



## Automatic Pesticides Spraying Machine

*Aakansha Edgar, Sanjana Likhar, Rahul Atkare, Yashwant Dhanokar, Nishikant Agame,*  
(Student Final Year Bachelor Of Engineering)

**Dr. Nitin K. Dhote**

(Professor & Head, Electrical Engineering Department)

Collaborative Project with CICR Nagpur

*Department of Electrical Engineering, St. Vincent Pallotti College of Engineering &  
Technology, Nagpur, Maharashtra, India*

**ABSTRACT:** The objective of this paper is to create an iot based spraying machine that will decrease pesticide use and human health damage, allowing farmers to be protected from health issues and labour intensity can be reduced. The pesticide sprayer will have and navigation systems, as well as driving control, spraying mechanism and system construction. The spraying system will be improved to eliminate leaks and prevent repeated spraying, with automatic sprays varying according to the target. This project proposes a pesticide spraying system which will help farmers in field of agriculture.

### I. INTRODUCTION

India is the farmland with a population of 3/4 in agriculture. Agriculture products plays very important role, which is the source of survival for the man kind. Not only human beings are dependent directly, most of the living creatures are also directly or indirectly dependent on agriculture products. In accordance with the climate and other resources accessible to them, farmers will grow multiple plants in their field. But some technological assistances are required to achieve high output and excellent quality. The yield in agricultural crops has been increased compared to past decades due to major improvement steps by the government and researches have been conducted to improve the soil fertility as well as for minimum usage of water for better yield and in turn. This gives better profit for the farmers for their products. When it comes to the increase in yield of the agricultural products, the main reasons which directly increase the yield of crops are water, soil fertility, and pesticides. Due to advance developments and researches in agriculture sector many new methods have evolved to increase the production in the agriculture sector. Chemicals are widely used for controlling disease, insects and weeds in the crops. The increase in the demand of labor in the agriculture fields is increasing day by day as the people now a days are less interested in agriculture so all we need is a robot which can replace humans. Pesticide spraying plays a key role in protecting the field. Many people are not interested in spraying pesticides as they are getting harmful skin infections and breathing problems also carbon dioxide emitted as pollutant during the operation of such pumps has

a harmful effect in the environment. Another important factor is human error which leads to unexpected issues while spraying. For instance, Due to lack of awareness human labor may spray extra dosage to the plants that leads severe damage to the field. We can find some of the robots available for pesticide spraying in the market but this proposed project will be implementing the automated pesticide spraying mechanism on a rover consisting of pesticide container, which will work on the commands provided by the web browser and pump will operate for spraying purpose. Though there are many journals listed in the reference section, only few important journals are highlighted in this section. These journals helped as a ready reckoner for developing a concept in pesticide spraying.

### II. LITERATURE SURVEY

Minimizing the human efforts has been a task for many years for agricultural equipment producers and engineers. Many attempts have been made to lower the human efforts on various agricultural operations. The main idea behind this project is to make an automated pesticide spraying bot, which will require fewer human efforts and also the safety of farmers will be a priority. The current market is fulfilled with many pesticide spraying machines. It won't be possible for us to mention them all but in context this project mentions the machines which are similar to our project. In India people use spraying machine which is more of traditionally implemented as backpack[2], wherein they have to carry a load of about 15 liters of pesticide in it and it consists of one nozzle which is then operated by handling

it with hand while other hand is used to pump the machine. Another type of sprayer that has taken into consideration was more of a multitasking. As it consists of spraying and the cultivating mechanism to the bike and so their bike was able to cultivate as well as spray the pesticides on crops provided it is cost effective[2]. Pesticide Spraying mechanism used by different researchers are given in [5-12].

