콩과 옥수수에 대한 알팔파와 베취의 타감영향

건국대학교 농업자원 개발연구소
김기준, 김광호, 안종국, 정일민*

ALLELOPATHIC INFLUENCE OF ALFALFA AND VETCH RESIDUE ON SOYBEAN AND CORN

The Research Institute of Agriculture Resources, Kon-Kuk University
Ki-June Kim, Kwang-Ho Kim, Joung-Kuk Ahn and Ill-Min Chung*

Objectives:

To investigate the allelopathic potential of alfalfa and vetch residues on soybean and corn was conducted.

Materials and Methods:

Alfalfa and vetch residue used various extract concentrations (0, 5, 10, 15, 20%, w/v) and residue rates (0, 0.25, 0.5, 0.75, 1%, w/w). Rate of germination and seedling vigor were calculated. Each extract treatment was replicated five times in a CRD and the experiment was repeated three times using alfalfa and four times using vetch. Residue rate and nodule number study were arranged in a CRDand the experiment repeated twice with three replications.

Results and Discussion:

The degree of inhibition significantly increased as the aqueous extract concentration increased. The aqueous extract of alfalfa resulted in greater reduction in germination, seedling length and weight of soybean than that of vetch. Alfalfa and vetch extracts inhibited secondary root formation and branching as the extract concentration increased. Alfalfa and vetch 1% residue rate inhibited soybean plant height by 30% and10%, leaf area by 31% and 23%, and dry weight by 18% and 1%, respectively. Also, nodule number was inhibited by 27% and 20% at the same rate. Alfalfa and vetch residue significantly enhanced plant height, leaf area and dry weight of corn. There is an allelopathic potential resulting from alfalfa and vetch residues on soybean growth. It also suggests that these residues may affect crop growth and development due to the inhibitory or stimulatory effects of allelochemicals existing in the residue.

Table 5.1. The effect of various dried alfalfa extract concentrations on germination, seedling growth and weight, seedling vigor, and germination rate of soybean.

Concentration(%)	GP[1]	RL[1]	HL[1]	CW[1]	HW[1]	HW[1]	SV[1]	GR[1]
	%	cm		mg				
0	93.3	16.2	10.9	144.8	24.2	12.0	1516.2	38.68
5.0	84.0	9.0	9.4	125.7	23.7	8.7	757.7	32.57
10.0	78.3	9.0	8.5	114.1	16.1	7.2	700.6	28.21
15.0	75.6	6.7	7.9	108.2	18.8	6.4	505.6	21.95
20.0	61.0	5.7	6.2	106.6	13.6	3.7	348.2	17.42
LSD(0.05)	4.95	1.02	1.44	6.36	2.98	1.52	98.63	2.09
CV(%)	4.78	8.36	12.78	4.02	11.74	15.15	9.76	5.73

[1] GP, Germination Percentage; RL, Radicle Length; HL, Hypocotyl Length; LW, Cotyledons Weight; HW, Hypocotyl Weight; RW, Radicle Weight; SV, Seedling Vigor; GR, Germination Rate.

Table 6. The effect of various dried vetch residue rates on growth and dry weight of soybean.

Rate(%, w/w)	H[1]	LA[1]	DRSW[1]	DRLW[1]	DRTOP[1]
	cm	cm^2	mg		
0.00	38.9	63.3	124.3	150.0	274.3
0.25	36.1	59.4	106.2	149.6	255.9
0.50	35.1	56.5	105.3	141.2	246.5
0.75	35.0	53.5	96.3	134.0	230.3
1.00	34.9	48.3	95.8	132.1	228.0
LSD(0.05)	3.11	0.59	16.36	8.98	17.17
CV(%)	4.76	0.58	8.51	3.49	3.82

[1] H, Plant Height; LA, Leaf Area; DRSW, Dry Stem Weight; DRLW, Dry Leaf Weight; DRTOP, Dry Top Weight.

Table 10. Electrical conductivity and pH characterization of dried alfalfa and vetch extracts.

Plant Material	Electrical Conductivity (1000 u Ohmoes)	pH
Alfalfa	7.4	5.74
Vetch	4.3	6.89

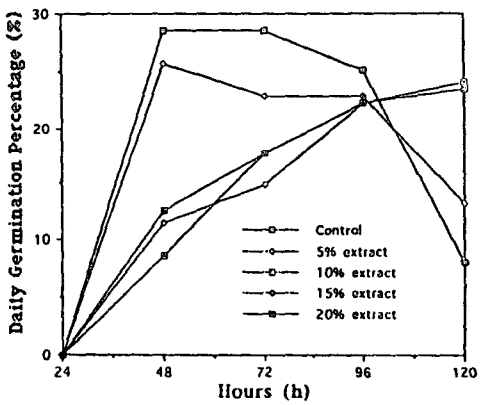

Fig. 5.3. Corn daily germination percentage (% of new germination each day) as affected by alfalfa extract concentration.