



Category: Applied Research in Health and Medicine

ORIGINAL

The use of pesticides in a Hypericu Flower plantation

El uso de plaguicidas en una plantación de Flor de Hipericu

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ABSTRACT

The use of pesticides in a hypericu flower plantation. In some countries, floriculture has become a means of job creation. But manage and control the policies of various businesses. Respected by both employees and employers. Influence is positive or negative, biosafety is a policy that must be respected to avoid occupational risk; diligently plant flowers. Well wearing protective clothing is an employee behavior that requires health consideration. An investigation will be conducted to identify the problem. The health of workers exposed to pesticides in the hypericu floriculture, in the Quinche parish, Urapamba neighborhood on Julio María Matovelle and Lucia viles streets, through qualitative and non-qualitative design studies. Experimental and explanatory tour. The population is 20 workers. As a tool to guide workers, research and observations, the main ones. The results are the following. The majority of the population is female (55%). The average age is 38 (76%), primary education (60%), hours worked as a florist for more than 6 years (91%), protective clothing (91%), knowing the risks of chemical products (98%), get all the armor (100%) but 50% only use it according to the company regulations, 60% of the employees have experienced diseases such as infectious diseases. enteritis (70%), conjunctivitis (13%), pneumonia (11%), atopic dermatitis (10%), Signs and symptoms such as watery eyes (52%), headache (57%), sore throat (61%) and cough (66%), weakness (36%), low back pain (40%), need for exercise (90%). Knowing, therefore, to conclude that the company provides workers with protective clothing together, they know the risks of chemical products and their importance in the context of disease prevention. Still using only 20%, facing current health problems, lacking endangering the integrity of workers. Training courses offered. The florist worker must have knowledge, awareness, Biosafety and Personal Care, Human Resources Manager The company carries out regular checks to verify the use of protective clothing correctly.

Keywords: Flower Company; flower growers; pesticides; biosafety; occupational hazards.

RESUMEN

En algunos países, la floricultura se ha convertido en un medio de creación de empleo. Pero administrar y controlar las políticas de varios negocios. Respetado tanto por los empleados como por los empleadores. Influencia sea positiva o negativa, la bioseguridad es una política que se debe respetar para evitar riesgo laboral; diligentemente plantar flores. Bueno el uso de ropa protectora es un comportamiento de los empleados que requiere consideración de salud. Se llevará a cabo una investigación para identificar el problema. La salud de los trabajadores expuestos a pesticidas en la florícola hipericu, en la parroquia el Quinche, Barrio Urapamba en la calle Julio María Matovelle y Lucia viles, a través de estudios de diseño cualitativos y no cualitativos. Recorrido experimental y explicativo. La población es de 20 trabajadores. Como herramienta para orientar a los trabajadores, investigaciones y observaciones, las principales. Los resultados son los siguientes. La mayoría de la población es femenina (55%). La edad promedio es 38 (76%), educación primaria (60%), horas de trabajó como florista durante más de 6 años (91%), ropa de protección (91%), conocer los riesgos de los productos químicos (98%), consigue toda la armadura (100 %) pero el 50 % solo úsala de acuerdo con la normativa de la empresa, el 60% de los empleados han experimentado enfermedades como enfermedades infecciosas. enteritis (70%), conjuntivitis (13%), neumonía (11%), dermatitis atópica (10%), Signos y síntomas como ojos llorosos (52 %), dolor de cabeza (57 %), dolor de garganta (61 %) y tos (66%), debilidad (36%), lumbalgia (40%), necesidad de ejercicio (90%). Saber, por lo tanto, concluir que la empresa proporciona a los trabajadores ropa de protección en conjunto, conocen los riesgos de los productos químicos y su importancia en el contexto de la prevención de enfermedades. Todavía usando solo el 20%, enfrentando problemas de salud actuales, carentes poner en peligro la integridad de los trabajadores. Cursos de formación ofrecidos. El trabajador de la floristería debe tener conocimientos, conciencia, Bioseguridad y Cuidado Personal, Gerente de Recursos Humanos La empresa realiza controles regulares para verificar el uso de ropa protectora correctamente.

Palabras clave: Empresa Florícola; floricultores; plaguicidas; bioseguridad; riesgos laborales.

INTRODUCTION

The risk factors of "exposure to pesticides" play an essential role in developing health problems in workers, especially chronic ones. Why is this work so focused? To identify the health problems the worker faces, especially their nervous system. It is one of the issues most affected by various groups of pesticides used in floriculture, with an average of 80 monthly products from different families, especially organics. Phosphates, carbamates, pyrethroids, chlorophenoxy acids, chloronitrophenols, mainly organic mercury, all are classified as toxic II to IV as described by the World Health Organization for this class of substances.

Most neurotoxins affect the nervous system with symptoms that are barely noticeable initially. Over time, the accumulation of chemicals in the body can cause similar symptoms, such as fatigue, lack of concentration, memory problems, and headaches: motor function, cognitive function, sensory function, and sensory function. Many were imperceptible to doctors but measurable in the group created in the present study.

The main damage associated with exposure to these pesticides mentioned in the literature is neurological, such as drowsiness/insomnia, dizziness, weakness, headaches, memory loss, and amnesia, as well as affecting other organs and systems, such as the circulatory and respiratory systems and the skin, many of which refer to illnesses suffered by the workers studied.

Jiménez Proaño, Barbarita Fernanda Year 2022: Factors such as repetitive movements, heavy loads, or forced postures during work activities represent a risk and can cause musculoskeletal disorders. This study aimed to evaluate the level of ergonomic risk and musculoskeletal symptoms in workers in the

fumigation area of the Cayambe flower farm. The methodology used was non-experimental, descriptive, quantitative, field-based, and cross-sectional. The sample consisted of 34 male workers from the fumigation area. The instruments used were the characterization form. The REBA method was used to identify the ergonomic risk level due to forced postures and detect musculoskeletal symptoms; the Nordic Standardized Questionnaire was used. Among the results, the most frequent age group was 18 to 24 years old at 50%, of mixed ethnicity at 55.9%, and the length of service was less than one year at 73.5%. The level of risk was medium, at 44.1%, requiring necessary action. A minimum percentage was found to have musculoskeletal symptoms in the elbow or forearm region at 11.8% and in both the neck and shoulder at 8.8% in the last 12 months. In conclusion, the fumigation workers presented a medium level of ergonomic risk. Most did not have musculoskeletal symptoms, probably because they had been working for less than a year.

Pérez Bejarano, Vanessa Estefanía Year 2014: The sale of pesticides and the increase in agriculture in Ecuador, as well as the expansion of the cultivated area, the workers exposed, the growth in demand for agricultural products and export sales, stimulate the use of pesticides day after day, even so, not everything has been studied about the effects of pesticides when they come into contact with the human body, therefore investigating the potential toxicity for the immune system provides results that can be analyzed as preventive examinations of the immune system's response, since it could be that acute or chronic exposure to these harmful agents is the cause of all clinical manifestations such as cancer, acute hypersensitivity also called an allergic pulmonary response, allergic contact dermatitis, rhinitis, asthma due to acceleration or suppression of antibody (immunoglobulin) production. The variation in the standard output of immunoglobulins due to exposure to carbamate and organophosphate pesticides raises the question of the mechanisms that cause notable changes in the immune system, which are externalized in clinical effects, placing an essential emphasis on the study of immunoglobulin-mediated reactions. The aim is to monitor the exposure to biocides that is evident in our country due to the demand for agricultural production and to verify their effects from a more internal medical point of view before the signs and symptoms can be manifested, thus reducing the rate of disease. For this study, a sample of 50 people was considered who underwent a survey and immunoglobulin G, M, and E by turbidimetric method, which provided data for the chi-square statistic, which showed that there is no relationship between the level of exposure to pesticides and the level of immunoglobulins, but that the results of the alteration of the immunoglobulins are obtained at random.

Andrea Pamela Flores Year 2022: Agricultural activity, particularly farming, is among the most important in Argentina. An interesting subset is that of horticultural and floricultural production. These are small production units located in peri-urban areas, heavily dependent on manual labor and with an intense use of phytosanitary products. This doctoral thesis has two parts. In the first part, a territorial analysis of floricultural and horticultural activities in Buenos Aires was made. To do this, official information about the activity was processed to determine its specific location in the peri-urban area, production characteristics, and evolution over time. In the second part of this work, a study was carried out on the impact of the use of phytosanitary products on horticultural and floricultural workers. The Potential Dermal Exposure (PDE) and the Margin of Safety (MOS) were determined experimentally. The absolute exposure values during the application, preparation, and loading stages and the distribution pattern on the workers' bodies were analyzed. In general terms, this study's results indicated that the preparation and loading stage of pesticides was the most dangerous.