Laukik P. Raut, Smit B. Jaiswal, Nitin Y. Mohite describes the Design, development and fabrication of agricultural pesticides sprayer with weeder. In India, the spraying is traditionally done by labor carrying backpack type sprayer which requires more human effort. The weeding is generally done with the help of Bulls which is time consuming. So, to overcome these above two problems an equipment is designed which will be beneficial to the farmer for the spraying and weeding operations. The equipment is purposely design for the farmers having small farming land say 5-6 acre. It is suitable for spraying as well as weeding at minimum cost for the farmer so that he can afford it.

S R Kulkarni paper describes Fabrication of Portable Foot Operated Agricultural Fertilizers and Pesticides Spraying Pump. The foot walking pesticide spraying machine is fitted on the foot activated by kinetic force being applied on it, when we stamp our foot on the ground, pushing the assembly to pump air into the tank, the power is very less but sufficient enough to use the pressure for pesticide spraying. This machine helps the farmers to speed the pesticide spraying. Proper adjustment facility in the model with respect to crop helps to avoid excessive use of pesticides which result into less pollution.

Sarvesh Kulkarni, Karan Hasurkar paper comprises of solar powered pesticide sprayer. Solar Energy based Sprayer plays an important role in the drying of agricultural products and irrigation and is used to pump water in remote rural areas without electricity. Solar powered Sprayer is cost effective and gives more advantages than the conventional sprayer.

The solar radiation is collected by solar panels and then converted it into electrical energy by photovoltaic conversion process. The battery uses electricity to charge itself. The electricity which is stored is used to run the motor and other portable devices.

R. Joshua, V. Vasu “Energy demand” is one of the major problems for our country. Finding solutions, to meet the “Energy demand” is the great challenge for Social Scientist, Engineers Entrepreneurs and Industrialist of our Country. According to them application non-conventional energy is the only alternate solution for conventional energy demand. Now-a- days the concept and technology employing this nonconventional energy became very popular for all kinds of development activities. Solar energy plays an important role in drying agriculture products and for irrigation purpose for pumping the well water in remote village without electricity.

Nitish Das, [April 2015], Paper comprises study on Agricultural Fertilizers and Pesticides Sprayers Spraying Methods. Also tells about different spraying methods 1) Backpack (Knapsack) Sprayer 2) Lite-Trac 3) Motorcycle Driven Multi-Purpose Farming Device (Bullet Santi) 4) Aerial Sprayer

Sagar S B, Punith describes design and development of trolley type agrochemical sprayer. The trolley carries tank, piston pump and slotted lever mechanism. It eliminates direct contact of pesticides from farmers.

Sandeep H. Poratkar, [2], [2013], et.al, The authors reviews on development of multi-nozzle Pesticides Sprayer pump and concludes proper adjustment facility in the model with respect to crop helps to avoid excessive use of pesticides which result into less pollution

Though there are many journals listed in the reference section, only few important journals are highlighted in this section. These journals helped as a ready reckoner for developing a concept in pesticide spraying

