

## Separating of Allelopathic and Shade Effect in Weed control by Rice Straw Mulch

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An impressive body of literature is already available on mulching weed control methods, such as crop straws. However, the majority of research focused simply on effects of weed control results, which were to be resulted in factors that is combined the shade effect and alleopathy effect by straw, while there have been not reported allelopathic effect that divided the shade and the allelopathic effect. The objective of this study was to separate the allelopathic effect and the shade effect from inhibition rate by rice straw mulch.

Separating the shade and the allelopathic effect was deserved four level mulches which are non-mulch, soaking-rice straw(soaking rice straw in water for overnight) 1 and 2kg, and non-soaking-rice straw 1kg per plot that is seeded weeds such as *Digitaria sanguinalis*(L ) Scop., *Stellaria media* Villars. At two months after treatments weeds were weighed.

Weeds in bed is affected light and chemicals be produced plant or mulching materials. Rice straw mulch were effective in controlling weeds up to 94.7%.non-soaking-rice straw mulching had significantly inhibited shoot of weed 93.1%. and soaking -rice straw decreased weed growth 79.3 % The inhibition rate was not different from mulching amounts of non-soaking rice straw

Rice mulches control weeds within the crop row and modify the crop microenvironment. They form a physical and chemical barrier for weed seedlings, prevent sunlight from reaching the soil surface, and exude allelopathic chemical, that is, modify the microenvironment effecting weed seed germination and subsequent weed populations. And that 94.7% inhibition rate by rice mulch was combined the shade and the allelopathic the inhibition by rice mulch was mainly effect the 79.3% shade effect, did rarely effected the allelopathic effect only 15.4%

Rice straw exuded allelopathic compound, such as momilactone, oryzalexine, and these compound inhibited weed growth in vitro(Lee et al 1999). In soil, however, this study observed the compounds not mainly effect the weed growth. It suggested that the compounds may be decomposed by soil organisms or bound by the soil So that effected weed growth a little. This studies draw a conclusion the weed inhibition by rice straw mulch was combined the shade and the allelopathic effect, the inhibition was mainly effect the shade effect, did rarely effected the allelopathic effect.

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Table 1 Inhibition rate of weed by rice straw mulching materials.

Mulching treatments	shoot		Root	
	Dry wt. (mg/pot)	Inhibition (% control)	Dry wt. (mg/pot)	Inhibition (% control)
Control(non-mulch)	507a	-	550a	-
Soaking-rice straw 1kg	105b	79.3±6.0	130b	76.4±6.3
Non-soaking rice straw 1kg	35c	93.1±2.6	53c	90.4±1.9
Non-soaking rice straw 2kg	27c	94.7±1.2	23c	95.8±1.1

1) Seeded weeds : *Digitaria sanguinalis*(L.) Scop., *Stellaria media* Villars

2) means within study with same letter are not significantly different according to Fisher's protected least significant difference(LSD) at  $P_s \leq 0.05$

3) values are the means  $\pm$  S.D

Table 2. Effect of Shade and allelopathic substances of weed shoot on rice straw mulching materials.

Mulching treatments	Inhibition rate <sup>a</sup> (% of control)	Shade effect <sup>b</sup> (%)	Allelopathy	effect <sup>c</sup>
			Rate (%)	Difference <sup>d</sup> (%)
Control(non-mulch)	-	-	-	-
Soaking-rice straw 1kg	79.3±6.0	79.3	-	-
Non-soaking rice straw 1kg	93.1±2.6	79.3	13.8	-
Non-soaking rice straw 2kg	94.7±1.2	79.3	15.4	1.6

a) Inhibition rate was calculated to be divided weed weight of mulching treatment by that of control.

b) Shade effect was calculated to be subtract the inhibition rate of the soaking- rice straw from that of control(Mulching treatments),

c) Allelopathic effect was calculated to be subtract the inhibition rate of the non- soak rice straw from that of soaking-rice mulching plot.

d)Values are Difference that is subtract Non-soaking rice straw 1kg from Non-soaking rice straw 2kg.

Table 3. Effect of Shade and allelopathic substances of weed root on rice straw mulching materials.

Mulching treatments	Inhibition rate <sup>a</sup> (% of control)	Shade effect <sup>b</sup> (%)	Allelopathy	effect <sup>c</sup>
			Rate (%)	Difference <sup>d</sup> (%)
Control(non-mulch)	-	-	-	-
Soaking-rice straw 1kg	76.4±6.3	76.4	-	-
Non-soaking rice straw 1kg	90.4±1.9	76.4	-	-
Non-soaking rice straw 2kg	95.8±1.1	76.4	-	-

a), b), c), d) see table 3