

# ADVANCEMENTS IN PESTICIDE SPRAYERS

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## **ABSTRACT:**

India itself to be an agriculturally based country, approximately 75% of the population addicted to farming directly or indirectly.

Farming is that the backbone of Indian economy. Agriculture contributes about 18% to the whole GDP and provides employment to over 50% of the population but till now our farmers do farming in same traditional ways. There's need of development during this sector and most ordinarily on fertilizer pesticides spraying technique, because it requires much time and efforts to spray. The agriculture sector is having many problems with capacity issues, shrinking revenues and labor shortages and increasing consumer demands. In addition, out of the 215.6million acres of irrigated land, around 44% is employed for Herbs, and 13% is employed for Shrubs, 14% for Climbers et al 5%. The pest sprayers which are on the market are often used for anybody of those sectors (2018).

Our project focuses on of these sectors. Most farmers are seeking other ways to boost the equipment quality while reducing the direct overhead costs (labor) and capital. Pesticide sprayer should be portable, an increased tank capacity with less cost, labor and spraying time.

Spraying could also be a significant operation to be performed by the farmer to safeguard the cultivated crops from insects, pest, funguses and diseases that various pesticides, fungicides, insecticides and nutrients are sprayed on crops for crop protection.

Spraying is that the secondary tillage operation. A sprayer could be a computer accustomed sprays the liquids like herbicides, pesticides, fungicides. Pesticides are widely utilized in agricultural production to forestall or control pests, diseases, weeds, and other plant pathogens in a shot to scale back or eliminate yield losses and maintain high product quality. Although pesticides are manufactured through very strict regulation processes to work with minimal impact on human health and Pests and disease control in crop plants could even be a vital component of agricultural production system. An outsized volume of pesticides is employed in crop protection. However, its application on different crops may be a highly inefficient process in our country.

The whole active ingredient of the pesticides applied to a crop, only a touch amount reaches the target pest. Remaining major portion is lost by drift, off-target losses and leaf runoff during the aim of spraying. The unused and lost portion of the pesticides not only winds

up in economic loss but also pollute air, water, soil and food resources.

## **KEYWORDS:**

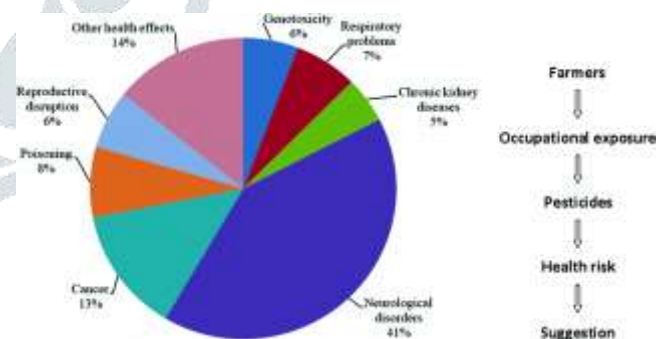
Pesticide, Insecticide, Battery, Sprayer, Fabrication, Motor, Herbicides, Pneumatic control.

## **INTRODUCTION:**

- Spraying is considered to be one of the best methods to remove unwanted plants and macro insects that are formed on plants in crop lands.
- To control weeds the following processes are performed namely Electrical Spraying, Chemical Control, Biological Control, Pneumatic Control and some farming pattern. It has been one of the major problems for farmers to control these weeds and pests.
- The main aim of the project is to reduce the health issues of the farmers such as skin infections and lung problems.
- In this it is reduced because the connecting rod which holds by the farmers to spray through nozzles are attached at the back side of the backpack sprayers.
- So that the farmer can wear the pesticide sprayer and can simply walk.
- The time required to spray the farm will be less when compared to normal sprayer.
- The main advantage is that there is no requirement of hand movement of the farmer.
- This sprayer is mostly suitable for Vegetable crops, Paddy, Wheat.
- In terms of design it covers a wide range of 1.50 mts towards both sides of the sprayer.
- Height adjustable can be done from the initial to final stage of the crop cultivation.
- Major concern is with health of the farmers, According to the latest researchers and data we studied nearly 60% of the farmer's health issues are only due to the spraying of the pesticides in farms.
- Majorly lung diseases and skin infections are decreasing the life of the farmers.
- In some rare cases due to the use of some powerful pesticides and the smell that they

breathe causes mild headache and feel uneasy while breathing.