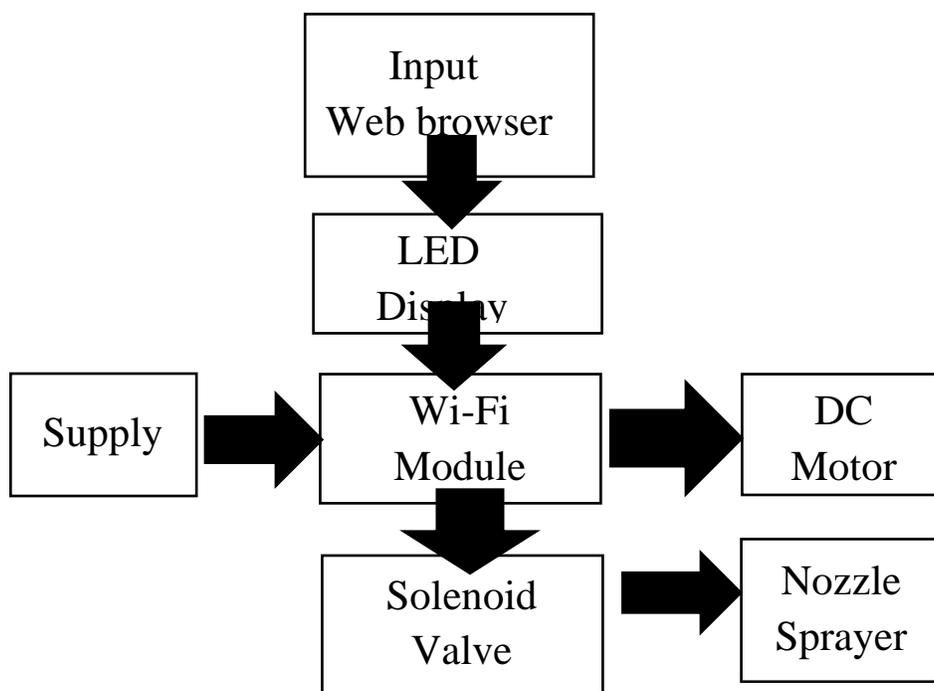
**III. PROBLEM STATEMENT** -Farmers suffering large financial losses because of usage of incorrect irrigation mechanisms, insect pests and attack of plant diseases, usage of uncalculated number of pesticides and insecticides. Wireless crop monitoring reduces labour costs while also allowing for precise tracking of changes that occur in real time at the field. Farmers must take numerous precautions when spraying pesticides, including wearing proper clothing, gloves, and masks, among others. In such situations, the use of robotics is a very imminent technological solution that increases productivity and efficiency. On the earth 42% of population is

dependent on an occupation of agriculture, they have to do a lot of work and more load on them. Spraying pesticides is one of these jobs that is risky and challenging because the chemicals used in these pesticide liquids are hazardous. It may cause breathing difficulties as well as other physical issues. As a result, we created an agricultural robot that assists farmers in pesticide liquids while reducing workload.

**IV. OBJECTIVES-**

1. To design automated pesticide spraying machine.
2. To apply the same pesticide machine for different types of crops in farms.
3. To make economically efficient machines which are affordable to average farmers.

**V. OPERATION FLOW CHART**



**VI. HARDWARE REQUIREMENTS**

Sr.No	Components	Description
1	Nozzle and Plastic Container	Nozzle is the device which converts a normal flow of water into a spray pattern. Plastic container will be used for storing pesticide and having the capacity of up to 5ltrs.



2	Li-ion 6000mAh 14.8 battery	Lithium-ion battery for powering up the entire system
3	Chassis	It consists of the framing the base of the rower which is then connected with 300 rpm dc motors.
4	Solenoid Valve	The valve works with solenoid coil which operates electronically with DC 12 volt supply. In its rest position it is closed but when it is provided with 12V DC supply it is opened and water/air flow is managed.
5	DC operated pump	This DC pump basically operates on 12V DC supply and having 3.5L/Min Micro 550 Diaphragm
6	Pipe	The pipes play the important role in connecting
7	Wi-Fi Module	It is used to control the communication with all of the wireless devices connected to it.
8	LED Display	Used for the connectivity details and batter status details

### VIII. ADVANTAGES

- Human safety.
- Saves time.
- Reduces human efforts.
- User friendly.
- Automated pesticide spraying mechanism.
- Rechargeable battery.
- For Different crops in same land different pesticides can be used.

- To reduce the risk of human health, Multipoint pesticide spraying machine seems an alternative concept.

### CONCLUSION

- The existing research work has drawn some conclusions which are listed below: -
- the traditional pesticide sprayers are mostly dependent on the human efforts.
- The traditional pesticide sprayers can harm human body
- Humans who are involved in such hardships are more prone to injuries and lumber pain.

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ISSN: 2278-6848 | Volume: 13 Issue: 03 | NCASIT-2022 | April 18<sup>th</sup> 2022

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Refereed & Peer Reviewed