MANUAL FOR INSTRUCTORS TO TRAIN FARMERS’ HOUSEWIVES ON THE SAFE AND CORRECT USE OF PLANT PROTECTION PRODUCTS AND INTEGRATED PEST MANAGEMENT (IPM)

AUTHOR:
INTRODUCTION

One of the main objectives of CropLife is the development and enforcement of Education and Training programmes on the Correct Use and Management of plant protection products and Integrated Pest Management (IPM).

Since 1991, with this objective in mind, the first projects have been under way and, to date, they have been extended throughout several regions, which has been of great benefit for the production process and the environment, and also to improve the knowledge of farmers and their families on the correct use of plant protection products and integrated pest management.

As a further step in the training process, CropLife offers this manual for instructors who have the task to train housewives with techniques of Correct Use and Management of Plant protection Products and Integrated Pest Management (IPM).

This manual has eight units that start with women’s role in the safe and correct use of plant protection products; their knowledge of harmful and domestic pests and how to control them. Risks to humans and the environment from the use of plant protection products; safety measures for farmers; purchase and transportation of products and elimination of empty containers; pursuing with this that housewives collaborate with their husbands, applying correctly the knowledge they have acquired, thus contributing to the production of food and fibre in a safe, competitive and profitable way.

We are confident that this manual will be a real and effective contribution to rural development and that it will be used by persons working in projects and programmes dedicated to this type of activity.
UNIT # 1

WOMEN’S ROLE IN THE CORRECT USE OF PLANT PROTECTION PRODUCTS
UNIT No. 1
WOMEN’S ROLE IN THE SAFE USE OF PLANT PROTECTION PRODUCTS

UNIT REVIEW

The objective of this unit is to obtain basic information from farmers’ housewives about the problems encountered in the community, as well as in their own household, with the use of plant protection products, due to their incorrect storage, repacking, reuse of empty containers, incorrect laundering of working clothes, use of plant protection products to control domestic and human pests; intoxication problems, environmental contamination and others; so women can become aware of their role to find solutions to these problems.

By focusing this unit in this manner, the role of the housewife at home and in her community can be valued, and her knowledge and experience level on the subject can be measured and improved through training, so she can be conscious of the importance of her participation as a promoter of the well being of her community and her own family.

The unit must cover the following points:
A. Inauguration of the course and formal introduction of the participants, instructors and special guests.
B. Distribution of the required materials to be used in the training process.
C. Title and objective of the unit
D. Identification of problems related to the use of plant protection products at home and in the community.
E. Identification of the housewife’s role in the solution of problems

OBJECTIVES

At the end of the activity the participant housewives will be able to:
- Identify at least five problems related to the use and management of plant protection products at her community, including her home.
- Recognise the important role she must play in her search for solutions to the problems.

EQUIPMENT AND DIDACTIC MATERIAL

- Flipchart paper
- Markers
- Board and chalk
- Notebooks and pens
- Masking tape
- Cards with name of the participants

TIME REQUIRED:

60 minutes
STEP No. 1
COURSE INAUGURATION AND INTRODUCTION OF PARTICIPANTS AND INSTRUCTORS

A representative from the sponsoring organisation should be invited to inaugurate the course. After the inauguration, the participants will introduce themselves, one by one. Their name should be written on a card that will be placed on the table so they can be identified. Afterwards, the necessary materials will be handed to them to start the programmed activity.

STEP No. 2 – TITLE AND OBJECTIVE OF THE UNIT

Write down on the board the title and objective of the unit. The target must agree with the proposed objectives. The trainer should explain briefly how this target will be reached.

STEP No. 3
THE ROLE OF THE HOUSEWIFE TO SOLVE THE PROBLEMS DERIVED FROM THE USE OF PLANT PROTECTION PRODUCTS

Form working groups to discuss and identify the problems derived from the incorrect use and management of plant protection products in the community and at home and to propose solutions. It is important to recognise the important role of the housewife to solve these problems. The working groups should be made of a minimum of four persons.

Have a meeting with all the participants, where the representative of each group will explain the conclusions they reached in a five-minute period and allow another five minutes for questions and comments.