On the other hand, no significant differences were found in the EDP values between floriculture and horticulture. Finally, in the case of indoor floriculture production, the distribution of pesticides during the application stage was studied for the different sectors of the greenhouses. The results concluded that the greenhouse floor was the most exposed area. However, non-negligible quantities of pesticides were detected on the walls of the greenhouses, depending on the organization and type of crop. This

indicates that the polyethylene used in the construction of greenhouses could be a sink or potential element for transferring phytosanitary products within the production unit.

The investigation involves chemical and biological agents that result in occupational diseases that strongly influence employees' lifestyles. With due diligence, the organization collaborates in implementing policies and strategies aimed at workplace safety when using chemical products in production and controlling the impact on employment and the environment. According to the World Health Organization, the highest incidence of the disease in the flower plantation is hypertension, gastritis, skin allergies, headaches, hand allergies, and hepatitis.

According to the World Health Organization, there are 3 million cases of pesticide poisoning, of which 10% are fatal. Most cases of pesticide poisoning, such as carbamates, organophosphates, and organochlorine compounds, occur in third-world countries, although 20% of pesticides worldwide. Therefore, safety measures are discipline and behavior to reduce the risk of infection in the work environment. This is a principle of safety for employees exposed to substances that are 100% harmful to health. And you know that working on a flower plantation allows you to earn a stable living, so you can put bread on the table where health problems can occur due to exposure to fungicides in the long run, abusing worker safeguards, and improper handling of chemicals in various work areas.

The survey found that 69% have burning eyes, 77% sweating, 55% frequent blurred vision, 47% headache, 47% emotional instability, and 47% anxiety when there is a problem with workers' health, sometimes without informing their employer that it can affect their work.

However, employees who work in environments exposed to chemicals do not consider the importance of applying measures to protect our bodies against any disease. Thus, a health problem that affects employees, families, and communities presents illnesses that are sometimes not reported, and the staff indicate that they are temporary. The working conditions of florists regarding safety and health quality of life at work are consistent with a positive or negative impactful environmental management; the actions of the employee cause illnesses that sometimes, they do not notify because this is happening in general, they think it is normal and part of the same job, and therefore there is no adequate control of diseases.

One form of prevention is to create appropriate standards and monitor and verify the correct application of the protections, the rights of employees to achieve their objectives, and other more effective means of fumigation.

The flower farm is located in the El Quinche parish, Urapamba neighborhood, on Julio María Matovelle and Lucia Viles Street.

How does occupational pesticide exposure affect workers' health at the Hypericum flower farm?

General objective

Safety training for workers at florícola Hipericu, Occupational health, and correct use of pesticides and personal protective equipment.

METHODS

Qualitative: This allows you to analyze the information collected interpretively, enabling you to obtain enough information using tools to study human behavior and habits.

Non-experimental: This allows events to be validated as if they had occurred so that they can be analyzed later and the variables are not manipulated.

3.11. Type of Research

Descriptive: To enable direct factual investigation, cause, and effect emerge through a series of questions from the facts and events under investigation. The results obtained can provide guidelines for decision-making and contribute to problem-solving.

Cross-sectional: Surveys and data collection are completed within a given period.

Field research: Data collection is carried out in the same place where the event occurs, the Hipericu floriculture.

3.2.2. Study location and setting

This study was carried out in the Hipericu floriculture area of the Urapamba district of the El Quinche parish. Real data was collected from florists directly exposed to fungicides, thus compiling complete information for the study.

3.3. Population and sample

3.3.1. Universe

The Universe constitutes the total number of workers in the company, which is 20.

3.3.2. Population

The workers of the Hypericum flower company.

3.3.3. Sample

Workers in the floriculture sector are exposed to chemical products in various fields of work.

Title 1. Operationalization of variables.

| CONCEPTUALIZATION | DIMENSIONS | INDICATORS | ITEMS | TECHNIQUE |
|--|---------------------------------------|--|-------|---------------|
| <p>VD: EFFECTS ON WORKERS' HEALTH Pesticides can come into contact with humans through any of the available contact methods: through the skin, inhalation and ingestion. Pesticides, depending on the level of exposure, can have acute or chronic health effects. Adverse health effects occur when exposure levels considered safe are exceeded through direct or indirect exposure. The specific effects on our health can be very serious (fatal) in very severe poisonings.</p> | <p>1.1 Health problems</p> | <ul style="list-style-type: none"> Identify whether pesticides affect their health | 1 | <p>Survey</p> |
| | | <ul style="list-style-type: none"> Recognize that pesticides affect their health | 2,3 | |
| | | <ul style="list-style-type: none"> Identify the degree of danger of the pesticide for their health and the environment | 4 | |
| | | <ul style="list-style-type: none"> Workers take care of their physical health and protect themselves completely when using pesticides | 5 | |
| | | | | |

Source: Author's own creation.

Title 2.

| CONCEPTUALIZACION | DIMENSIONES | INDICADORES | ITEMS | TECNICA |
|---|---|--|---------------------------------|----------|
| VI: LA EXPOSICION DE LOS PLAGUICIDAS La cantidad de productos químicos utilizados, las diferentes formulaciones utilizadas en el campo, el tamaño de las áreas en las que se utilizan, así como las condiciones ambientales a las que están expuestos los individuos. | 1.1. Identificación de plagas 1.2. Necesidad de uso de plaguicidas 1.3. Periodo de uso de plaguicidas 1.4. Peligrosidad de los plaguicidas | <ul style="list-style-type: none"> Reconoce las plagas que atacan al cultivo de flores Identificar los plaguicidas más utilizados para combatir las plagas en las flores Enumera los plaguicidas que utiliza con frecuencia para las flores Frecuencia de uso de los plaguicidas Se interesa por los peligros de los plaguicidas Conocer sobre los peligros de los plaguicidas | 6,7 8 9 10 11 12 | ENCUESTA |

Source: Author's own creation.

Method of information gathering

Throughout the study, data was collected by survey and guided observation.

Survey: A survey will be conducted of all workers exposed to the disinfectant to obtain information on their knowledge of protective clothing and chemical risks.

Observational guide: Observation guides applied to verify and cite information that can be compared in a similar way to the results obtained from the research.

3.6. Data analysis plan

- Survey applied.
- All the information collected is organized.
- An analysis of the corresponding results was carried out for each question.
- Analysis of variables.
- The results are presented with their respective graphs.
- The results are analyzed and interpreted.

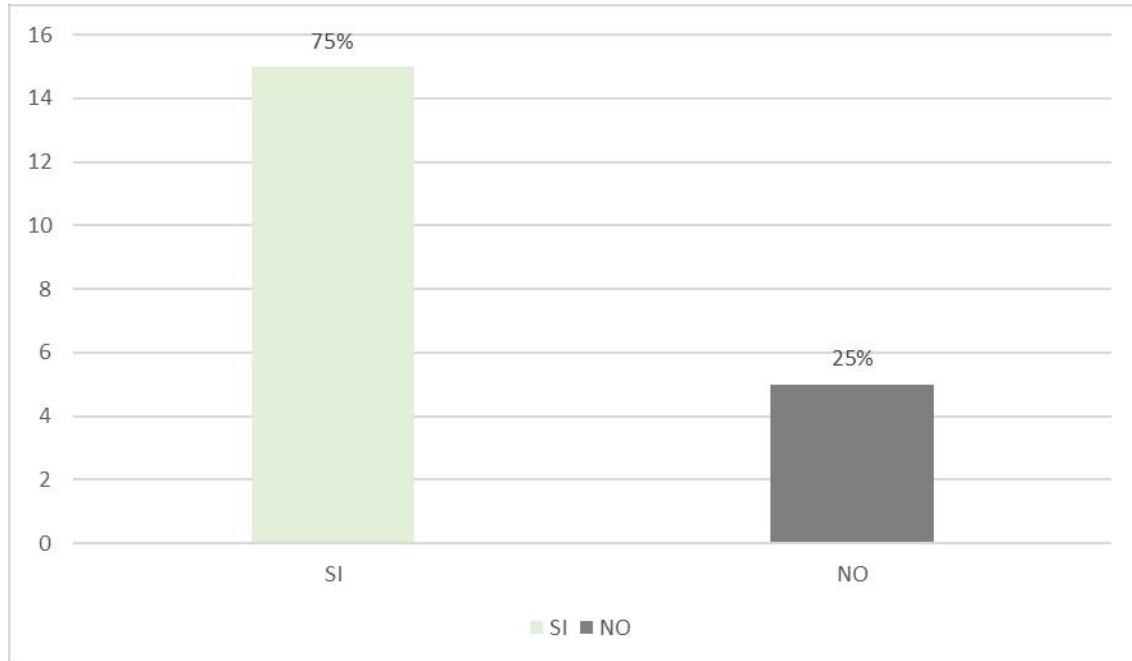
4. Analysis and interpretation of results

Table 3. Do you know if pesticides are harmful to health?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|-----------|-------------------|----------------|
| YES | 15 | 75 |
| NO | 5 | 25 |
| TOTAL | 20 | 100 |

Source: Author's own creation.

