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PRODUCTION OF APPROPRIATE FOOD: sufficient, safe, sustainable

Experimental protocol for the treatment of the external surfaces of the clay jars containing legumes with natural insecticide for the protection of food from pests

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UNIVERSITÀ CATTOLICA DEL SACRO CUORE DI PIACENZA

OBJECTIVES

The aim of the study is to verify the efficacy of a natural insecticide extracted from a local plant composed of azadirachtin (commercial name: Oikos) which also functions as repellent and inappetent. The azadirachtin is the active ingredient extracted from the Indian plant known as *Azadirachta indica* Juss. (also known as Neem tree / Sabah - bah / Azaddaracht / Margosa according to the local microlanguages). The extract is applied on the outer surfaces of clay jars, closed with cover of *bambuaceae* assembled in the same area and stored in a place protected from the outside (warehouse or shed enclosed on three sides). Oikos is a product, registered for the direct treatment of cereals. In our experiment it is applied on the surfaces of the structures that contain the foodstuff. The experimental plan was planned on the basis of the good results obtained from a similar experiment at the Italian pilot center (Cerzoo) that showed a reduction in the degree of infestation by 80 to 100% in the first three months and 60-80 % in next three. The original foodstuff presented an acceptable shelf-life for more than six months. The Oikos application is carried out in aqueous solution in the form of aerosols using nebulizers with immersion pump. This kind of experimental application could be effective to delay and prevent the infestation of the product, thus enhancing the local conservation structures without any chemical treatment directly on the grain, in a perspective of sustainable management. The clay jars are in fact commonly produced locally, using local raw materials within business of pottery.

MATERIALS AND METHODS

PREPARATION OF PLACE STORAGE (HUTS/STOREHOUSE) OF THE JARS

- choose some facilities from a minimum of 3 to a maximum of 5, away from trees in different areas of the same village, in dry condition, away from animal, waste and handy for the stages of inspection and control;
- any structure must contain 5 jars, of which 1 is not treated (control);
- identify the jars treated with a symbol (example V1, V2, V3, V4, V5);



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- identify the not-treated jars with a symbol (example B1, B2, B3, B4, B5);
- the results obtained in this case can be compared with the treatments;
- clean the interior spaces of the storage area (huts or storehouses), especially at the corners (basal and apical structure), removing any residue of infested and non-infested grain, dust and cobwebs;

PREPARATION OF THE JARS AND THEIR COVERS BEFORE THEIR PLACING IN STOREHOUSES OR HUTS

- build rudimentary covers of the jars (one for one jar) with plant material available in the local area (reeds, small pieces of bamboo, straw with rubber adhesive material) trying to create a compact structure and wider than the opening of each jar;
- place these covers previously assembled on a flat surface (ground?) outdoors except those that will be used to cover the jars do not treat;
- treat both surfaces of the covers with the product diluted in water (8 % volume/volume) with a dose of 50 mL/m² of the surface through a nebulizer;
- the same procedure must be carried out for all the jars except for those non-treated;



- jars must be placed on a flat surface (separated between them) facilitating in this way the treatments of all the external walls;



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- treat all exterior surfaces of each jar;
- allow to dry all surfaces before taking them in the huts;
- place all the material (jars+covers) in the huts, spacing between them of 20 cm and 10 cm from the walls of the hut;
- fill the jars with legumes of the same type and time of collection;



- do not mix old legumes to the new one;
- use a product healthy and not infested;
- fill all the jars with the same amount of product in the normal manner of management of post-harvest;
- close each jar with its cover assembled earlier, if necessary secure it with a central weight (little stone?);

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- ensure that untreated jars are closed with their untreated covers;
- ensure that treated jars are closed with their treated covers;
- repeat treatments at the same dose used for the first, every 30 days;
- perform all treatments always out of huts by placing outside all the jars+covers;
- sprayed all external surfaces of the jars including their covers;
- if you can place all the jars above of wooden pallets in order to isolate them from the hut floor.

SAMPLING AND CONTROL

- every 30 days if possible, otherwise every 60 days sample from each jar a fixed amount of product. It is recommended to sample approximately 250-500 g of product;
- perform sampling with a container/cup, taking different rates at different points of the jar (surface, mid-height, bottom) up to the amount established;
- at the end of each sampling close all the jars with their covers reopening them **ONLY** before next sampling;
- carefully observe **ALL** of the sampled material, pouring little by little the sample in a tray at the bottom of a clear and noting the number of insects observed (living and dead) and the relative date on a notepad;



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- duration of the test: 180 days;

NOTES

- perform all treatments during the coolest hours of the day with no wind;
- apply the mixture of the product immediately after preparation;
- once the preparation and distribution of the product thoroughly wash the equipment used;
- during the preparation and distribution of the product equip themselves with adequate equipment for body protection (gloves, masks, glasses);

Write down on a block-note as many details about the trial as the date of beginning and end of the experiment; sampling date, number of experimental thesis made (and their abbreviations), type of cereal and amount of product used in the trial, any unexpected factors emerging during the trial. Also describe the characteristics of warehouses chosen for testing (time and materials of construction, years of actual use as a storage area for products, the presence of fissures / cracks in the walls inside / outside of the structure, type of product stored, how it is stored, the most frequent problems encountered during storage of the last years e.g. rodents, insects, mold, number of openings to the outside; degree of isolation from the outside, often the solutions adopted for the protection / pest control by parasites). If you can bring all this data in a schematic way in a



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spreadsheet to keep updated regularly. Take photos when possible to document each stage of the
trial.