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A Review Paper on Solar Dryer (AMLA SEGMENT)

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ABSTRACT :- Drying is eldest preservation technique of fruits and vegetable. Sun drying quietly used for the preservation of fruits or vegetables. The impulsive upturn and repeated scarcity of remnant fuel accelerated the continuous search for an alternative power source. In this job, gooseberry (*Phyllanthus E-mblica* Lim) or Amla fruit which are prime source of vitamins C amongst fruits were dried using solar dryer by way of the helps of solar energy. The make use of solar dryer lead to huge decrease of drying time in judgment to sun drying. The amla segment are dried in solar dryer were totally confined from insects, moisture and dust.

INTRODUCTION

Drying is the one of the technique used to corollary food product for lengthier days. The hotness from the sun coupled with the airstream has been use to dry fruits for preservation for a several existences. Solar thermal technology are an knowledge that is speedily gaining approval as an energy cutback portion in agronomy and domestic applications. It is favored to other marginal sources energy such as wind and shale, given that it is profuse and non-poisoning.

Heat isn't the only factor which are necessary on behalf of drying. Solar dryer are sooner and additional hygienic to drying using the sun. Improved quality of product can be obtained. The basic principle of this dryer is simple: heat or warm the air higher than the ambient temperature to about 50°C to 60°C and pass the air over the food items. In most cases, a natural convectional current is used, the hot air goes upward. Drying may be required for several reasons. initially the water is detached to make bigger its useful life. Food is dried out so that a new product, definitely different from its original form can be produced.

Amla tree having good fruit attitude capacity would acquiesce 187 to 299 kg fruit per year. Amla fruit which is the rich cause of Vitamin C match up to other all other fruit. Amla is serial and are to the maximum scale flimsy in a nature as its storage in individual order after harvest is very top secret it be in the order of 5-6days Indian gooseberry is deeply acidic and sharp in test which makes them unpleasant and unsuitable for a direct burning up hence they are extreme in process forms such as jams, jellies, candy, etc. Amla is made offered during the year by applying several technique a dealing out such as freezing, pickle with salt, oil spices drying.

Keywords: Solar dryer setup, expected convection, Amla (agriculture product).

TYPES OF SOLAR DRYER

Solar-energy drying systems are confidential above all this according to their heating mode sand the style in which is the solar heat is utilize. In extensive terms; they can be secret into two major groups, namely:

- Active solar-energy drying systems.
- Passive solar-energy drying systems.

Three different sub-classes of moreover the energetic or inactive solar drying systems be able to be acknowledged which differ mostly in the design pact of system mechanism and the mode of consumption of the solar heat, namely:

- Direct (integral) type solar dryers
- Indirect (distributed) type solar dryers.

The three modes of drying are:

- (i) open sun,
- (ii) direct and
- (iii) Indirect in the presence of Solar energy.

The working faith of these mode mostly depends upon the method of solar energy collected works and its renewal to useful thermal energy.

Direct Type Solar Drying (DSD)

It is natural type of dryer in which cloth has been dried is placed in an field with crystal clear cover like glass. Heat is generate inside chamber by attractive solar radiation by item for spending itself and internal surface of meeting room .Here light get falls on the mug of glass then this happen. Some light captivated some light is echo back from glass some light is transmit.

Advantages:

- Infected of product is avoid due to field with crystal clear cover.
- Product worth obtain is top than unlock to sun dryer.

Disadvantages:

- More time compulsory for amla drying.
- Poor class of final construction.

Indirect Type Solar Drying (Without Blower)

In this system air enter from first to last open foot finish of the aerial and it's heated even as it passed over the rock. Measurement of chamber used in this dissertation for motionlessness airstream operate gas mask is placed on peak of dryer board room. It is assemblage of straight and roundabout type of solar dryer. This type is not frankly exposed to solar emission to decrease discolorations and fast. The drying cavity is worn for observation the in wire mesh tray.

A down in front of absorber is set lower the drying assembly room at a copiousness coldness beginning the foot of the drying board room. A cylindrical reflector is placed under the absorber built-in with the glass envelop on its space to decrease convective heat dead from the absorber. The region of absorber and glass enclose are taken one and the same to the region of base of drying board room. Solar rays after fly-by-night from side to side the glass wrap is reflect by cylindrical reflector on the way to an absorber.