Figure 1. Do you know if pesticides are harmful to health?



Source: Author's own creation.

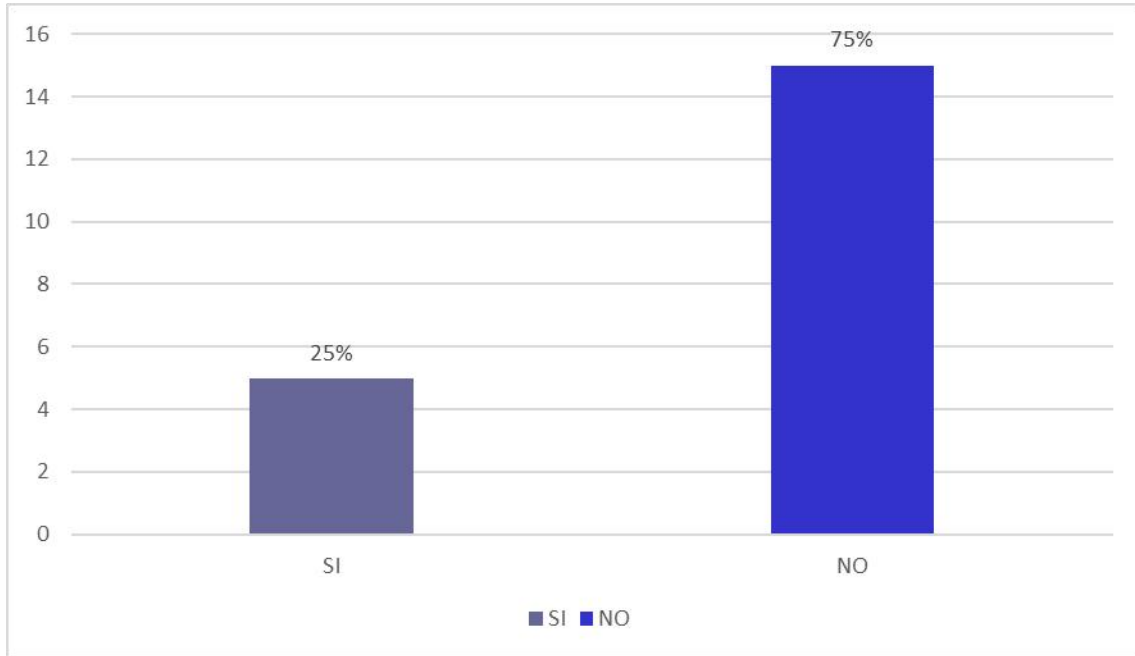
We can see that 75% of the workers on the Hypericum flower plantation are aware of the damage that pesticides can cause to their health and 25% of the workers are not aware of the damage that using pesticides on Hypericum can cause to their health.

Table 4. After the application of pesticides, did you suffer any pain or symptoms?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|-----------|-------------------|----------------|
| YES | 5 | 25 |
| NO | 15 | 75 |
| TOTAL | 20 | 100 |

Source: Author's own creation.

Figure 2. After the application of pesticides, did you suffer any pain or symptoms?



Source: Author's own creation.

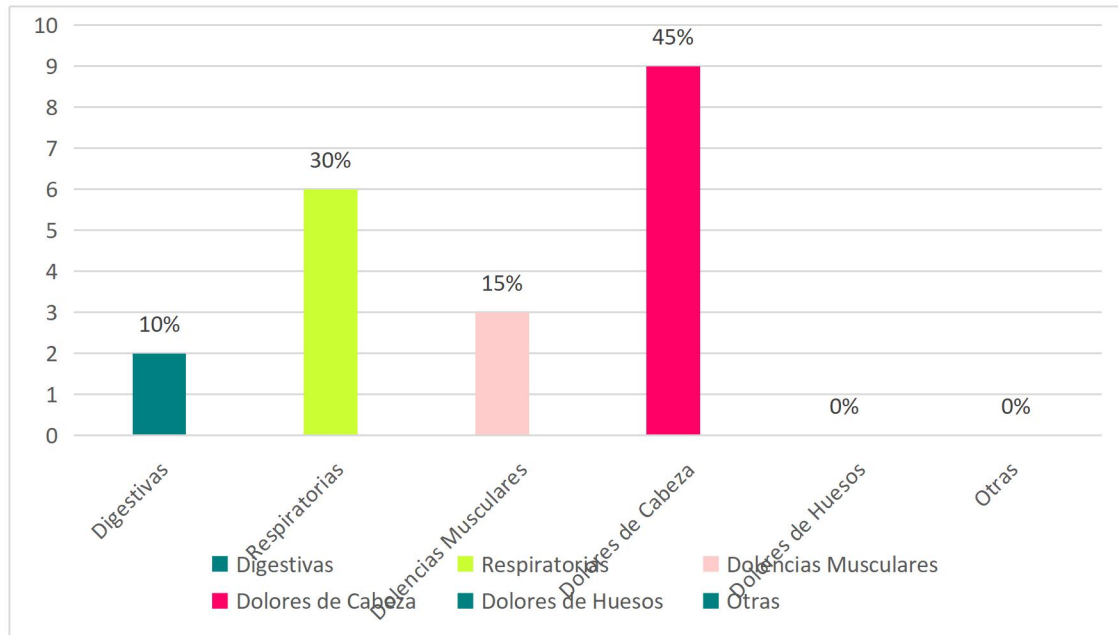
We can see that 25% have felt symptoms after using pesticides in the hypericum flower shop and 75% have not felt any pain in using pesticides after spraying the hypericum flowers.

Table 5. What illnesses have you been affected by lately?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|--------------------------|-------------------|----------------|
| GASTROINTESTINAL | 2 | 10 |
| RESPIRATORY | 6 | 30 |
| MUSCULAR ACHES AND PAINS | 3 | 15 |
| HEADACHE | 9 | 45 |
| BONE PAIN | 0 | 0 |
| OTHER | 0 | 0 |
| TOTAL | 20 | 100 |

Source: Author's own creation.

Figure 3. What illnesses have affected you lately?



Source: own elaboration.

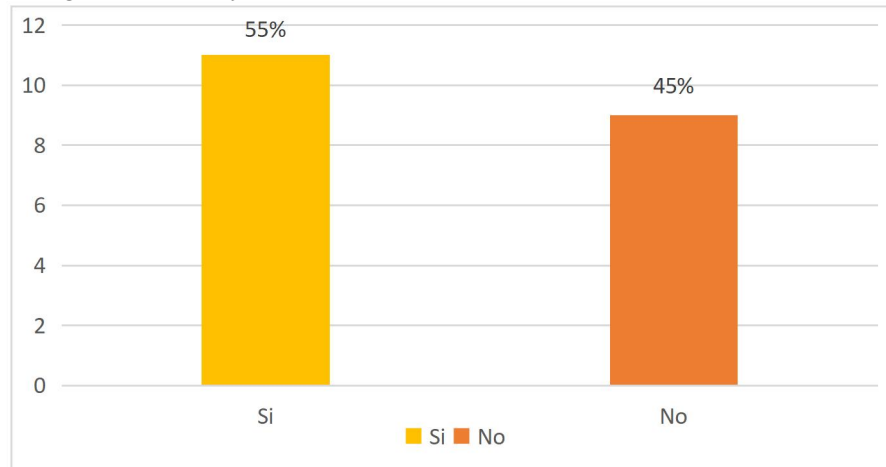
We observe that 10% suffer less from digestive diseases, 30% suffer from respiratory diseases, 15% suffer from muscular ailments, 45% suffer more from headaches when they use pesticides in the hypericum flower plantation, 0% suffer from bone pain and the other 0% suffer from other illnesses.

Table 6. Have you visited a health center to treat these ailments?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|-----------|-------------------|----------------|
| YES | 11 | 55 |
| NO | 9 | 45 |
| TOTAL | 20 | 100 |

Source: Author's own creation.