At the end of the meeting the instructor should unify ideas and highlight the important job of the housewife as a transformer agent.

The instructor must motivate the participants during the course of the activity to present ideas and value their own work as agents that look after their family and community.
UNIT # 2
CONCEPTS ABOUT FARMING AND DOMESTIC PESTS

UNIT REVIEW

One of the purposes of this unit is to inform housewives that in nature there are no pests. Pests are product of man’s appreciation and of how the community describes them. Some organisms are perceived as pests because they interfere with man’s own activities.

This interference may be directly responsible of man’s health problems; loss of domestic animals; low crop yield; damage or loss of stored food and upsetting man’s well being.

Another purpose is to identify some pest organisms that may damage man’s crops, affect his health or the health of his domestic animals or that are causing damage, contamination and loss of stored food and products; they may also be interfering with his well being.

The titles of the main subjects are:

A. Pest concept
B. Some pest organisms
C. Farming and domestic pests

OBJECTIVES

At the end of this activity the participating housewife should be able to:

- Know pest concepts
- Identify and recognise the problems caused by pests
- Identify and recognise at least eight pest organisms
- Identify and recognise at least four farming pests and four domestic pests

TIME REQUIRED:

60 minutes
STEP No. 1 – PRESENTATION: PEST CONCEPT

Pest is a broad term in view that there are various organisms that can fit in this condition. An organism can be considered by a person as a pest at a determined place and moment, while the same organism may be thought as valuable by another person, even at the same place and moment or under other circumstances.

Note for the Instructor: Explain this situation, citing some local examples, to explore the knowledge and experience level of the participants. Motivate their participation.

Generally, a pest can be defined as any organism population that is causing economic loss to crops and stored grains; that damage or affect the health and well being of man and his farm or domestic animals.

STEP No. 2 – PRESENTATION AND DEMONSTRATION: IDENTIFICATION AND RECOGNITION OF PEST ORGANISMS

Pest organisms have been known and described since ancient times. Insects constitute the most outstanding organism group of all pests known by man, but there are also other organisms that can be harmful. Among these we can find pathogen agents that cause diseases (fungus, germs, virus, etc.); weeds, mites, nematodes, rodents and birds.

Note for the Instructor: Take to the classroom several samples of pest organisms and mention to the students the damage caused by each of them. Have the participants examine the different samples and arrive to their own conclusions.
STEP No. 3 – PRESENTATION: FARMING AND DOMESTIC PESTS

Insects:

Insects can damage the crop, destroy and contaminate stored grains and food and can also transmit diseases dangerous to humans. Some of the insects that damage crops are: leaf chewer, stem and root cutter, sucker insect, stem and root borer, fruit driller, leaf miner.

Among the insects that damage stored grains and food we find the weevil and the moth.

Some insects are vectors of diseases such as malaria, yellow fever, dengue, encephalitis, amoeba dysentery, cholera, typhoid fever, polio, infectious hepatitis, etc. and among them are the cockroaches, bedbugs, lice, mosquitoes, and flies.

Note for the Instructor: Show species and pictures of insects that have economic importance in farming and human and animal health. Identify their various feeding forms. Remember that there are also beneficial insects.

Grasshoppers. Locust. These insects are usually harmless. They nourish from natural pastures, but among them there are some species that can devour cereals, such as corn, wheat, barley and oats. Locusts fly in clouds that can eat up to the last stem of a crop.
**Beetles.** These insects, in the adult stage or as larvae, have a chewing device with which they eat roots, leaves, flowers and fruit. They can nourish from various crops.

![Image of a beetle]

**Weevil.** These are small coleopterous insects. Larvae and adults have a chewing device. The adult has it curved. They damage various crops, such as cotton, pepper and bean. They also damage stored grains.

![Image of a weevil]
Leaf miner flies. These insects are harmful to various vegetables. In larvae stage they eat leaves, making mines and, consequently, reducing yields or killing the plant completely when damage is too severe.

Aphids. These insects are found in colonies in terminal leaf buds, sucking the plants sap. They are virus vectors and, therefore, make plants ill.

