



RESEARCH ARTICLE

Evaluation of botanicals for management of pulse beetle, *Callosobruchus maculatus* in stored green gram

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ABSTRACT

Different plant powders and plant oils were evaluated for their grain protectant efficacy against *C. maculatus* in green gram (variety GM-4). Custard apple seed powder (25g /kg seed), orange peel powder (150g/kg seed), coconut oil (10 ml/kg seed) and clove oil (10 ml/kg seed) completely prevented oviposition, adult emergence and grain damage on number and weight base even after four months of storage and found most effective grain protectants, while clove flower bud powder (10 flower buds powder/kg seed) and red chilli fruit powder (5 g / kg seed) allowed cent per cent damage due to high oviposition and adult emergence after four months of storage and found ineffective as grain protectants, but significantly less than neem seed kernel powder, neem leaf powder (both, 25 g/kg seed), chrysanthemum flower powder and pomegranate peel powder (both, 25 g/kg seed) which were found least effective grain protectants against *C. maculatus*. Groundnut oil, olive oil and safflower oil (all at 10 ml/kg seed) were also found effective grain protectants. Rest of the treatments viz., neem seed kernel powder, neem leaf powder (both, 25g/ kg seed), chrysanthemum flower powder and pomegranate peel powder (both, 25g/ kg seed) which were found least effective grain protectants against *C. maculatus*.

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INTRODUCTION

Green gram [*Vigna radiata* (L.) Wilczek] is the third most popular pulse crop cultivated throughout India. In India green gram is grown on about 3.55 million ha with production and yield as 1.80 m tones and 512 kg/ha, respectively. It is grown mainly in Rajasthan, Maharashtra, Andhra Pradesh, Karnataka and Orissa (Anonymous, 2012). In India, most of the grains produced are being stored at the farmer's place and under most primitive conditions of storage they become vulnerable to a variety of insect pests. Out of these, the major one is the pulse beetle of the family *Bruchidae* belonging to genus *Callosobruchus*. It is an interesting worldwide group, most abundant in tropics, whose larvae develop inside the seeds and mostly prefer the hosts belong to the family Leguminosae. Banto and Sanchez (1972) reported that when green gram

seeds with 9.9 per cent seed infestation by *C. chinensis* stored for three months, it resulted into total destruction of seeds showing the importance of this storage pest. The pulse beetle being an internal feeder is hard to control with insecticides. It is also not advisable to mix insecticides with food grains. Fumigation being the most effective method cannot be inside the residential areas.

Plant materials which are being traditionally used by some farmers practiced in our villages because the storage structures are not air tight and are mostly built are quite safe and appear to be the most promising as grain protectants. The potential hazards for mammals from synthetic insecticides, the ecological consequences and the increase of insect resistance to pesticides had led to a search for new classes of insecticides with lower mammalian toxicity and a lower persistence in the environment (Regnault-Roger and Hamraoui, 1993). Keeping