Figure 4. Have you visited a health center to treat these ailments?



Source: own elaboration.

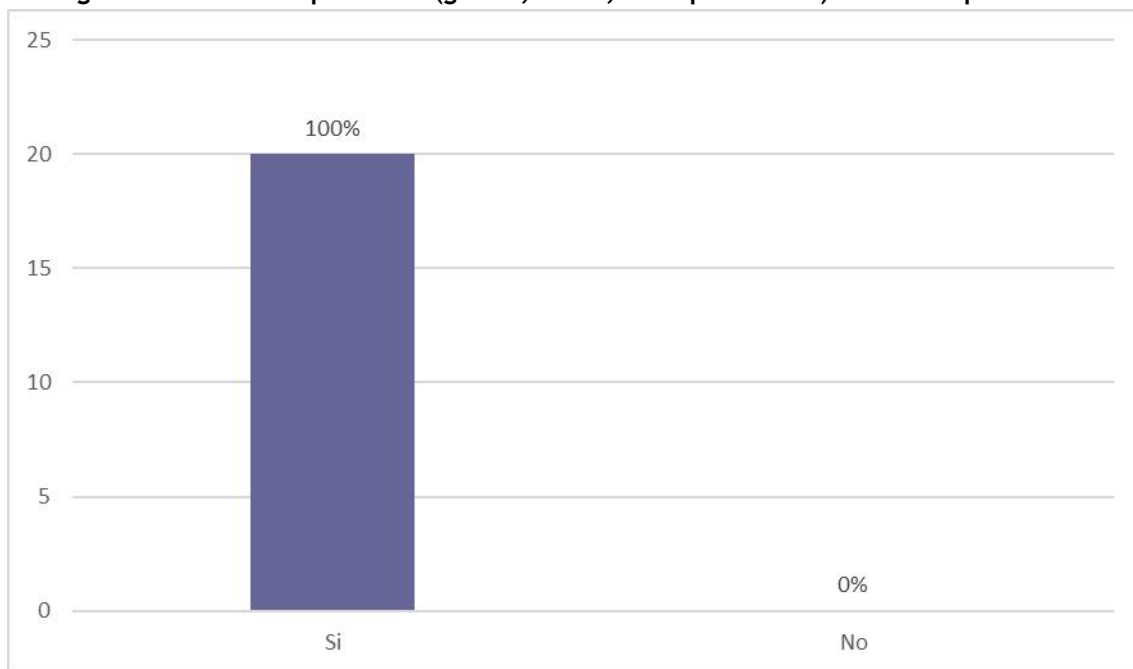
We observe that 55% of workers have attended the health center to be cured of these diseases and 45% have not attended health centers to be cured of these diseases that occur in using pesticides on the plantations of the hypericum flower farm.

Table 7. Do you use implements (gloves, boots, nose protectors) to handle pesticides?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|-----------|-------------------|----------------|
| YES | 20 | 100 |
| NO | 0 | 0 |
| TOTAL | 20 | 100 |

Source: Prepared by the author.

Figure 5. You use implements (gloves, boots, nose protectors) to handle pesticides.



Source: Author's own creation.

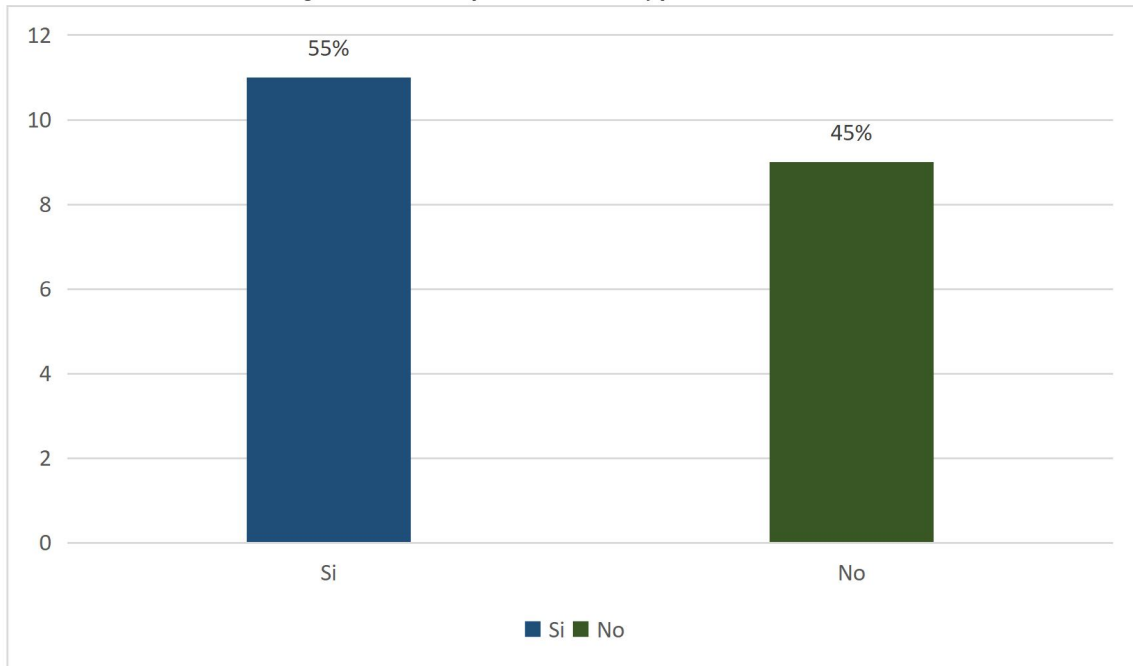
We can see that all the workers use 100% personal protective equipment such as gloves, boots and nose protectors, etc., when using pesticides for fumigation on the hypericum flower plantations.

Table 8. Ever worked in a flower plantation?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|-----------|-------------------|----------------|
| YES | 11 | 55 |
| NO | 9 | 45 |
| TOTAL | 20 | 100 |

Source: Prepared by the author.

Figure 6. What pests attack hypericum flowers?



Source: Author's own creation.

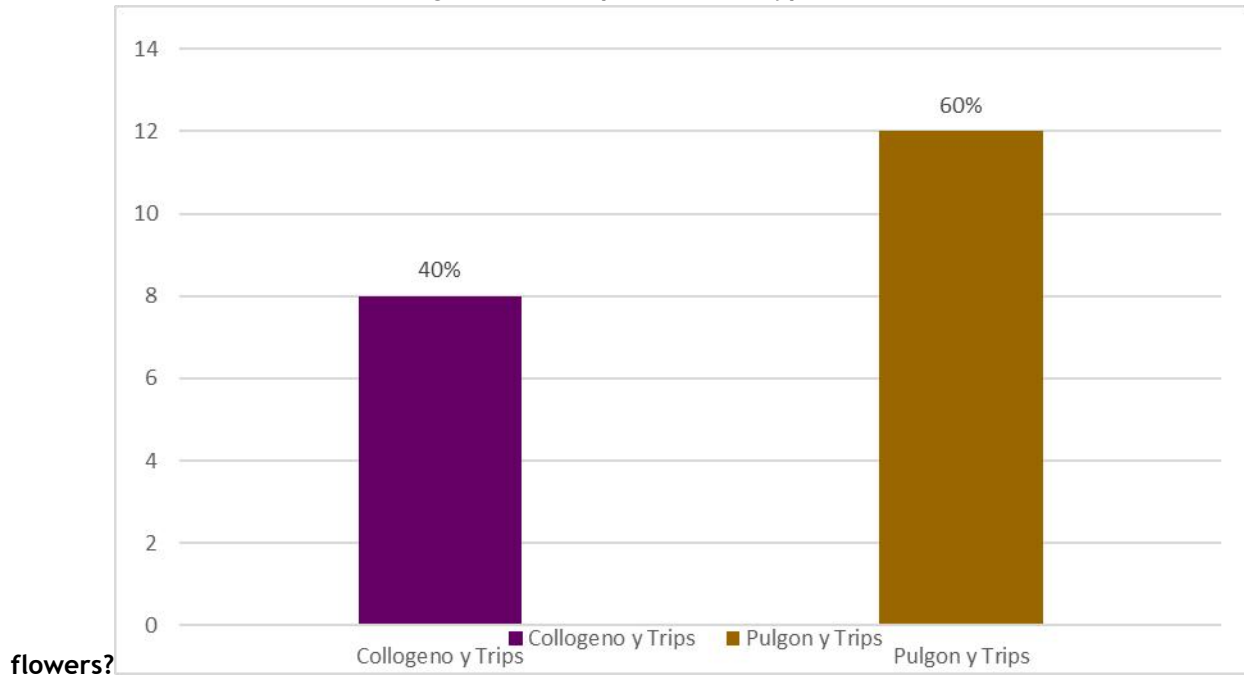
We observe that 55% of the workers had previously worked in flower shops and 45% had not worked in any flower shop before and had previously worked in other companies in different categories such as fruit and vegetables, and then started working in the Hypericu flower shop.