Grain Moth and Butterflies. In adult stage these insects have a sucking oral device and contribute to plants pollination; however, in larvae stage, they have a chewing oral
device and are constantly chewing leaves and causing economic damage; although, they also may be found damaging stored grains.

Cockroaches. This is the most common group of insects. They produce smelly secretions through various parts of their body, which may affect food flavour. Various types of gastroenteritis, such as unspecified diarrhoea, dysentery, and other problems associated with premature food decomposition are some of the main diseases transmitted by cockroaches.
Sucking and chewing lice. These are wingless parasite insects that live in hot-blooded animals, but differ in their structure and feeding habits. Sucking lice have sucking oral devices and nourish from blood. Chewing lice have chewing oral devices and nourish from skin flakes and body secretions.

Fleas. These insects are found all over the world. They are a pest found in humans and domestic animals. Even though most fleas prefer non-human hosts, many of them can feed themselves from humans when there are strong infestations or when there are no other hosts available.
**Domestic fly.** This is a world-wide pest. Flies relate with organisms that produce diseases such as typhoid fever, paratyphoid fever, cholera; bacillus dysentery; child diarrhoea; intestinal worm; ascarids, trichina, anchilostoma and tapeworm.

**Bedbugs.** Bedbugs are a universal pest of man, domestic animals, bats, birds and other mammals. In some experiments it has been proved that they are vectors of infectious diseases that cause diseases such as anthrax, yellow fever, recurrent fever and typhoid fever.
**Beak Beadbugs.** Most of these insects are predators of other insects, but many of them are definitely adapted to live on blood. Many of these species (*Triatoma spp.*) that suck blood are important vectors of agents that affect the heart.

**Mosquitoes.** Mosquitoes are found in tropical regions or in the artic. They are the only means known that cause malaria, yellow fever and certain types of encephalities.
Fungus:

Many fungus cannot be seen at a glance. They are organisms that cannot produce their own food; therefore, they have to nourish from other organisms. The same way as insects, not all fungus are harmful. Some are beneficial to man and can be eaten.

There are some fungus that damage crops and cause some diseases, such as rust, blight, carbons, ashes, mange, scab, etc. Some fungus harm and contaminate stored grains.

**DAMAGE CAUSED BY:**

- **POTATO LATE BLIGHT**
- **WHEAT RUST**
- **APPLE SCAB**
- **WHEAT DOWNY MILDEW**
Bacteria

These are micro-organisms, invisible at first sight, that can cause plant diseases, characterised by soft sticky and fetid rottenness. There are also bacteria that man uses for industrial purposes and to control insect pests.

GALL PROVOKED BY
Agrobacterium IN APRICOT TREE

MOKO PROVOKED BY
Pseudomona IN BANANA

VASCULAR LUCERNE WILT PROVOKED BY
Clavibacter
Virus:

Virus are pathogen agents that cannot be seen at first sight and transmit diseases very easily to healthy plants through insect vectors or through mechanical means, such as working tools. Once infected, plants do not grow, do not produce and remain yellow, with the leaves curled. There are also some viruses that are beneficial to humans and are used to control insect larvae.

**DAMAGE CAUSED BY:**

- Tomato Virus
- Golden Mosaic in Bean
- Polyvirus in Cucurbitas
Nematodes:

These are small, cylindrical worms that live on the soil and can damage roots and aerial parts of plants. Usually, they do not kill the plants, but can lower their yield. Many of them are harmless and some are useful to control insect pests that are on the soil.

Weeds:

Weeds are plants that are not located in the right place and compete with crops for space, nutrients, light and water. Some weeds are insect and disease hosts, what makes them undesirable.
Animals:

Some animals can become pests: Birds and rodents can destroy and eat plants, fruits and grains. Many times they reduce their quality or make them useless with their urine, hair, feathers or excrement.

