International Journal of Research in Engineering, Science and Management
Volume-2, Issue-2, February-2019
www.ijresm.com | ISSN (Online): 2581-5792

Design and Fabrication of Portable Solar Operated Chemical Sprayer

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***Abstract*: In India energy demand is the major thread for the people. Finding of solution for reducing energy demand is great challenge for scientists. Now a day's pesticide sprayer is based on fuel engine and hand operated sprayer. In agriculture, pesticides spraying is the important for protect the crops from the insects. Mostly farmers can use hand operated and fuel operated spray pump system for spraying pesticides. Now-a-days non-conventional energy plays a major role for all the developing activities. The proposed sprayer is design considering parameters like desired spraying efficiency, low weight, low cost, user friendly nature, and high operating time and for faster coverage of area. In our project, we are going to use the cheapest method by trapping the solar energy. The trapped solar energy is used to charge the battery for pumping the particular items to the agriculture field.**

***Keywords*: Herbicides, pesticides, fungicides, Solar energy and conventional**

1. Introduction

A sprayer is a mechanical device used to spray the liquid like herbicides, pesticides, fungicides and fertilizers to the crop for avoiding any pests and insects. Sprayer provides optimum utilization of pesticides or any liquid with minimum efforts. Farmers used two types of sprayer, there are hand operated and fuel operated sprayer for spraying pesticides. These types of sprayer can sprinkled the pesticides and fertilizers manually, but it will result in harmful effects on farmers. In order to overcome this problem, different spraying techniques have been developed. 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. The first unit of proposed system is energy conversion unit. Solar energy is absorbed from the sun is converted into electrical energy using solar panel by photovoltaic effect.

2. Literature survey

R.Joshua, V. Vasu et al [1] Finding solutions for the "Energy-demand" is the great challenge for social scientist, Engineers, Entrepreneurs and Industrialist of our country. According to them, applications of non-conventional energy is the only alternate solution for conventional energy demand. Now-a-days the concept and technology employing this non-conventional energy becomes very popular for all kinds of development activities. One of the major area, which finds number applications are in agriculture sectors. Solar energy plays an important role in drying agriculture products and for irrigation purpose for pumping the well water in romote villages without electricity.

R. Rajesh et al [2] Energy demand is one of the main threads for our country. Finding solution to meet the energy demand is great challenge for scientist, engineers. Now a day pesticide sprayer is operated based on fuel engine. This operation is more economical. In order to overcome this problem we found the new concept known as "solar pesticide sprayer". In this pesticide sprayer is operated mainly based on solar energy and hence there is no need of any kind of alternative source. It has many advantages such as cost of spraying and also saving on Fuel/Petrol.

Akshay M.Narete,Gopal Waghmare et al [3] Today's energy demand is the great challenge for our society. Conventional energy (fossil fuel, coal, nuclear energy) can be widely used in India such as Textial industry, power plant etc. Conventional energy there are many exhaudt that can be come out after pollutant which is harmful to our environments. In such situation we should move towards some non-conventional energy (solar energy, wind energy, tidal energy).Non-conventional becomes very popular for all kinds of developments activities such as irrigation purpose and for spraying purpose. In this paper we are trying to make unique equipment for cultivation users. My contribution on my project is that from enauri on 20 farmer I can collect data regarding spraying and how exactly farmer can facing problem while spraying, farmers mainly use hand operated or fuel operated spray pump for this task.

Krishna Murthy B et al [4] A solar operated pesticide sprayer is a pump running on electricity generated by photovoltaic panels. The operation of solar powered pumps is more economical due to the low operation and maintenance costs and less environmental impact than pumps powered by an internal combustion engine(ICE).Solar pumps are useful where grid electricity is unavailable and alternative sources (in particular wind) do not provide sufficient energy. The solar panels make up most (up to 80%) of the systems cost. The size of the solar irradiance available. The solar sprayer has many advantages.

S.Charvani et al [5] In agriculture sector, spraying of pesticides is an important task to protect the crops from insects. 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 farmers. 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 and high operating time.

3. Machine components

The proposed solar sprayer consists of the following components to full fill the requirements of complete operation of the machine.

- Pump
- Solar panel
- Battery
- Nozzle
- Storage tank

4. Working principle

The system consists of solar panel, charging unit, Battery, Pump, storage tank and sprayer. The solar panel delivers an output power absorbing the sun light. The power is saved to the battery. The power from the battery is used to run the pump. According to the charged unit, the pump operates. The outlet of the storage tank is connected with the pump inlet. The outlet of the pump id connected with the nozzle hence when the pump is switched on it delivers the fluid at certain pressure through the nozzle.

5. Drawing for proposed solar sprayer

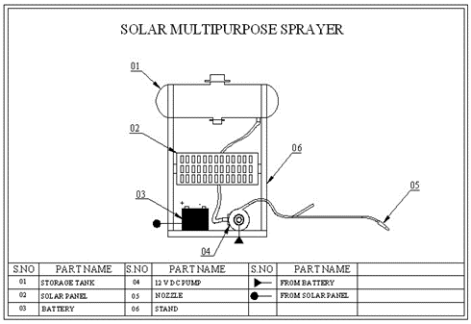

Fig. 1. Solar multipurpose sprayer

6. Conclusion

The trapped solar energy is used to charge the battery for pumping the fertilizers, medicine etc., in the field hence the power is saved. We use the cheapest method by trapping the solar energy. It is very useful to the farmers for spraying the fertilizers, medicine etc.

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