Table 9. What pests attack hypericum flowers?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|---------------------|-------------------|----------------|
| COGOLLENO AND TRIPS | 8 | 40 |
| APHID AND TRIPS | 12 | 60 |
| TOTAL | 20 | 100 |

Source: Author's own creation.

Figure 7. What pests attack hypericum



Source: Author's own creation.

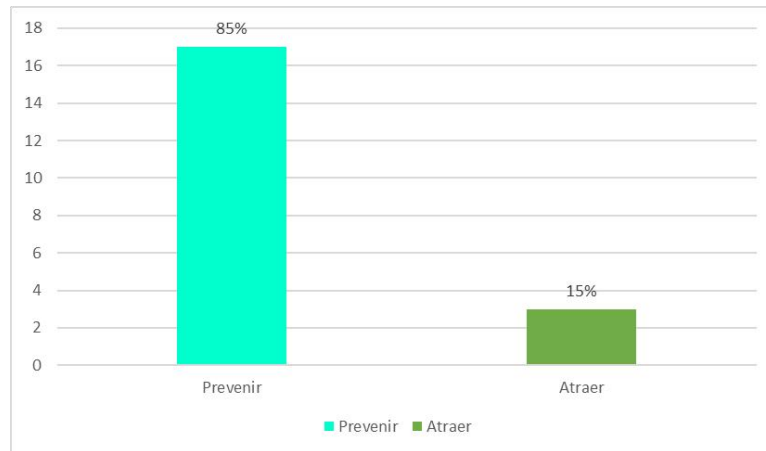
We have observed that 40% of the workers say that the mites and thrips are the pests that attack the hypericum flowers and 60% of the other workers say that it is the aphid and also the thrips that attack the hypericum flowers, when they do not fumigate at the right time, to prevent these pests from damaging or attacking the hypericum flower plantations.

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|-----------|-------------------|----------------|
| PREVENT | 17 | 85 |
| ATTRACT | 3 | 15 |
| TOTAL | 20 | 100 |

Table 10. What is the use of pesticides in hypericum flowers?

Source: Author's own creation.

Figure 8. What do they use pesticides for in the hypericum flowers?



Source: Author's own creation.

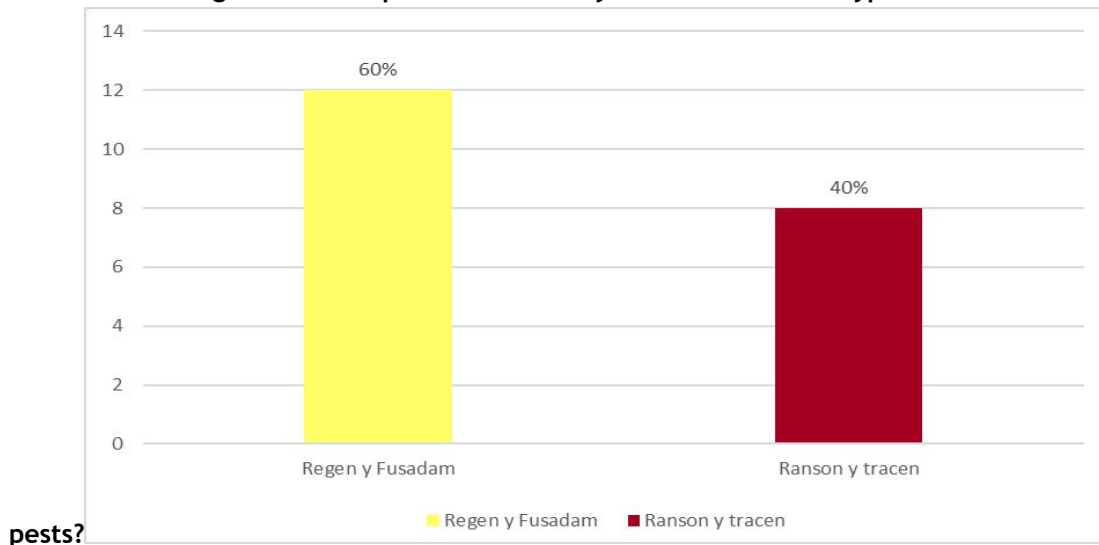
We can see that 85% use pesticides to prevent pests that can cause disease to the saffron crocus plantations and 15% say they use pesticides to attract pests that can cause damage to the saffron crocus crop and can cause losses to the saffron crocus flower plantation.

Table 11. What pesticides do you use to attack the hypericum pests?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|-------------------|-------------------|----------------|
| REGEN AND FUSADAM | 12 | 60 |
| DESCRIBE AND DRAW | 8 | 40 |
| TOTAL | 20 | 100 |

Source: Prepared by the author.

Figure 9. What pesticides do they use to attack the hypericum



pests?

Source: Author's own creation.

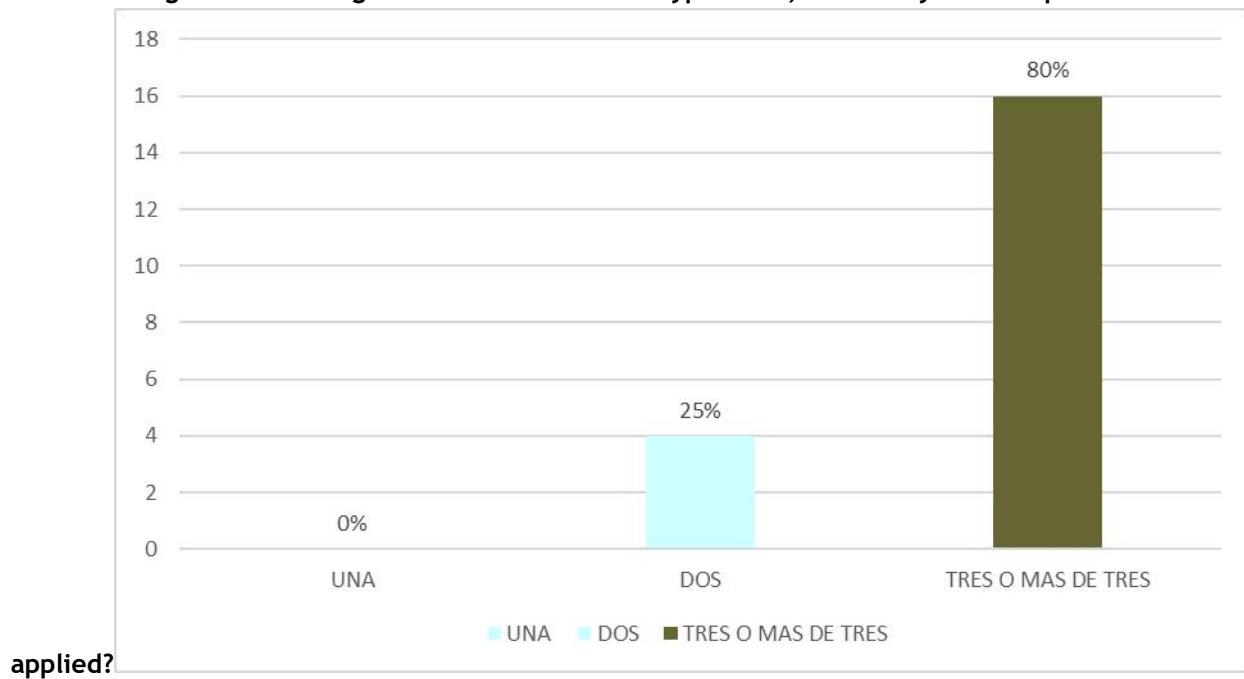
Table 12. Throughout the entire cultivation of hypericum, how many times is pesticide applied?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|-----------|-------------------|----------------|
| ONE | 0 | 0 |
| TWO | 4 | 25 |

| | | |
|---------------------------------|-----------|------------|
| THREE OR MORE THAN THREE | 16 | 80 |
| TOTAL | 20 | 100 |

Source: Author's own creation.

Figure 10. Throughout the cultivation of hypericum, how many times is pesticide



Source: Author's own creation.