STEP # 4 - UNIT REVIEW

The main points of this unit are:

01. In nature there are various organisms.

02. Some organisms can reach a pest condition.

03. Some insects are the most common pests.

04. The rest of the pests are: Fungus, germs, virus, nematodes, weeds, rodents and birds.
Note for the Instructor: End this unit making an evaluation. Ask questions to the participants. Have them ask questions among themselves. Motivate their participation.

UNIT #3

ALTERNATIVES FOR PEST CONTROL
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ALTERNATIVES FOR PEST CONTROL

UNIT REVIEW
In this unit there is information about the various alternatives to control and manage pests, so the housewife will know them and be able to orient others or decide at a given moment about the alternative or combination of alternatives that should be adopted to solve pest related problems.

The main purpose of this unit is to develop the housewives’ analysis capacity to orient their families or make the right decisions to protect their family’s health and economy and the environment.

The titles of the main subjects are:
A. Alternatives for pest control
B. Integrated Pest Management
C. The use of plant protection products

OBJECTIVES
At the end of this unit participants will be able to:
- Name a minimum of six pest control alternatives
- Indicate how to use these alternatives separately or in a combined form
- Define and know the integrated pest management concept
- Mention some ideas on how to implement integrated pest management, and
- Recognise the importance of the safe use of plant protection products and of integrated pest management

TIME REQUIRED:
60 minutes
STEP No. 1 – PRESENTATION: ALTERNATIVES FOR PEST CONTROL

For an organism pest population to get established in a crop, certain special conditions must prevail; the organism pest population must have enough food to survive and a favourable environment on which to live and reproduce. Besides, the organism pest population must have the right amount of light, humidity and heat necessary to live normally. Usually, if these conditions are not present, the organism pest population does not establish on the crop (life triangle). If these series of conditions are understood, prevention alternatives can be selected (indirect) or curative alternatives (direct). To select any control alternatives it is necessary to maintain a monitoring programme to observe and exam the crops (sampling) so a decision can be taken to control the pests.

Note for the Instructor: Present illustrations of pest organisms; their feeding sources, water and shelters. Request the participating housewives to offer local examples.
APHIDS

PLANTS' JUICE

UNDER THE LEAVES

PLANTS

FORMING SEEDS

INSIDE THE SEED

PLANT

SORGHUM FLY

WOOD AND PASTURE

SUBTERRANEAN CAVES AND WOOD

SOIL AND FOOD

TERMITES
Indirect or prevention measures have as their main objective to reduce the initial severity of pest attacks. Among them we can mention: Adequate location of cropping site; crop rotation; crop distribution; resistant varieties; crop management and sanitation, crop traps, good fertilisation and irrigation; stubble management, etc.

Direct, curative or intervention measures include physical or mechanical control; ecological control, using coloured traps, feeding attractors and pheromones; biological control, using parasites, parasitoids and predators; and chemical control with selective criteria.

**Note for the Instructor:** Give examples of each one of these control alternatives. Explore the participants’ experiences and explain to them any doubts or questions. Motivate their participation. Show supportive educational material, such as pictures, slides or other materials.
WATER TRAPS

STICKY TRAPS

TRAPS WITH PHEROMONES AND FOOD ATTRACTANTS

USE OF PARASITOIDS

USE OF PARASITES
STEP No. 2 – PRESENTATION: INTEGRATED PEST MANAGEMENT (IPM)

Integrated Pest Management (IPM) represents the best combinations of cultural measures, biological control, chemical control and crop management to control diseases, insects, mites, weeds and other pest organisms in a more economic, environmentally safe and sociably acceptable way.

IPM is based on the following principles:

1. **Observation activities.** In order to determine what measure to take and when to take it, crop management requires routine inspections to evaluate how plants are developing and what measures must be taken regarding shores, use of fertilisers, control of weeds, insects, mites, fungus, bacteriae, nematodes and other pest organisms and when to harvest.

2. **Prevention Activities.** To reduce the initial attack severity of pest organism populations, many aspects of farming and crop exploitation management serve to limit or stop the initial development of a pest population attack. For example: crop
rotation; modification of sowing dates and sowing density; use of resistant varieties; use of vegetative barriers; inserted crops, etc.

