PRODUCTION OF APPROPRIATE FOOD: sufficient, safe, sustainable

Experimental protocol on the conservation of grains in FAO metal silos for their protection from pests and insects without using chemical means

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OBJECTIVES

Investigations carried out in some Congolese villages showed that storing grain in post-harvest is still a serious problem to be solved. This trial aims to evaluate the conservative effectiveness of metal silos assembled on site in the prevention or delay of grains' infestation by animal pests. Such activity that involves the use of only non-chemical and physical means (treatment with pesticides) falls within the scope of sustainable management of the post-harvest strongly promoted by EXPO 2015. The experimental plan was designed on the basis of the good results obtained by a similar experiment carried out at the Italian Pilot Centre (PC) *CERZOO* using silos. Such structures assembled by following the guidelines established by FAO in partnership with a metallurgical company of Brescia (Italy) ensured a great degree of product shelf -life for over six months. Slight contamination only emerged at the outlet side of the silos (withdrawal). The effective insulation from the outside of the mass, in addition to unfavorable microclimatic conditions established in the silos, seem to be the main factors limiting the development of insects. The trial will be held at the PC of Kabinda (RD Congo) under Congolese's field conditions. Common silos assembled by locals using metal sheets will be used on purpose. Their effectiveness appears to be similar to that of ordinary steel silos promoted by FAO and tested in Italy, but for now not easily accessible in economic terms by the local populations. If this experimental application is effective, could delay or even prevent altogether the infestation of the product by strengthening this way the conservation structures already in the Congolese area.

MATERIALS and METHODS

PREPARATION OF METALLIC SILOS BEFORE USE

- During Assembly of silos ensure that all parts are "welded" effectively together by excluding any cleavage (fig. 1);

Figure 1

- before use of each silos, especially if previously used, carry out a thorough cleaning of the interior spaces, particularly at the edges(washing with water and dried thoroughly to direct sunlight for three days).

PREPARATION OF METALLIC SILOSTORAGE (WAREHOUSE/SHED CLOSED ON THREE SIDES AND COVERED WITH ROOF)

- inspect the floor of the storage area, making sure it is isolated from the outside and free of any residue of (non-) infested grain dust and webs;
- keep it clean and protected from water infiltrations (fig. 2);

Figure 2

- close any cracks/bumps on it with a slurry of clay/mud and lime;
- place each silos away from trees, animals, wastes, in a dry area, protected from the weather and from the solar radiation, at your fingertips for easy inspections and control;
- have each storage silos in the area taking care to keep them above-high from the floor. For this purpose it would be useful if each container was equipped with metal feet. Alternatively place your silos on stones or regular wood and stand back from the walls;
- to carry out this kind of application on a number of silos ranging between 3 and 5 of similar size, spaced and placed in the same area/village;
- the degree of infestation or non-infestation of grain stored in metal silos will be compared with that achieved by a normal conservative techniques between works transmitted locally.

FILLING OF SILOS

- fill with crushed all silos chosen for experimenting until total coverage to minimize empty internal spaces;
- fill all the silos by weighing the amount of product (fig. 3);

Figure 3

- employ the same grain and harvest;
- do not mix old and new grain;
- use as reference the most grit in this area, even and in sufficient quantities to fill all the silos that have been selected.
- use a healthy product and not infested;
- finish filling close each silos taking care to wrap the output pipe with sealing material in order to further isolate from outside silos discarding any openings to the outside (fig. 4);

Figure 4

- This operation is necessary based on the results obtained in the preliminary test performed in Italy and above.

SAMPLING AND CONTROL

- on a regular basis (if possible every 30 days) sample from each silos a fixed quantity of product. Sampling must be done from the bottom simulating the common use of silos (fig. 5). You may want to sample approximately 500g of product at a time. At the end of each sampling close the silos ONLY sampling dates during the subsequent reopening established preliminarily;

Figure 5

- make sure that at the end of each sample are restored the original closing conditions;
- in case of absence or low presence of animal pests the product can be used for alimentary purposes;
- Enter the silos only from the basal;
- in case of accidental fall of grain on the floor during sampling proceed to immediate removal;
- carefully observe all the material sampled, pouring slowly the champion in a tray to clear background and noting the indicative number of insects observed (living and dead) and the date on a Notepad (fig. 6);

Figure 6

- test period: 180 days.

NOTES

Annotating on a paperback book the most details you can relating to experimentation as start and end date for example; date of sampling; number of theses performed (with related acronyms); grain type choice for experimentation; any unexpected factors emerging during the trial. Describe also the characteristics of the warehouse/s the chosen/s for testing (time and materials; years of enjoyment as an area for storage products; presence of cracks/slits internal/external in the walls of the structure stored product typology, preservation, conservation problems encountered during the past years i.e. rodents, insects, mold; number of openings to the outside; degree of isolation from the outside; the solutions adopted frequently for protection/pest control by parasites). If all this data can be schematically within a spreadsheet to keep regularly updated. Document if possible every step of the experiment using photographs.