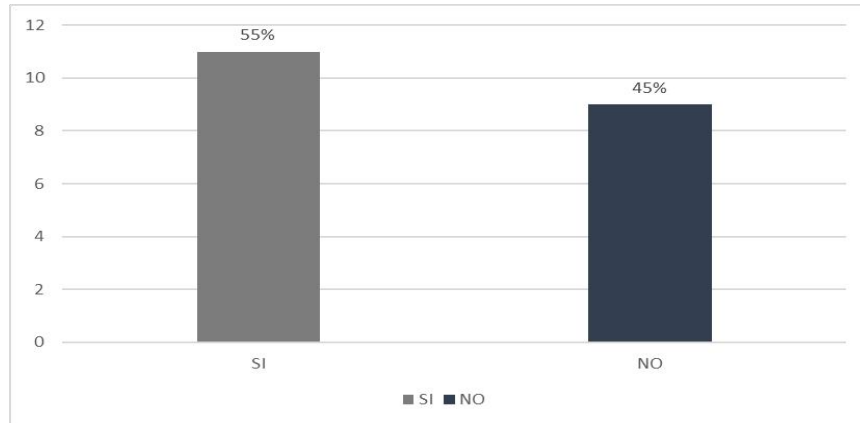
We observe that 80% apply pesticides to the Hypericum flower plantation more than three times, 25% apply the pesticide twice and 0% apply it once. This means that they do not apply the pesticide to the Hypericum flowers a few times and they apply the pesticide more than three times to the Hypericum flower plantation, to control diseases or pests in the Hypericum flowers.

Table 13. Do you read the label of the pesticide product you purchase?

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|--------------|-------------------|----------------|
| YES | 11 | 55 |
| NO | 9 | 45 |
| TOTAL | 20 | 100 |

Source: Author's own creation.

Figure 11. Read the label of the pesticide product you are buying.



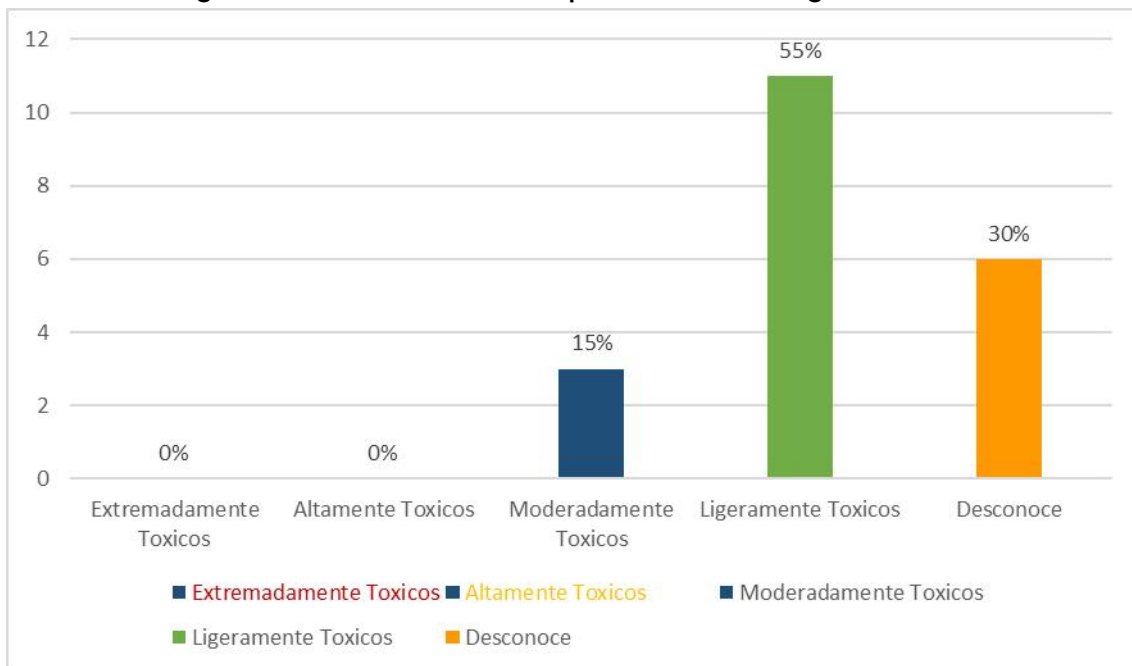
Source: Author's own creation.

Table 14. The classification of pesticides according to their use

| FREQUENCY | NUMBER OF WORKERS | PERCENTAGE (%) |
|--------------------------------|-------------------|----------------|
| EXTREMELY TOXIC (RED STRIPE) | 0 | 0 |
| HIGHLY TOXIC (YELLOW STRIPE) | 0 | 0 |
| MODERATELY TOXIC (BLUE STRIPE) | 3 | 15 |
| SLIGHTLY TOXIC (GREEN STRIPE) | 11 | 55 |
| UNKNOWN | 6 | 30 |
| TOTAL | 20 | 100 |

Source: Author's own creation.

Figure 12. The classification of pesticides according to their use



Source: Author's own creation.

We observe that 55% are in the green band in terms of pesticide use, 30% do not know which classification the use of pesticides falls under, 15% are in the blue band in their use of pesticides, and 0% are in the yellow and red bands. This means that the most used classification is the green band, followed by the slightly toxic band, and the other band they also use is the blue band, which is the modernly toxic band for hypericum flower pesticides.

Proposal

Title

Initial training in occupational safety and proper use of pesticides and Personal Protective Equipment from Florícola Hipericu.

Informative data

Insufficient knowledge of pesticide management in the cultivation of hypericum flowers is harmful to the health of farmers, consumers, and the environment because they are not. Total control over their use, technical recommendations, and helpful life reaches the point of product commercialization, even with residual residue.

Farmers lack understanding about pesticide rotation to control pests that cause heavy losses in the hypericum flower. Crops have high levels of contamination by pesticide residues with harmful environmental effects due to controlled chemicals, both by users of these products and those who harvest the hypericum flower. This evidence is based on the results obtained in the analysis.

Farmers do not know how to use the countless varieties of pesticides correctly when cultivating the hypericum flower, which results in economic, health, and environmental problems. Using rational pesticides, such as MIC, for integrated crop management reduces product and environmental contamination.

Background to the Proposal

Immunotoxicity is a largely unexplored and studied topic in the world. Ecuador and, mainly because it is a new topic to be explored in our country produces agriculture and this study. The investigation of the complications of pesticides in the immune system. And how the delayed effect is focused on our organism and preventing occupational hazards to 0. Through training on specific topics, demonstrate employee integrity and demonstrate financial benefits to employers.

Ecuador has experienced tremendous growth and development in the flower industry, creating more than 70,000 direct jobs. It is essential to provide training to employees on how to protect themselves. Employers provide specific points to mitigate risks. It is your responsibility; this is how you manage agricultural implements and pesticides for floriculture production. Due to the large number of employees, floriculture is only for employers. They investigate it, but they don't examine how it affects them. Existing standards should provide efficient working conditions. It is stipulated in the occupational risk assessment system (SART), ISO standards, labor standards, and regulations, and it prevents immunotoxicity from gradually affecting the optimal response of the immune system to pesticide exposure.

Procedures

Purchase and Transportation

Please select the pesticide to be used. As a flower production manager, know what you want to control and the pesticides used. When buying an insecticide, you must identify the drug.

Toxicity is compared to the color indicated on the label. Do not open the pesticide container and do not smell or taste it. If it is a known pesticide, do not take children or vulnerable people (elderly and pregnant women) to buy pesticides. Sellers should not sell either.

The pesticide must be used in a closed vehicle or load transporting food. This prevents the spread of pesticides during transportation. For a supplier to be approved for floriculture, the criteria must be applied and founded in 1927 for storing and transporting pesticides.

Preparation of the mixture

When you have pesticides, decide on the color of the label. The label indicates the product's toxicity, so handle it with care. Follow the dosage-related labels that apply to your pump.

Pest and crop recommendations. Please read our guide to addiction symptoms and first aid methods.

Follow-up support in case of intoxication, protective equipment (mask, suit, boots, gloves, overalls) when opening the product container and starting the mixing process.

I don't hold the case up to my face to see if the measurements are accurate. Use an appropriate method for pesticide quantification.

Before spraying

Check the application equipment (pump) for leaks. If your device has a problem, start repairing it immediately.

I need an unused spare part, so I will send it in for service and use another pump well. Temperature and humidity conditions (temperature, humidity, sufficient airspeed to start sterilization).