3. **Intervention activities.** So that economically harmful pest populations can be reduced to acceptable levels, mechanical, biological and chemical control alternatives can be applied, individually or combined, taking in consideration costs, benefits, and right moment for intervention, as well as occupational and environmental safety aspects.
At present, there is a broad range of plant protection products available at world level. These compounds (chemical and/or biological) are the result of approximately 50 years of research and field experience from the plant protection industry. The use of chemical control agents represents, in many cases, the most important and disclosed way to obtain an effective and trustworthy reduction of the damage provoked by diseases, insects, mites, rodents, nematodes, weeds and other pest organisms. But, since it is essential to reduce users unnecessary exposure to products destined to plant protection, as well as to improve hygiene measures and working practices; to limit residues in the environment and in crops and to avoid pests relapse and resistance to agrochemicals, a rational application of plant protection products is an important objective of IPM principles to minimise risk of adverse effects.

STEP No. 4 – UNIT RESUME

The main points of this unit are:

1. There are several alternatives to manage and control pest-organism populations.
2. The objective of these alternatives is to prevent or reduce the initial severity attack of pest populations.
3. Some of these alternatives are: Sanitation, crop rotation, stubble management, modification of sowing dates, polycrops, etc.
4. The main objective of other alternatives is to reduce acceptable levels of economically harmful populations through physical, chemical, biological, and ecological alternatives.
5. Integrated Pest Management is destined to reduce organism-pest populations to an acceptable level, through an adequate combination of control alternatives.

Message for the Instructor: End this unit asking questions and clarifying doubts. Once the explanations are concluded, verify if participants have comprehended and assimilated them.
UNIT # 4

THE LABEL AND PAMPHLET OF THE PLANT PROTECTION PRODUCTS
UNIT # 4 THE LABEL AND PAMPHLET OF THE PLANT PROTECTION PRODUCTS.

REVIEW UNIT

The purpose of this unit is to explain the housewife that often, the trouble situations or questions related to the use and manage of plant protection products can be solved by reading the label and/or the pamphlet that identifies the product. It is important that the housewife knows that in some cases the label does not have all the required information, but it can be found by reading the pamphlet. The objective of the unit is to stand out the importance of these legal documents.

The titles of the main subjects are:

A. The importance of the label and pamphlet of the plant protection products.
B. The parts of the label and pamphlet.
C. The danger of crop production products according to its toxicity.
D. Types of labels and pamphlets.
E. Use of the label and pamphlet.

OBJECTIVES

At the end of the unit the housewife would be in capacity of:

- Recognise the importance of the label and pamphlet as legal documents that have all the necessary information to make use of plant protection products in a responsible manner.

- Localise the places on the label and pamphlet where the subjects she is interested in, can be found in case of trouble.

- Identify and classify the different types of labels and pamphlets
- Make safe and correct use of the information in the documents to achieve an effective, economic, social and environmentally speaking pest control.

TIME REQUIRED:

30 minutes.

STEP No. 1 – PRESENTATION AND DEMONSTRATION
What is a label? and What is a pamphlet?

The label from plant protection products is defined as any written, printed, or engraved material, adhered to the container, package or exterior wrapping for retail sale or distribution.

The pamphlet is an additional informative sheet that must be included with the product when the purchase takes place. That document contains very important agricultural information to manage and use the product in a safe and responsible way.

Recommendations for the Instructor: He should supply himself with several label and pamphlet samples of plant protection products being sold or distributed in the geographical area used by the husbands of the housewives being trained. He should expose the material, comment and clarify any doubts.

STEP No. 2 – PRESENTATION OF THE IMPORTANCE OF LABEL AND PAMPHLET

The label and pamphlet are the legal documents that should be handed to the buyer in most countries. It is required that these documents be written in the country’s official language and, in addition, they should show all the information and instructions for the safe and responsible management of plant protection products; therefore, the information must be written in a language that can be understood by the user.

