

SPRAYER FOR AGRICULTURE USE POWERED BY THE SUN

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ABSTRACT

In agriculture sector, spraying of pesticides is an important task to protect the crops from insects for obtaining high yield. However, farmers have been mainly using traditional conventional techniques like hand operated and fuel operated sprayer system for spraying pesticides. Fuel is expensive and in many places fuel may not be available. If hand operated spray systems are used, the labor productivity decreases and the efficiency will be low. The use of solar energy system is an alternate solution for these limitations. Hence, a solar powered agricultural pesticide sprayer is designed and fabricated. The system was designed and fabricated by considering parameters like desired spraying capacity, low weight, low cost, user-friendly nature, high operating time and for faster coverage of area. Thus, the solar sprayer was fabricated to be a value for money product in the agricultural sector.

Keywords:

Solar power, Battery, water pump, MS plate, Agriculture, tank.

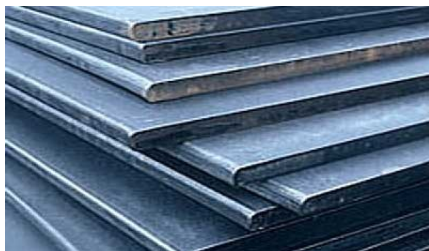
1. INTRODUCTION

A sprayer is a mechanical device used to spray the liquid like herbicides, pesticides, fungicides and fertilizers to the crops in order to avoid any pest and control the unwanted plant species. Sprayer provides optimum utilization of pesticides or any liquid with minimum efforts. In Indian farms generally two types of spray pumps are used for spraying, they are hand operated spray pump and fuel operated spray pump, out of which hand operated spray pumps are most popular. To kill the pests and insects pesticides, fertilizers are sprayed either manually or by using sprayers. Earlier, the pesticides and fertilizers were sprinkled manually, but they will result in harmful effects on farmers. In order to overcome this problem, different spraying techniques have been developed. These sprayers consist of different mechanisms and the cost of equipment is generally high. A solar operated sprayer is easy to handle and maintenance free, hence is affordable to the farmers. Therefore a solar operated sprayer is designed and fabricated.

This system can be operated using solar energy or electrical energy. The solar energy is converted into electrical energy and is stored in a storage battery. The main advantages of the present system are the running cost reduces to minimum and consume less time. Solar energy from the sun is harvested on the solar panel. The panel is made up of photovoltaic cells, which converts photon energy to electric energy. These cells are made up of silicon semiconductor. Solar panel is used to generate electric energy and charge the battery. The charged battery is used to operate a DC pump for spraying the pesticides.

2. METHODOLOGY**2.1 Fabrication of Solar Sprayer**

Solar operated pesticide sprayer is fabricated to meet the demands of farmers such as reduced maintenance cost, shortage of electricity and fuel. The main parts of solar operated pesticide sprayer consist of Solar panel, DC Pump, Battery, Chemical tank, Nozzle, Spray gun etc.

*Fig: 1 Battery**Fig: 2 Water Pump**Fig:3 Ms Plate**Fig:4 Solar Panel***Fig5 : SOLAR POWERD SPRAYER FOR AGRICULTURE USE SETUP****2.2 WORKING PRINCIPLE**

The system consists of Solar panel, charging unit, battery, pump and sprayer. The solar panel delivers an output in the order of 12 volts and 20 Watts power to the charging unit. The charging unit is used to strengthen the signal from the solar panel. The charging unit delivers the signal which charges the battery. According to the charged unit, the pump operates, such that the sprayer works. Here fertilizer can be stored in tank. When the sun rays are falling on the solar panel electricity will be generated through the solar cells and stored in the battery. By the electric power in the battery the pump operates and therefore fertilizers from the tank is sprayed out through the sprayers. The layout of solar sprayer is shown in fig.1. There is no maintenance cost and operating

cost as it is using solar energy and no pollution problem. Its working principle is very easy and it is economical for the farmers, which has one more advantage that it can also generate power that power is saved in the battery and it can be used for both for spraying and well as to light in the houses when there is no current supply.

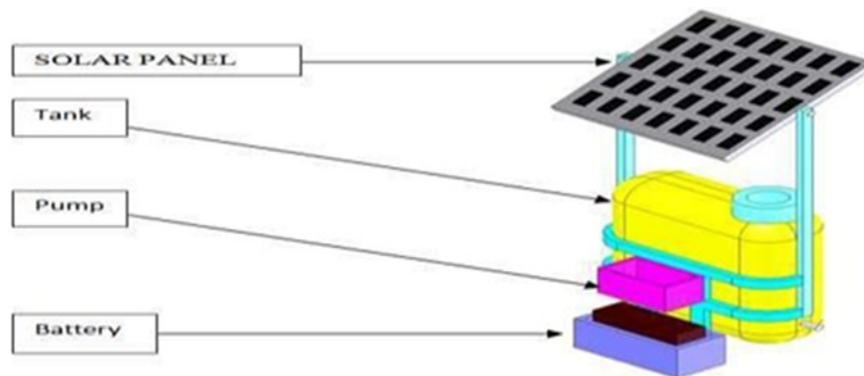


Fig: 6 Layout of solar pesticide sprayer

CONCLUSION

The prepared solar operated sprayer is environment friendly and cost efficient. The prepared solar operated sprayer can be used largely in agriculture field effectively. The prepared solar pesticide sprayer is the best option to farmer who economically challenged and facing electrical problems like load shedding etc. It does not create air pollution and noise. It does not require fuel hence it is a zero fuel operated equipment. It can use in municipality for killing insects and mosquitoes. It is maintenance free device. It is easy to operate and portable. The solar operated sprayer will help the farmers of those remote areas of country where fuel is not available easily. They can perform their regular work as well as saves fuel up to large extent. At the same time they can do their pesticide spraying work with very less environment pollution.

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