

PERFORMANCE ENHANCEMENT OF AGRICULTURAL SOLAR SPRAYER

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Abstract :

A pressure sprayer is a device used to spray the liquids / soluble forms (i.e.; Pesticides , fertilizers , herbicides , etc) by using the petrol engines. It is cost as much or more to purchase and also it releases very toxic gases which harmful to farmer.

So we suggest to use Solar Operated Sprayer Machine which we fabricated.

This invention is about an agricultural pesticide sprayer, which uses solar energy as source of power for spraying. It consists of a solar panel of 20 W Capacity, a 12V DC battery, charged by solar energy received by the solar panel , a DC motor , operated by the battery, a pump, to spray the pesticide and a tank to hold the pesticide in the form of solution or liquid. The entire unit is portable and is operated by a labour.

As the equipment used by other external source of power and that it is operated by the user, it reduces drudgery, is quite economical and eco-friendly as it uses solar energy which can be easily affordable by small and marginal farmers.

We Enhanced the performance of Agricultural multy-Chargeble solar sprayer.

Introduction

The applications of pesticides using spraying equipment play an important role. The chemicals are widely used for increasing agricultural production through better insect and pest management. Spraying is one of the most effective and efficient technique for applying small quantity of liquid through fine droplets to protect the crops. In India, many versions of hand operated and power operated spraying equipments are being used.

Spraying of pesticides on crops like cotton, red gram. Farmers are facing the problem of coverage of large area within a short period of time as the pest attack is serious problem and spreads quickly.

The main drawback of hand operated spray pumps is that the user cannot use it continuously for more than 5-6 hours since he gets tired after such a long duration because they have their own difficulties such as they need lot of effort to push the liver up and down in order to create the pressure to spray.

Components of the solar sprayer

Specifications :

- **Solar Panel :** Solar panel consists of photovoltaic cells. Charging can be done using the solar panel. Battery can be charged continuously during discharge itself by attaching the panel on the Sprayers.



Dimensions of solar panel : 540 mm >> 340 mm

Capacity of the panel : 12V 20W

Material used : polysilicon and monocrystalline silicon 8

- **Battery :** Battery capacity was 12V and 8AH .Battery was used to store the energy.



Power : 12 V

Capacity of the battery : 12V 8 AH / 20 HR

Material Used : Plastic

Type of battery : Lead-Acid

Motor : Motor and pump unit was operated by current supply from battery. The solar operated sprayer had utilized



- Operating voltage : 12 V

Used Material : Plastic

Motor speed : 1600 rpm

- Frame :** A square hallow rod was used to prepare a frame to mount the solar panel. Two square rods were attached to the Mild steel sheet fitted over the sprayer body on either side with help of bolts and nuts.



- Material Used : A Square hallow pipes

Quantity of the material : 2m

- Fluid Tank :** Capacity of tank was 16L and has smooth and streamlines appearance. The barrel was ergonomically designed. to imitate the back of human to allow cozy mounting.



- Capacity of the Tank : 16L

Material Used : Plastic

- Nozzles :**

- Types : 4

Material Used : Plastic

- **Springs :**

Material Used : Plastic

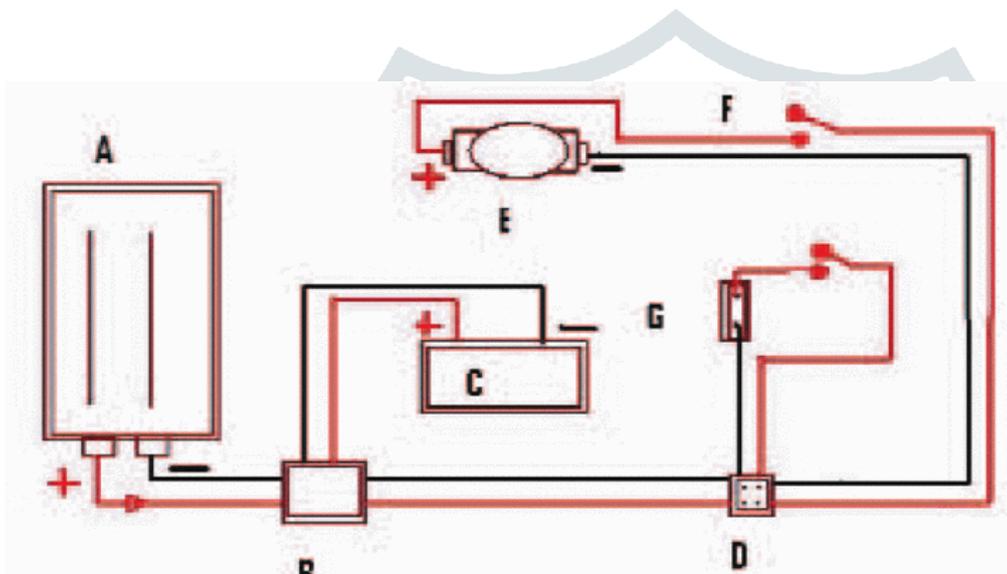
Quantity : 2

- **Spray Lance :**

Material Used : Plastic

Quantity : 1

Experimental setup



Working Principle :

This system mainly consists of four units namely energy conversion unit, control unit, DC drive and sprayer. The details of each unit are discussed as follows.

The first unit of the system is energy conversion unit. The energy conversion can be done by solar energy mode. solar energy obtained by the sun is converted into electrical energy using solar panel by photovoltaic effect. The energy was stored in the battery.

Conclusion :

S.No		Petrol	Diesel	Solar
1	Power Source	High	Modern	Free
2	Maintainence	Modern	High	Low
3	Cost	4200	3300	5280

Performance Enhancement Of Agricultural Solar Sprayer.

- By using the solar operated sprayer Initial Cost is high by using this there is no need of Maintainence.
- But by using petrol / diesel pumps there are required more maintainence.

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