Application

Place the disinfectant lance as far away from your body as possible. Do not let the pesticide mixture run over your body.

Apply to cover crops and direct pesticides to the problem you want to control. If you sweat, don't wipe it with your sleeve. If you are thirsty or hungry, wait until the job is finished, wash your personal protective equipment, and then shower with soap and water; after work, you can do anything.

After application

With protective clothing on, wash gloves and start cleaning the equipment in general and by parts, not forgetting filters and nozzles, to prevent pesticide residue from accumulating and affecting future applications and damaging the equipment.

Wash the utensils used for mixing and applying the pesticide. Do not wash the equipment near water sources or drainage channels into water sources.

After completing the above steps, wash the PPE and then shower with soap and water as normal.

Protective clothing and used clothing should be placed separately (in a plastic bag) from regularly used clothing and washed immediately.

The greenhouse should have sufficient ventilation and air extraction systems to reduce the risk of contamination for staff working in it after fumigation.

Personal protective equipment

The protective clothing and equipment to be used include:

- Long-sleeved shirt and long trousers
- Rubber gloves.
- Rubber boots
- Waterproof overalls
- Full face mask

Training: For the correct handling of personal protective equipment and work clothes, employees are instructed according to the following rules.

- Correct use
- Maintenance
- Accessories, spare parts
- Type of protection provided by the item
- Lifespan of the item

Use: The following rules apply to the correct use of personal protective equipment and work clothes:

All personal protective equipment and protective clothing are for personal use, and it is strictly forbidden to lend or exchange them between users.

The OSH unit ensures that workers use the personal protective equipment and clothing provided correctly. Environments that interfere with the correct use of personal protective equipment and

| TYPE OF PROTECTION | TEAM | CHARACTERISTICS |
|------------------------|------------|---|
| Respiratory Protection | Mask | Advanced electrostatic media, Elastic adjustable band |
| | | Advanced electrostatic media, organic vapor release at disturbing levels, adjustable elastic band. |
| | Respirator | Silicone material, fit that reduces tension, facilitates breathing due to the special design of the valves. |

protective clothing are avoided.

Personal protective equipment and work clothes are stored in a safe place. They are used only for the purpose for which they were designed.

Do not use personal protective equipment that is in poor condition, such as with holes or cuts.

After completing the disinfection process, wash the protective equipment with water and detergent in the area designated for this activity. Always clean the suit, hood, and boots first and gloves last, in that order. ○ Periodic maintenance will be carried out.

Personal protective equipment and clothing are continuously checked as new personnel are required.

Maintenance: Safe maintenance of equipment requires consideration of the type of equipment to be repaired, compliance with the standards established by each manufacturer for each product, and maintenance of adequate sanitary conditions.

The personal protective equipment to be purchased is as follows:

Table 15.

| TIPO DE PROTECCIÓN | EQUIPO | CARACTERISTICAS |
|-------------------------|------------|--|
| Protección Respiratoria | Mascarilla | Medios electrostaticos avanzados, Banda ajustable elástica |
| | | Medios electrostaticos avanzados, liberación de vapores orgánicos en niveles molestos, banda ajustable elástica. |
| | Respirador | Material silicon, ajuste que reduce la tensión, facilita la respiración por el diseño especial de las valvulas. |

Source: Author's own creation.

Table 16.

| | | |
|---------------------------------|-----------------------|---|
| | Filtros de Respirador | Aprobación NIOSH: protección contra ciertos vapores organicos. Pinturas, disolventes, pesticidas |
| | | Aprobación NIOSH: Protección contra gases ácidos. Cl, Cloruro de hidrogeno, y Dioxido de azufre. |
| | | Aprobación NIOSH: Protección contra ciertos vapores organicos y Vapores ácidos., Cl, Cloruro de hidrogeno, y Dioxido de azufre. |
| | | Compatible con los filtros 6601, 6002, 6003. |
| Protección Auditiva | Tapones | Nivel de reducción de ruido 29 dB. Norma ANSI S3. 19-1974 |
| | Orejeras | Nivel de reducción de ruido 23 dB. Norma ANSI S3. 19-1974 |
| Protección visual | Mono gafas | Gafas de uso general, Lente de policarbonato transparente, antiempañante, antirasguños. No debe usarse para protección contra salpicaduras Norma ANZI Z87.1; CE EN166 |
| | Gafas | Gafas de uso general. Lentes de policarbonato con protección a rayos UV 99%, antiempañante, antirayaduras. Norma ANSI Z87.1-2003 |
| Protección para Cabeza y Rostro | Careta de Protección | Capucha liviana, permite el uso de multiple mascarillas, cubre completamente la cabeza, nuca, y |

Source: Author's own creation.

Table 17.

| | | |
|-------------------------------------|---------------------------------------|--|
| | | parte de la espalda. Resiste a material agrícola. |
| | Casco | Material polietileno de alta densidad y bajo peso. Suspensión de 6 puntos de apoyo. ANSI Z89. 1-2003 |
| Protección de extremidades y cuerpo | Guantes de latex | Calibre 35 milésimas de pulgada, 300 mm largo |
| | | Calibre 40 milésimas de pulgada, 350 mm de largo |
| | Guantes de nitrilo | Calibre 18 milésimas de pulgada, 320 mm de largo |
| | Guantes Revestidos | Guante de nitrilo con tejido de refuerzo para trabajo liviano, 250 mm de largo |
| | Guantes de cuero | Guantes de cuero suave y grueso resistente al rasgado. |
| | Trajes de fumigación | Trajes de PVC, comprende pantalón y capucha. |
| | Delantales PVC | Material PVC, Calibre 16, con refuerzo |
| | MangasPVC | Material PVC, calibre 16, ajuste elástico. |
| | Interiores de fumigación | Material Jersey, comprende pantalón y buzo manga larga. |
| | Ponchos para lluvia | Material PVC, livianos, Calibre 16 |
| Cinturón de Baqueta | Cinturón de cuero para soporte lumbar | |

Source: Author's own creation.

Personal protective equipment (PPE).

Article 68 of the Occupational Accidents and Diseases Act 16.744 establishes that companies must provide their employees with the necessary protective equipment and supplies and cannot charge for their value. It protects against possible injury and is required if the hazard has not been eliminated.

To protect the Hipericu florists, we have to point out that each work area has different protection needs, so we will collectively analyze all the equipment that needs to be transported to carry out the work.

Eye protection.

All workers who perform operations that may endanger the eye must adequately protect these organs.

Safety glasses for workers who carry out activities requiring corrosive or similar chemicals should be made of a flexible material that adapts to the face and resists the attack of such substances.

Respiratory protection.

Respirators provide protection and reduce concentrations in the breathing zone below the threshold limit value (TLV) or other recommended exposure levels.

Respirators with a chemical cartridge are the most suitable for this activity.

Protection of hands and arms.

The gloves provided to workers should allow free movement of the fingers, be of the appropriate size, be kept in good condition, and not be crushed, torn, or soaked in chemicals.

Leather or fabric gloves are recommended when working with rough or sharp materials. Long rubber or neoprene gloves should be worn when working with chemicals.

Foot and leg protection.

Safety shoes should protect workers' feet from moisture, heat, rough surfaces, stepping on sharp objects, and falling objects.

Non-slip rubber boots are used when working in wet environments.

Protective clothing.

These special garments should be used to protect against certain risks, especially when handling corrosive substances.

Rubber or rubber-like materials should be used to make protective clothing and hoods for workers exposed to corrosive or other hazardous substances.

Emergency response

Poisoning symptoms appear in 5-10 minutes for high doses, 15-45 minutes through the skin, and 15-20 minutes for low doses that are inhaled or swallowed.

The symptoms generally develop gradually:

- General discomfort (fatigue)
- Headache
- Dizziness
- Sweating
- Blurred vision
- Lack of coordination when speaking.
- Vomiting
- Muscle spasms
- Difficulty breathing
- Drooling and mucus
- Loss of consciousness
- First aid and treatment in case of intoxication:
 - Reducing exposure to pesticides: From the moment the applicator feels the pesticide come into contact with their body:
 - The application must be stopped immediately.

- Wash the gloves
- Remove the protective clothing.
- Wash the exposed areas thoroughly with soap and water.
- Leave the application area, shower, change clothes, stop the application and rest.

Once a pesticide is ingested or inhaled, it must release its poison:

Follow the above recommendations when removing toxins from the body's surface.

Keep the patient warm.

Try to induce vomiting with a warm saline solution (1 tablespoon per glass of water) or manual stimulation.