- This all above issues can be rectified by simply keeping nozzles at the back side of the sprayers.
- Actually, these issues can be avoided by taking some precautions such as wearing proper masks, glasses, fully covered clothes.
- But due to the lack of knowledge this precautions are not followed by the farmers if we keep campaigns, rallies in order to take precautions this masks clothes should be regularly changed, this may increase the cost factor of the farmers.
- Another motto is with the time consumption i.e., by using this advanced sprayers farmer can simply walk in between the crops so that from the back side of the sprayers through nozzles if we switch on the pests will simply sprayed on the both sides.
- If we don't want both sides, we can switch off separately one side and use another one.
- Separate motors are fitted with separate switches to the nozzles.
- A normal pesticide sprayer will around a weight of 5 kgs without the pesticide liquid which is of 10 liters tank capacity due to additional such as motor, clamps, connecting tubes, etc.,



## **LITERATURE REVIEW:**

We all know that people doing Agriculture from a few years so as to survive for food. Permanently growth of crops in farming lands generally farmers use pests though sprayers. There are many styles of pesticides spraying technique available now that we are ready to find as we move all directions in an exceedingly particular way. It's difficult to mention all those techniques here. But we tried to say main

techniques used and best known to us. People in India use backpack type sprayer which is keep it up back of the person with max. 10 to 15 liters pesticide solution within the tank and rod in one hand that has nozzle in one end while other hand is used to pump the machine to make pressure. A machine that is developed and supplied in England was patented by Holme Farm Supplies Ltd. This machine is consisting of water tank on tractor. This cistern contains liquid pesticides. On back side of it an extended rod is attached on which nozzles are attached. This could be often accustomed spray pesticides. Also many such machines are manufactured by this company for large scale farming and big size crops. One another machine is formed in India by Mansukhbhai Jagani. He attached spraying and cultivating equipment to his bike. So his bike will able to do work such as furrow opening, sowing, cultivate and spray pesticides on plants.

### WORKING PRINCIPLE:

The general principle behind the backpack sprayer is the pressure difference created by hand operated lever. It has a nozzle through which liquid pesticides is forced out in fine droplet form. The Capacity of backpack sprayer is less than 20 liters. The components of backpack sprayer are the tank, piston pump, hose, spraying handle and a nozzle. Sprayers convert the pesticides into small droplets which can be varied by changing the pressure & size of perforation on the nozzle. Large size droplets have less spray drift while spraying, but there is a lot of wastage of pesticides in this method. The smaller size droplet sprays more evenly. The major drawback of backpack sprayer is that the labor has to carry nearly 18-19 liters capacity tank on his back which causes severe back pain and fatigue to labor.

Construction or the advanced changes done on the back pack sprayer was somehow difficult. It was easy to attach a motor that connects with switch and a connecting tube to battery. The reason why we attached a additional motor was the motor which was already in backpack sprayer does not working properly if we attach a another pipe to it. We had an idea to replace the battery with a battery of more capacity but it will increase the cost and even weight of the sprayer. So we connected another motor to it. The major problem is with the height adjustment.

We tried to explain through pictures so that it will be more comfortable to understand.



### SPECIFICATIONS:

- ❖ Tank capacity=10 liters
- ❖ Entire weight of the sprayer=6.4kgs
- ❖ Dimensions
  - Length=400mm
  - Width=400mm
  - Height=600mm
- ❖ Nozzle diameter=5cms
- ❖ Battery capacity=12v
- ❖ Motor capacity=12v
- ❖ Working time=2.5 hours
- ❖ Charging time=4 hours

### COMPONENTS USED:

#### Nozzle:

Nozzle is one in all the most components of the project, because the output of the projects depends on the nozzle. how much are is roofed by sprayer, is set by the sort of nozzle used.

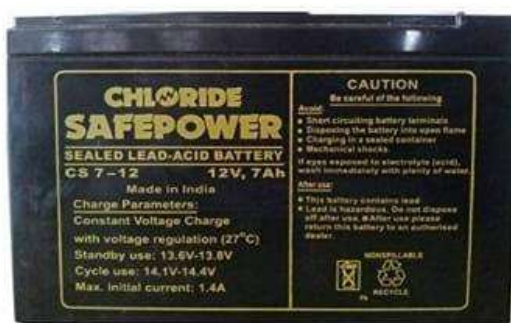
The function of spray nozzle was conversion of pressurized spray liquid into droplets for application of insecticides, pesticides and herbicides on the place.



## TANK:[STORAGE TANK]

A 10 liters capacity of tank was installed on the center of the frame. It is absolutely for storing the solution of pests or chemicals for spraying. It absolutely was a difficult plastic and very rigid, better for every climatic condition. An opening was subjected on the simplest possible side for pouring the chemicals/micro-nutrients. A nylon belt was provided vertically for supporting the tank from displacing. It was light-weight and simple to carry container.

## BATTERY:



The Battery capacity was 12V and 12AH, battery was used to store chemical energy and convert chemical energy into electrical energy.



## WATER PUMP:[MOTOR]

We had attached two motors to the battery and they are separately connected to the nozzles. If we keep only one motor the capacity of the motor insufficient

## CONNECTING TUBES:

In the entire process of the project we try to use the PVC pipes even in the height adjustment because of its light weight.

## CHARGING UNIT:



## FRAME:

## CLAMPS:



**CONCLUSION:**

There are many advanced and modern pest sprayer machines are invented up to today but there is a major usage the backpack sprayers in agriculture for the pesticide spraying due to the cost factor so we want to make changes to backpack sprayers in order to make comfortable to the farmers.

The changes are: Height adjustment according to the crop growth, nozzles and connecting rods are at the back side of the sprayer so there will be no need of hand movement also there will be no skin allergies and lung infection to the farmers

But the drawback was less working time because of having only one battery with two motors.

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