Following is some of the information that should appear on the label: Name of the formulator, commercial name of the product, concentration, formulation type, biological action, name of active ingredient, use precautions and warnings (with their respective pictogrammes), intoxication signs and symptoms, first aid, antidotes, some environmental issues (also with pictogrammes) and the colour band that identifies its danger, with the corresponding warning phrases.
The pamphlet, besides containing most of the information that appears on the label, it should mention agricultural aspects, such as, action mode, application equipment, how to prepare the mixture, recommendations of use against pest organisms, recommended dose, application intervals, waiting time between last application and crop, waiting period to return to treated area, phytotoxicity, compatibility, etc.

**Recommendations for the Instructor:** Using the board, group the information that appears on the label and compare it with the information on the pamphlet. Have the housewives discuss the subject and come to their own conclusions.

**STEP No. 3 – DEMONSTRATION:**
**TYPES OF LABELS AND PAMPHLETS; THEIR PARTS**

There are three types of labels: With one body (one face); with two bodies (two faces) and three bodies (three faces). These are used for obligatory labelling of products formulated for agricultural use, according to their size. One-body labels are used on small containers and the three-body labels in larger containers. Pamphlets constitute an informative document that must be handed to the buyer when he buys the product, regardless of size. All pamphlets contain the same information.

**Recommendations for the Instructor:** Organise some working groups and give them labels and pamphlets so the participants can find out the differences between the two. Ask them to study carefully the labels and pamphlets and answer the questions that you have prepared on a sheet of paper. Some examples of questions can be the following: What is that product for? Which is the most dangerous product? Which is the least dangerous? How should the products be stored? How should the empty containers be treated? What is the first aid that can be use depending on the kind of intoxication? Use your creativity to make other questions. At the end of the exercise the housewives should give a report and explain it to the others. Correct errors and clarify doubts.

**STEP No. 4 – SUMMARY: USE OF LABEL AND PAMPHLET**

The best way to use labels and pamphlets is to read them to solve any doubts about the correct and safe manner to use a plant protection product. It is important to recognise that there are at least five situations on which it is necessary to read the label and pamphlet. These are:

**A. Before buying the product.** Selecting the product is easier if the label and pamphlet are read thoroughly before purchasing. Both documents help to identify the appropriate product to treat the problem that the crop presents.
Before buying or using a product, the user should recognize the risks or problems that could emerge.

B. **Before preparing the dosage and the mixture or applying a product.** The label and pamphlet have the instructions and warnings about the use of the product; for that reason, it is always necessary to read both documents before preparing the dosage and the mixture or applying a product. This will give assurance that the product is being used correctly.

C. **Before storing and transporting the product.** The label as well as the pamphlet indicate the proper procedures for storage and transportation.

D. **Before eliminating empty containers.** These documents contain the procedures for a correct elimination of empty containers, including triple rinse.

E. **At the time of an accident or an emergency caused by the incorrect use of a product.**
ALWAYS REMEMBER HOW IMPORTANT AND USEFUL IT IS TO READ BOTH THE LABEL AND THE PAMPHLET!

The instructor should end the unit making a recapitulation. He should evaluate the level of learning of the housewives and clarify their doubts.
ONE-BODY LABELS

LABELS IN ENGLISH SHOULD BE INSERTED ON THIS PAGE
Two-Body Labels

Labels in English should be inserted on this page.
THREE-BODY LABELS
PICTOGRAMMES

POR CONTACTO CON LOS OJOS: Lavar inmediatamente con agua limpa durante 15 minutos.
POR CONTACTO CON LA PIEL: Quitar la ropa y zapatos contaminados. Lavar las partes afectadas con abundante agua y jabón por 15 minutos.
NUNCA DE A BEBER NI INDUZCA EL VOMITO A PERSONAS EN ESTADO DE INCONSCIENCIA.

ANTIDOTO Y TRATAMIENTO MEDICO:
- Inyectar por vía intravenosa una solución de bicarbonato sódico en caso de intoxicación por contaminaciones que puedan causar estenosis y bloqueos al paso del fluido.
- En caso de convulsiones, sustraer la vía intravenosa y administrar líquidos para mantener la hidratación.
- En caso de intoxicación, lavar la piel con agua fría.

