimando et al., 2001). Oueslati (2003) evaluated that, roots, leaves and stems extraction in diluted from wheat variety Karim and Om rabi cause allelopathic effect on barley var. Manel and wheat var. Ariana. Guenzi & McCalla (1966) studied that, phenolic acids, particularly *p*-coumaric acid, from residue of cereals and wheat. Niemeyer H.M. (1988) reported that, 40 days old wheat plant produce Hydroxamic acids, varying with age of the plant. Glucosinolates found high amount in Brassica spp. (Fenwick et al., 1983). Isothiocyanates were strongly suppressing the germination of *Sonchus asper* L. Hill, smooth pigweed (*Amaranthus hybridus* L.), (*Echinochloa crusgalli* L. Beauv.), scentless mayweed (*Matricaria inodora* L.), blackgrass (*Alopecurus myosuroides* Huds.) and wheat (*Triticum aestivum* L.) (Peterson et al., 2001). Turk & Tawaha (2003) evaluated that, wild oat (*Avena fatua* L.) germination and seedling growth as affected by allelopathic of black mustard (*Brassica nigra* L.). Allelopathic extraction were significantly affected germination and radical length, the inhibitory effect on germination increased with increasing concentration of extract solution of the fresh allelopathic plant parts use. A screening of 526 cucumber (*Curcumis sativus*) accession, originating from 41 countries, revealed several accessions showing strong growth inhibition of *Panicum miliaceum* and *Brassica hirta*. From the above study, 26 accessions caused 50-87% growth inhibition of the species tested in this experiment (Peterson et al., 2001).

CONCLUSION

The most commonly used methods of alternative herbicides and tillage crops are allelopathic properties that are used for weeds control. Plants cover a variety of reasons, including preventing the development of weeds, disease control, soil enrichment through nitrogen fixation in soil, improve soil texture and structure, preventing the leaching of fertilizers, increase soil organic matter and reduce soil erosion are grown. Thus, the use of crop Allelopathic crops properties both economically and environmentally is very good.

AUTHOR CONTRIBUTION

Nadeem Khan collected the data from different research articles and reviewed. Muhammad Ayaz Khan and Asif Iqbal are corrected and approved for the publication.

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COMPETING INTERESTS

The authors declare that they have no conflicts of interest associated with the publication of this mini-review.

ETHICS APPROVAL

Not applicable.

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