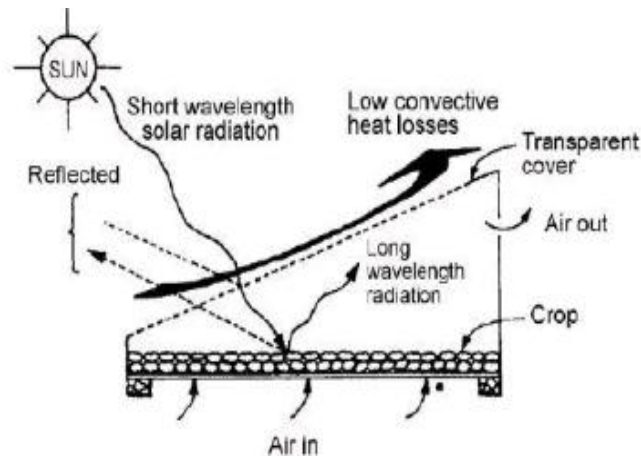
There are quite a small number of types of driers residential to serve the various purpose of drying products as per local need and on hand know-how. The best likely and popular ones are natural convection filing cabinet type, forced convection indirect type and sea green house type. Apart from the above three, as seen from the prose, solar tunnel drier is also start to be popular.

Advantages:

- Swift rate of drying than direct solar drying.

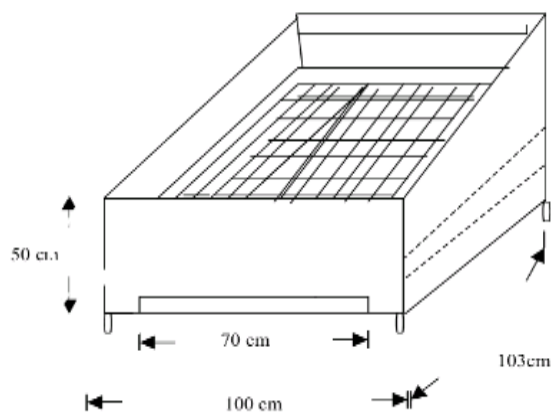
Disadvantages:

- Capital cost important is higher.
- Costly in continuation.

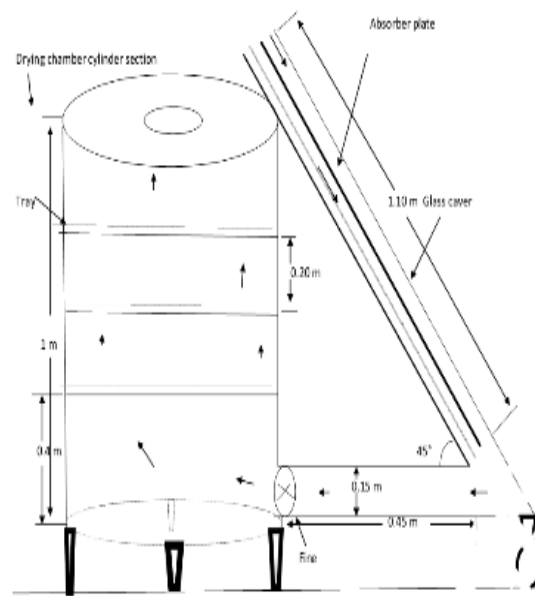


LITERATURE REVIEW

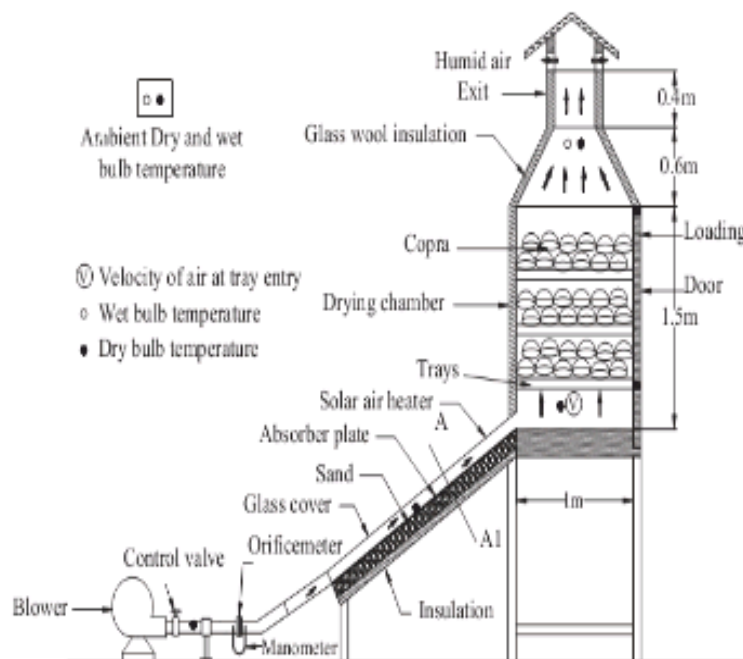
1. *Amin Omda Mohamed Akoy* story on usual convection solar dryer of a small package type was calculated and construct. The dryer contain drying hall and solar collector region collective in one unit and they done the calculated dryer with a solar collector area of $16.8m^2$ is probable to dry 195.2 kg clean mango from initial wetness 81.4% to 10% final wetness in two days.