CENTROS DE INFORMACION TECNOLÓGICA

GUATEMALA: Centro Nacional de Información Tecnológica 281-7906
ELECTROCONSEJO, Cámara Nacional de la Construcción, 281-7906

EL SALVADOR: Centro de Información Técnica, 281-3999
Centro de Innovación y Desarrollo, 281-1953

PARAGUAY: Ministerio de Salud, 281-3999

FORMULADO Y DISTRIBUIDO POR:

AVISO DE GARANTÍA:
Garantizamos que la composición y concentración de este producto corresponden a lo indicado en la etiqueta. Sus instrucciones de uso se basan en rigurosos y extensos ensayos en todo el mundo. Sin embargo, como su aplicación y manejo están fuera de nuestro control, no damos ninguna garantía explícita o implícita sobre los resultados al usuario.

EL USO DE ESTE PRODUCTO DE ACUERDO A LAS INSTRUCCIONES DE USO DE LA ETIQUETA ES DE SU PROPIA RESPONSABILIDAD.

LABELS IN ENGLISH SHOULD BE INSERTED ON THIS PAGE
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GUATEMALA, BELICE, EL SALVADOR, HONDURAS, NICARAGUA, COSTA RICA Y PANAMÁ

CULTIVOS SUGERIDOS POR HELBACA

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USO AGRICOLMICO:

MCDO DE ACCION: PROWLE 56 EC, herbicida selectivo absorbido por raíces y foliáceo transstadialado vía ócea y roce, inhibe tanto la división como la elongación celular en raíz y tallo de las malvas susceptibles.

EQUIPO DE APLICACIÓN: PROWLE 56 EC, puede ser aplicado con equipo manual tarretero a aéreo. Coloque el equipo antes de aplicar el producto. En aplicaciones aerianas el volumen de cebado no debe ser menor de 60 litros por hectárea, en aplicaciones tarreteras un mínimo de 200 litros por hectárea. Llene el equipo después de cada jornada de trabajo. Utile boquillas de abastecimiento.

FORMA DE PREPARACIÓN DE LA MIELIZA: 1 minuto hasta la inmediata con agua, vierte la cantidad recomendada de PROWLE 56 EC, termo de llenar el tanque mientras agita.

Se deben aplicar una suspenso sustituto o suspensión fría en un volumen de proyección mínima de 1 a 1 con agua. Agrega a este promedio al tanque con agua (luego 20 partes) agita hasta obtener una dispersión total. Agrega PROWLE 56 EC al tanque mientras agita y termo de llenar el tanque mientras agita.

Recomendaciones de uso: PROWLE 56 EC está indicado para el control de las siguientes malvas:

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SAFETY PRECAUTIONS:

ALDOCON: Aplique en presencia incorporado, con dosis y aplicado a raíz de 0 a 0.5 cm, de profundidad y siempreviva inmediatamente después de la siembra, mínimo 24 horas después, si el suelo está húmedo o si se esperan lluvias. No realizar aplicaciones postemergentes ya que pueden ser muy toxicidas al cultivar.

MAZ: Aplique preemergernte, solo en mezclas con estroncio (1 kg/sa, ha) mayor a la emergencia total al cultivo antes de que emerjan las raíces de la planta. El uso debe ser sometido a una profundidad de 4 cm.

AIR: Preemergernte aplicado inmediatamente después de la siembra. Debe estar en el modo de actuación del producto en caso de requerir la aplicaciones antes de la siembra. El suelo debe estar bien preparado y nivelado sin charcos o depósitos de agua. Aplique cuando se esperan lluvias o que se irán a irregulares dentro de los 3 días siguientes a la aplicación. El área de regar no en menos de 300 litros por hectárea en el caso de 2 a 3 ha, mientras que la mescla tienen 2 a 3 ha, como seguimiento del uso. Se recomienda un uso del adyacente con otros adyacentes de uso inmediato de 3 a 4 días después de la aplicación a la planta del siguiente en los casos siguientes y 10 a 12 días de tratamiento. Se debe aprovechar un periodo de 24 días después de la aplicación para poder sembrar.

