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## Efficacy of tulsi (*Ocimum sanctum*) leaves powder as a pesticide against *Callosobruchus maculatus* (F.) in stored gram

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**Abstract:** *Ocimum sanctum* is the most popular medicinal plant with religious and sacred value. It has also unidentified but speculated insecticidal property to kill the insect pests of the stored grain products. The traditional use of tulsi powder analogous to that of neem has yielded considerable pest control result. As such in the present study, the efficacy of tulsi leaf powder in dried condition on the stored gram pest, *Callosobruchus maculatus* has been tested experimentally in the laboratory condition on newly emerged adults propagating on fresh gram seeds. Higher dose of sprinkling of the powder has been found to disrupt the growth & reproduction of the pest upto 70-80% (50mg::10 adults-both male & female:: 8 mortality at 30°C & 40% RH). Whereas the lower quantum powder sprinkling resulted only 20-30% pest control. (10mg::10 adults-both male & female::3 mortality at 30°C & 40% RH).

**Key words:** *Ocimum sanctum*, dry leaf powder, pest control efficacy, *Callosobruchus maculatus*

### INTRODUCTION

The tulsi plant is a shrub of great medicinal value and is quite familiar to all. This plant, which grows in all places and under a wide variety of conditions, holds a position of sanctity and importance in our religion and generally in Indian culture as well. Nearly all of our scriptures have sung its praises. The very name 'Tulsi', that which cannot be compared, the 'Incomparable one', indicates its great value. In our ancient literature it has been variously named as Gramya, Vishnuvallahba, Subhagativra, Papaghami, Mayura, Sarla, Krishna bhootpriya, Sumanjari, Vrinda, Shweta, Vaishnavi, Kaveri etc.<sup>1,2</sup> Actually the names characterise the various species which possess varying characteristics.<sup>3,4</sup> Presumably the popular

name 'Tulsi' was coined in the Medieval age with a view to propagate and popularise its miraculous medicinal properties.<sup>5,6</sup>

Besides India, Tulsi is also found in several European, African and Asian countries. It is found in Italy, Africa, Ethiopia, Thailand, Vietnam, Brazil, Guyana, Japan, China and Cambodia. Tulsi is one of the most useful plants of India.<sup>7</sup> It grows wild, and can also be cultivated. The plant is 3 to 4 feet tall. It grows in all types of soils, but black sticky and moist soil is particularly suitable for it. The plant bears inflorescences about 2 inches long. The leaves are of an elongated oval shape with serrations. Modern taxonomists mention about 150 species of Tulsi and put this plant under the family Lubiatae.<sup>8,9</sup> Its two common varieties, Holy basil and white basil known as *Ocimum sanctum* and *Ocimum album* respectively are mostly used

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as medicines. *Ocimum sanctum* is used against fever, respiratory ailment, cold, asthma, arthritis etc. The white basil or *Ocimum album* is mostly found in South India. Major chemical constituents of Tulsi are 0.4 to 0.8% volatile oil containing chiefly eugenol (about 21%) and  $\beta$ -Caryophyllene (37%). Eugenol content reaches maximum in spring and minimum in autumn.

## MATERIAL & METHODS

In this set of experiment Tulsi Leaves Powder (TLP) was tested as pesticide against *C. maculatus* infesting stored gram. As described earlier TLP was already kept in laboratory as stock. 100 gm. of Bengal gram (*Cicer arietinum*) was taken from laboratory stock in separate tin container of equal size. Each grain filled container was treated with a particular dose of TLP from the laboratory

stock prepared for this purpose. In this experiment 8 doses were tested, i.e. 0.5gm., 1gm., 1.5gm., 2.0gm., 2.5gm., 3.0gm., 3.5gm., and 4.0gm. Each treatment was done in three replications. Simultaneously on set of three replications was kept untreated and maintained as control. Containers with TLP treated grains were tightly closed and shaken thoroughly for 10 minutes for optimum coverage of the grain surface.

The test insects were taken from laboratory culture. Five pairs (5 males and 5 females) of freshly emerged insects were released in very container including the control. The experiments were performed at normal room temperature and humidity. At regular interval adult mortality oviposition and emergence was recorded and was statistically analysed.



**Figure1-Tulsi Plant, Tulsi leaves and Tulsi leaves Powder**

## RESULT & DISCUSSION

Treatments of Tulsi Leaves Powder (TLP) with 0.5gm., 1gm., 1.5gm., 2gm., 2.5gm., and 3gm. did not bring about 100% mortality of adults earlier than that of control. In the control the mortality rate was 63% on 12 DAI, 80% on 14 DAI and 100% on 16 DAI. In 0.5gm. and 1gm. treatments also first mortality was observed on 12 DAI and it was 80%. In 1.5gm., and 2gm. treatments also the mortality was observed not earlier than 10<sup>th</sup> day and it was 35%. In 3gm. and 3.5gm. treatments 20% mortality of adults was observed on 4 DAI and 6 DAI respectively. Here a remarkable effect was observed. In 3.5gm and 4gm. treatments 100% mortality of adults was observed on 12 DAI.

So, in TLP treatments only higher doses i.e., 3.5gm. and 4 gm. brought about 100% mortality of insect pest earlier than that in the control.

All the TLP treatments except 4gm. treatment caused not check the oviposition completely, however, it was lowered to some extent. In 0.5gm. treatment the oviposition was similar to the control (400). The percentage reduction in oviposition in 1gm., 1.5gm., 2gm., 2.5gm., and 3.5gm. treatments was 15%, 15%, 25%, 25% and 25% respectively. There was 75% reduction in egg laying in 3.5gm. treatment with respect to the control. In 4gm. treatment there was no oviposition.

The population growth observed on 45<sup>th</sup> day showed no reduction in 0.5gm. treatment. In 1gm. and 1.5gm. treatment it was reduced to 18.75% with respect to the control. In 2gm., 2.5gm., and 3.5gm. treatment the population growth was reduced to 30%. In 3.5gm. treatment the population growth was reduced to 77.5%. In 4gm there was no growth.

Effect of Tulsi Leaves Powder (TLP) Treatment

TLP/ 100 gm. of gram	Adult Mortality Percentage							
	2 DAI	4 DAI	6 DAI	8 DAI	10 DAI	12 DAI	14 DAI	16 DAI
Control					30	63	80	100
0.5 gm.						80	90	100
1 gm.						80	90	100
1.5 gm.					35	70	80	100
2 gm.					35	70	80	100
2.5 gm.					40	80	90	100
3 gm.		20	20	40	60	70	90	100
3.5 gm.		20	20	60	80	100		
4 gm.		30	50	50	90	100		

DAI = Days After Infestation

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