Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 03, Issue: 01 (JAN-FEB, 2023)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Electrostatic Sprayer System

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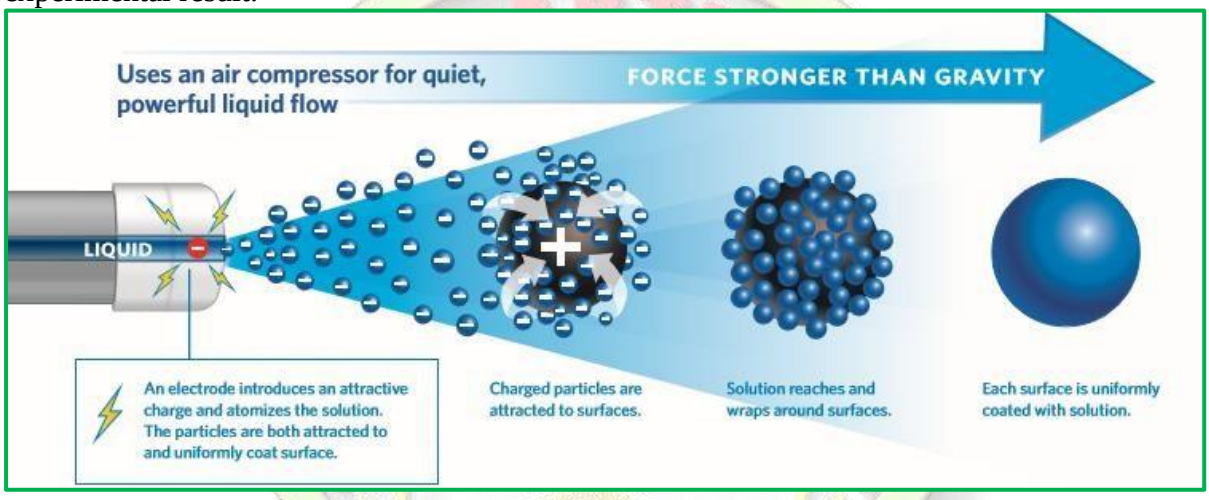
Abstract

To control the certain pest disease or weeds the pesticides are toxic or harmful chemicals are designed. They contaminate the environment, soil, birds and aquatic life too. When they runoff from field for these aspects the application of pesticide should be done accurately.

The new technologies on sensor and image analyzing process promoted the success of application technique. In the study of the electrostatic spraying in agriculture application was evaluated like; hector mounted, electrostatic sprayer or drone sprayer, explained and experimental result.



Introduction

Besides the electrostatic spraying is a new trend in India or world to apply pesticides with less drift potential. In recent years this techniques are also used in paintings, ink printing, etc. By the use of the electrostatic spraying water consumption of that kind of sprayer is upto 10 times less than conventional spraying. On the other hand this method has some disadvantages and difficulties in operating the system newly.

There are many subjects that affect the success of the application. In the high volume and the low volume amount as 'The high volume application rate is > 400 <ha^{-1} and it's droplet size 300 to 500 um. And during low volume spraying application rate is 50 to 400 (ha -1. And the droplet size 125 to 250 um.

During the ultra low volume spraying the rate of the application of the pesticides is < 5lha^{-1} and it's droplet size vary from 5 to 50 um. In this case generally mist, blower, ULV sprayer and the electrostatic sprayer are used. In this type of application of the pesticide biological efficiency is better with less chemical was and not injurious to environment with proper application.

Material and Methods

There are 3 types of charging method for electrostatic spraying. These are induction charging, ionized field charging and direct charging.

- Induction charging: "When a high-voltage electrode, positioned close to where spray liquid emitted from a nozzle, is positively charged, a conductive water, based pesticide spray at earth potential, has a negative charge induced on its surface by the attraction of electrons" (Law 1978)
- Ionized field charging: "A high voltage applied to pinpoint can create an intense electric field around it that sufficed molecules of the surrounding air. A positively charged conductor will repel the positive ions created, while the electrons that are released in the ionization process will be attracted to the conductor and neutralize some of its charge" (Arnold and pye, 1980)
- Direct charging: "When a semi conductive spray liquid, with an electrical resistivity in the range 104 – 106 ohm m, is exposed to a high voltage (15-40 KV) as the liquid emerges through a narrow slit, mutual repulsion between different portions of the liquid. Overcomes surface tension and ligament and formed. These ligaments break up into droplets represents the maximum that can be attained and is called the Rayleigh limit (Rayleigh, 1882)

Electrostatic sprayer uses & Application

- Electrostatic Disinfection for those who need it most. Professional electrostatic sprayer work by projecting an electrostatically charged cleaning solution onto surfaces and object. Since the mist contains positively chaged particles, the cleaning solution. Strongly adheres to surfaces and particles repel one another, leaving a consistent and even coating.
- Cordless electrostatic backup sprayer A professional electrostatic backpack sprayer covers up to 23,000 sq. ft. one a single tank of cleaning flui. Perfect for larger applicatios, such a medical facilities and community centers, these sprayers are an affective and reliable solution to a variety of sanitary challenges.
- Cordless handheld electrostatic sprayer. A handheld electrostatic sprayer is an effective portable disinfectant solution for a wide range of applications. These sprayers are ideal for smaller areas. Such as classrooms and airplanes, and allow the sprayer to disinfect hard-to-reach areas.

➢ Healthcare: Healthcare provides across the country utilize cordless electrostatic sprayers for their disinfectant needs. An electrostatic sprayers system will help hospitals prevent infections and keep their patients safe from harmful germs.

➢ Food services: Electrostatic sprayer help restaurants and catering scruices keep both their workers and patrons safe from infection. With easy-to-use opration and full coverage. Electrostatic sprayer are perfect for disinfecting kitchens and dining areas alike

- School: Electrostatic sprayer allow schools to reliable disinfect high-contact surfaces and help prevent infection. Available in both handheld and backup sprayer configurations, custodial staffs and teachers alike will find in these a reliable disinfectant solution.

Conclusion

Electrostatic sprayers save time, water, labour, fuel and pesticide. Because of the size of the droplets produced by electro statically the coverage on tops and undersides of plants is better than conventional spraying. On the other hand electrostatic sprayers' acquisition costs are still expensive and in same cases the droplets cannot reach to the tops of the high trees. Calibration of the sprayer should be done always precisely and keeping eye on the weather conditions is vital during the electrostatic spraying process.

This typr of sprayers produced "Extremly fine or very fine"droplets (ANSI/ASAE S572.1). For a conventional sprayer it is not easy to lead the droplets to the target. With the help of gentle air flow charged fine droplets reach to the target with electrostatic spraying technique. There are many types of conventional sprayers that can be used in pesticide application. On these sprayers, new technologies are introduced every year. Electrostatic spraying has been not only a new technique but also a new topic of conversation in recent years.

The secret of efficient spraying lies in even and targeted liquid distribution. Uneven coverage of the target area is wasteful, costs money and results in unwanted and unnecessary contamination of the environment.

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