Do not give castor oil, milk, butter, eggs, alcohol, or coffee to the patient because they affect the patient more than they help.

Take the patient to the doctor or clinic for a labeled pesticide container.

Feasibility analysis

The success of each program and project implemented in the field of the flower business. It is a preliminary feasibility or feasibility analysis that is carried out when critical aspects such as social viability, law, and the environment are evaluated,

Social feasibility

Gender: Men and women at risk and their exposure. Respect when pesticides are not handled properly and the rules of use, drying, and handling that affect the system. Train your staff because the immune system causes immunotoxicity. When it comes to workplace safety, it is essential that employees.

Cultural: Most employees work in the floristry system. Primary education level: To reduce risk and improve occupational safety, people should be educated about potential hazards. They are at work, and it is very important to know how to prevent them.

Legal reference: Article 35 Article 11 of the Constitution, text. 41 of Art and Labor Law. 12 of the Health and Safety Regulations Improvement of employees and the work environment at that time. Hire workers to work as a labor intermediation service.

Environmental feasibility

Prolonged and chronic exposure to polluting emissions. Pesticides have a significant impact on public health. The environmental problems caused by the improvement of floriculture are relevant and closely linked to and impacting the safety and waste management of a lethal environment.

To address this problem, the Environmental Management Agency has decided to take a course of action that affects the environment, directly or indirectly affecting people. One of the crucial points is the management of pesticide waste and its packaging, so it is recommended that, after all, pesticides, the containers should be washed 3 times, rendered useless (perforated), and if the product is not, hand it over to the competent authority. Once completed, it can be treated with potting soil. Finally, this is why this training also has the advantage of being beneficial.

Florist on the environmental risks of pesticides and how residues should be treated and disposed of in an environmentally friendly way.

Table 18.

| FASES | METAS | ACTIVIDADES | RESPONSABLE | RECURSOS | TIEMPO |
|--|---|--|--------------|---------------------------------|-----------|
| Formulación de la propuesta. | Determinar la importancia de las capacitaciones sobre seguridad ocupacional | Revisión bibliográfica | Investigador | Humanos, técnicos y económicos. | 2 semanas |
| Desarrollo preliminar de la propuesta. | Elaborar la capacitación para el personal de la florícola | Revisión bibliográfica. Esquemas y diagramas de flujo. | Investigador | Humanos, técnicos y económicos. | 2 semanas |
| Implementación de la propuesta | Ejecutar la propuesta | Conferencias capacitadoras e informativas sobre seguridad ocupacional. | Investigador | Humanos, técnicos y económicos. | 1 semana |
| Evaluación de la propuesta. | Comprobación del proceso y diagnóstico de la propuesta | Verificación de lo aprendido por parte del personal de forma práctica y de manera didáctica. | Investigador | Humanos, técnicos y económicos. | 1 semana |

Source: Prepared by the authors.

Table 19. Resources needed to implement the safe pesticide management plan

| PLAN DE MANEJO SEGURO DE PLAGUICIDAS EN FLORICOLAS | | | | | | | |
|--|------------------------|---|-----------------------|---|---------------------------------------|------------------|------|
| EMPRESA: | | FLORICOLA HIPERICU | | | | | |
| RECURSOS REQUERIDOS Y PRESUPUESTO | | | | | | | |
| TIPO DE CONTROL | RECURSO | DETALLE | CANTIDAD | ARTICULO | PRECIO UNITARIO USD | PRECIO TOTAL USD | |
| 1 | ASESORÍA | ASESORIA PARA LA IMPLEMENTACION DEL PLAN | 1 | RECOPIACION DE LA INFORMACION, ANALISIS DE LA INFORMACION, DESARROLLO DE PROCEDIMIENTOS, MEDICIONES | 2600 | 2600 | |
| 2 | CONTROL EN LA FUENTE | CONDICIONES TERMOHIGROMETRICAS (medición) | 4 | TERMOHIGRÓMETRO | 109 | 436 | |
| | | VELOCIDAD DEL AIRE | 4 | ANEMÓMETRO | 149 | 596 | |
| 3 | CONTROL EN EL MEDIO | EXTRACCIÓN LOCALIZADA | 120 | MODIFICACION A 1/4 LA SALIDA DE AIRE DE INVERNADEROS | 75 | 9000 | |
| | | VENTILACIÓN | | | | | |
| | EQUIPO DE PROTECCION | TRAJE DE FUMIGACIÓN | 60 | TRAJE DE FUMIGACIÓN | 19 | 1140 | |
| | | TRAJE INTERNO | 60 | TRAJE INTERNO | 15 | 900 | |
| | | GUANTES DE CAUCHO FUMIGACION PAR | 60 | GUANTES DE CAUCHO | 14,5 | 870 | |
| | | GUANTES DE CAUCHO POSTCOSECHA LAB. CULTURALES | 358 | GUANTES | 6,75 | 2416,5 | |
| 4 | CONTROL EN EL RECEPTOR | PERSONAL | MASCARILLA FUMIGACION | 60 | MASCARILLA | 14 | 840 |
| | | MASCARILLA POST COSECHA / LABORES CULTURALES | 358 | MASCARILLA | 5,13 | 1836,54 | |
| | | BOTAS / PAR | 418 | BOTAS | 35 | 14630 | |
| | | CAPUCHA | 60 | CAPUCHA | 12 | 720 | |
| | | CAPACITACIÓN | PLAN DE CAPACITACIÓN | 1 | CURSO PARA 5 DIRECTIVOS / 8 HORAS | 300 | 300 |
| | | | | 1 | CURSO PARA 14 MANDOS MEDIOS / 8 HORAS | 840 | 840 |
| | | | | 1 | CURSO PARA 418 OPERADORES / 8 HORAS | 6270 | 6270 |
| TOTAL, IMPLEMENTACIÓN DEL PLAN DE MANEJO DE PLAGUICIDAS | | | | | | 30763,04 | |

Source: Author's own creation.

CONCLUSIONS

The company buys pesticides approved by regulators for use in the hippuric flower industry. This is done to reduce the risks to those exposed to handling pesticides and avoid environmental contamination. The safety data sheet for each pesticide provides this information.

The risk points where possible contamination of health and the environment can occur are sowing and harvesting operations in agricultural fields, post-harvest areas, receiving flowers, hydration, and washing foliage.

Most pesticides used during cultivation and post-harvest have IV and III toxicity.

During fumigation, the greenhouse is completely sealed to avoid contaminating the environment and prevent residual pesticides from leaking outside. Likewise, when formulating pesticides, the safety regulations recommended by the pesticide manufacturers regarding dosage must be taken into account; this way, possible damage can be controlled.

The waiting time before re-entering the greenhouse is significantly reduced, although safety regulations do not recommend this. Workers entering greenhouses are at greater risk of contamination as they are unaware of the dangers they are exposed to when entering fumigation areas.

The fumigation team consists of two people and the person who does this job rotates every three months. This is considered a reasonable time; a sterilization worker returned after a nine-month rotation, but this deadline was not met. Workers want to return to the fumigation work because this is the only job dedicated to fumigation work, with additional bonuses on top of the monthly salary of around US\$80. This bonus is an excellent help compared to their salary and does not consider the long-term exposure they incur, so people always want to return. The diseases can irreversibly affect their health and even cause congenital disabilities in their unborn children.

The sterilization stage presents a high chemical risk for personnel in direct contact (such as disinfectors and pump handlers) due to the mist generated during the sterilization process. Workers who work in greenhouses are also at risk. When the mist enters the environment, dry leaves turn into dust, which can enter through the skin, the respiratory tract, and even the digestive tract.

As for personal protective equipment, it was concluded that the company has the necessary equipment for disinfection work, all officially certified. Operators must be trained in its use, handling, care, and maintenance. Work is underway to improve this aspect by informing workers about the risks and consequences of not using PPE correctly, even though some people do not use it because it is frustrating and annoying.

The workers at Florícola Hipericu receive continuous training in the handling of pesticides and are also trained in the following standards. Be sure to follow these instructions to prevent accidents and occupational illnesses caused by handling agricultural chemicals. In addition, some people have returned empty pesticide containers, so they received training on environmental pollution issues, such as not reusing them.

They were also informed that rinsing empty pesticide containers in tap water could affect nearby water sources, such as ditches and rivers. Needless to say, many people have successfully obtained these materials without considering the environmental and health risks involved.

These training sessions and conferences aim to minimize the potential environmental and health impacts of this chemical hazard. In addition to the chemical hazards associated with pesticide handling.

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FINANCING

None.

CONFLICT OF INTEREST

None.