2. *Ahmed abed gate* a urban a solar dryer system of cylindrical part and psychoanalysis of the routine of thermal drying system. The system contain of solar radio dish flat plate with length of 1.10 m and distance across of 1.10 m drying meeting room cylinder segment and a fan was built and considered for the rationale of drying 70 kg of bean crop. The routine of the solar air collector by income of three air flow rates has been hardened. The highest temperature of the outlet solar antenna has been obtained at 11am. At energy intensity $750 w/m^2$ for air flow rate of $0.0401 kg/s$ was attain and least temperature was obtained when air flow rate was $0.0675 kg/s$.



3. A Zomorodian, D. zare, H. ghasemkhani obtainable optimization and estimate of a semi nonstop solar dryer for cereal. The uneven rice solar dryer was a irritated flow and an active varied mode kind of solar dryer with a new and an resourceful timer assist semi unremitting discharge system. The dryer engineer be calculated and untrue which consist of six regular solar air heater, an supporting electric heating channel, a drying board room with an electrically rotary discharge valve and an air distribute system. The region of each radio dish was 2 m^2 and they were install on a light outline tilted 45° towards the south. The experiment were conduct on luminous day with average thing solar radiation of 865 w/m^2 , nearly unvarying relative damp and average ambient air heat of 25°C . One of the objective in this delve into was to assess the achieve of air mass flow rate and the time space of crop discharge, on the rate crop drying by the dryer.



4. M. Mohanraj and P. Chandrasekhar build compell convert solar dryer and tested for the ventilation copra under Indian climate circumstance. At that time a maximum solar amount of 932 w/m^2 was experiential. The average drying air hotness at

the inlet of the dryer was 44°C the maximum dryer temperature recorded was 63°C . at the outlet of the drying meeting room, a higher capable humidity of about 90% was record during the initial stage of drying but this increasingly reduce to about 34% at the end of drying. The average dampness content of the coconut was reduce from about 51.8% to 7.8% and 9.7% in the bottom and the top tray, in that order, after 82 hr. the wetness reduce during the first and the second day in that order. Finally, they talented that forced convection solar dryer is more apt for creation high quality copra for small holder.



FUTURE SCOPE

- On the better of the drying cavity the wooden plate while replace by the plant glass it will mounting the drying capability of the product.
- We can put a sparkly mirror on the front side of the aeration chamber which also help to reflect the sun emission on the glasses.
- By mounting the size of the dryer we can dry large amount of products at a time.
- If the encourage fan is fitted at the inlet of heat chamber for proper flow of air, it will also increasing the good organization of a system.
- By recirculation the wear out air in the drying assembly room the efficiency can be superior.

CONCLUSIONS AND RECOMMENDATIONS

- Under the constituent go forward topic in Mechanical Engineering Projects on sequence engineering was to design a close to to the ground cost amla dryer. However, the show of available solar amla dryer can still be better upon in particular in the feature of dropping the drying time and maybe storage of heat energy with in system. Also, data should be with pleasure to be had to users of solar amla product to make sure highest good organization and usefulness of the system.
- Such in run will almost certainly guide a narrow people on at what time to dry his amla precious goods and when not to dry them. Locally available cheap material were used in building manufacture it available and sun dryer are mostly used for farmers. This will go a long way in dipping food expenditure and at same time foodstuff storage. Since it is be use at length for majority of the farming food crop. A part from this solar energy is obligatory for its procedure which is readily obtainable.
- The product surrounded by the dryer mandatory less concentration, like attack of the product by rain or pain in the neck, compare with those in the open sun drying. though the dryer was used to dry green fenugreek, it can be used to dry other crops like yams, cassava, maize and plantain etc. there is ease in monitor when compared to the natural sun drying technique.

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