Visual Performance with Working Arrangement of VTD (Vibro Thermal Disinfestor)

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Abstract— In the earlier days, the food grain when finished at the field was sun dried and then kept inside the air tight underground pit and was closed within the ground with air tight lid and kept in that form for few days and month. This was to reduce the moisture content of the food grain and retain that it in that form for few days which will increase the shelf life and dis-infest. Now-a-days we are not doing so due to lack of time and patience. Now we finish the food grain at the field and send it to the whole sale market which instantly comes to the retail market and we buy back and consume ending up with lots of pulmonary disorders since the moisture content is more which is unsafe for human consumption. Therefore, heat/ thermal disinfestations of food grains can be a simple alternative. Vibro Thermal Disinfestor (VTD) is a simple electricity operated device for disinfestations of food grains. here we are increase a efficiency of Vibro Thermal Disinfestor (VTD) and reduction of heat and noise.

Key words: Tray, Heating coil, Electric Motor

I. INTRODUCTION

In India most of the farmer dryers the grain in open space there some disadvantage and this method is time consuming. It more required space there is possibility of mixing of dust and other material in grain is also effect the quality of the grain in human being so it's necessary to make a VTD. VTD is a simple electric operated device we can use for both energy like conventional l& non-conventional energy we can use with the help of solar panel, its pollution free, free of cost with long life, it's some advantages like labor and unskilled people easily operated, its compact and portable device, less maintenance, its fast & efficient process its killed the fumigation in food grain. [2]

II. LITERATURE REVIEW

Direct type solar dryer- The figure shows simplest type of cabinet dryer. Here moisture is removed from top air enters into cabinet from below and leaves from top. This is open to the sun drying type of dryer only difference is food product is covered with the glass cover. When sun light fall on the surface of glass then three things happens, first is some light is absorbed, some light is reflected back from the glass, some light is transmitted. As part of radiation absorbs by surface of crop which causes increase in temperature. The glass cover reduces direct convective losses to the ambient and which plays important role in increasing temperature of agricultural product and cabinet temperature. It is small box made up of wood, having 1m length and 0.3m width. The temperature recorded in this cabinet dryer is 80˚C. There are some disadvantages of cabinet dryer like, drying time required is large due to natural convection of air flow hence low heat and moisture transfer coefficient. Hence efficiency is low.

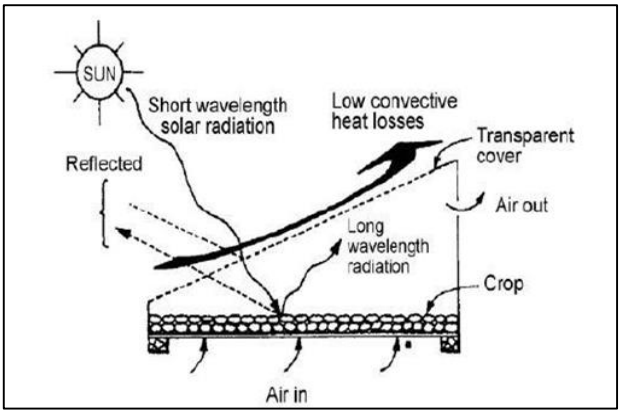

Fig. 1: direct type solar drayer direct type solar dryer, It is found that time required for drying [3]

III. DESIGN

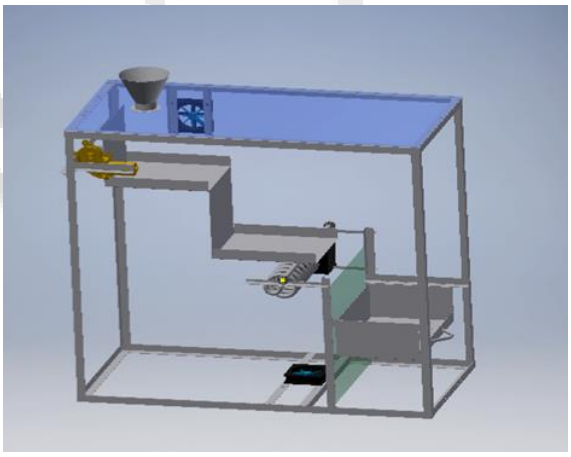

Fig. 2: VTD [Vibro Thermal Disinfestor]

Grains are loaded in top hopper and passed at a pre-determined flow rate across 2 sloping metal trays. The tray system is provided with light vibrations to ensure the flow. During flow the grain is heated to a predetermined temperature by hot air that kills all developmental insect stages including the larval and pupal stages of those species that develop inside grain kernels. The hot air is supplied from the top heating module and passed over the material evenly and uniformly with the help of the blower. For monitoring the temperature inside the box sensors are fitted. The grain is collected at the bottom tray after treatment. The heat treated grains has to be stored in an insect impermeable packaging material or in tight silos for getting a shelf life extension up to one year[4]

IV. ADVANTAGE

- VTD doesn't have any season restrictions compared to sun drying method.
- The VTD is used for insect disinfestations and drying of food grains to achieve a shelf life extension up to one year.
- The system can be used for scale up and is mobile.
- The treatment has no effect on the germination of seeds.
- It doesn't affect the nutritive value of food grains.
- The system is simple and can be fabricated without much capital investment.
- Efficient drying of seeds using VTD permits early harvest.
- It leads to the efficient utilization of land and manpower.
- The floor area required for VTD is less.
- However, in VTD, uniform heating of food grains is completely assured because of the vibrations involved.

V. DISADVANTAGE

- Noise is more.
- Heat loss is more.
- Electrical connections may be dis-connected due to vibration of trays.

VI. FUTURE SCOPE

- It can be implemented in large scales.
- The spring's service life can be increased by using good quality springs.
- The cost of the design can be reduced by reducing the cost of materials/components used in the design.
- Other than agricultural purpose it can also be used as home appliances.
- Eco-friendly& natural resource utilized component.

VII. CONCLUSION

By reviewing above research paper we can conclude that VTD is the one of the fastest method to dry and remove moisture content from the food grains. Heating of food grains is completely assured because of the vibrations involved.

There is no surface damage to the seeds due to the absence of stirring devices. VTD can also be operated by unskilled operator which also includes farmers and other illiterate people.

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