SOYA Y PRIJOU: Corte preemergernte aplicar inmediatamente después de la siembra (inmediatamente después de la siembra de 0 a 0.5 cm) para el control de las malvas sufrimentes. Se recomienda un uso de adyacentes de uso inmediato de 18 a 24 horas después del tratamiento.

CÉBOLA: Aplique de 0 a 0.5 días después del transplante.

CAÑA DE AZÚCAR: En preemergernte aplicado a 600 a 0.5 cm por hectárea. En postemergencia se puede usar en mezcla con. Se recomienda un uso de adyacentes de uso inmediato de 18 a 24 horas después del tratamiento.

TABACO: PROWLE 56 EC puede ser aplicado en forma incorporada o en forma inmediata después de la siembra y antes de la emergencia de las malvas. Para estos cultivos se recomienda una buena preparación del terreno.

LABELS IN ENGLISH SHOULD BE INSERTED ON THIS PAGE
INTERVALO ENTRE LA ÚLTIMA APLICACION Y LA COSECHA: Prowl® 50 EC se aplica en el momento del cultivo, por lo cual siempre rueda un mínimo de 62 días.

INTERVALO DE REPOSAMIENTO AL ÁREA TRATADA: Cuando la aplicación sobre la superficie tratada haya secado.

FITOTOXICIDAD: Prowl® 50 EC puede provocar fitotoxicidad en cultivos como algodón, frijol, soya y maní, si se aplican cerca a después de su emergencia y en si este tiene menos de 3 hojas verdaderas.

COMPATIBILIDAD: Prowl® 50 EC es compatible en mezcla de tanque con Propanil, 2,4-D, Atsazina, Diuron, Fluometuron, Gramíneas/Herbicidas y sulfuroxidas. Prowl® 50 EC puede ser mezclado con insecticidas, pretrhoides, organofosforados y carbamatos. No es compatible con productos acelinos.

PRECAUCIONES Y ADVERTENCIAS DE USO: ALMACENAMIENTO Y TRANSPORTE: No almacenar o transporte con alimentos, ropas medicinales ni animales. Mantenga su envase original lejos de la luz directa del sol. Almacene el producto bajo llave, en un lugar seco y fresco, alejado del calor o del fuego. No es corrosivo. Es inflamable.

NO ALMACENAR ESTE PRODUCTO EN CASAS DE HABITACION.

MANTENGASE FUERA DEL ALCANCE DE LOS NIÑOS.

NO COMER, FUMAR O BEBER DURANTE EL MANEJO Y APLICACIÓN DE ESTE PRODUCTO.

BANíSE DESPUÉS DE TRABAJAR Y LAVASE ROPA LIMPIA.

SINTOMAS DE INTOXICACIÓN: Cansancio, sudoración acelerada, sofocación. Es un caso severo hay un aumento de ansiedad, sequedad y aumento en el ritmo respiratorio y latido del corazón.

PRIMEROS AUXILIOS: POR INGESTIÓN: No provoque el vómito porque puede causar necrosis química a dorso pulmonar al asfixiar. Lleve el paciente al médico.

POR INHALACIÓN: Retire a la persona del área contaminada y llévele a un lugar limpio y ventilado.

POR CONTACTO CON LOS OJOS: Bécase en los ojos, lave con suficiente agua durante 15 minutos.

POR CONTACTO CON LA PIEL: Si se cae en el piso quite la ropa contaminada y de un baño con suficiente agua y jabón, poniendo especial atención en el pelo, orejas, el ombligo, las uñas y la ingle. Lave con una esponja suave.

NINGUNA DE A REBE SERA INDUCIDA EL VOMITO A PERSONAS EN ESTADO DE INCONSCIENCIA.

ANTIDOTO Y TRATAMIENTO MEDICO: No hay antidoto. Dar tratamiento sintomático, siempre que sea necesario, según el cuadro clínico del paciente.

CENTROS NACIONALES DE INTOXICACION:

PAÍS | INSTITUCIÓN | TELÉFONOS
---|---|---
GUATEMALA | Centro de Información y Asistencia Toxicológica | 2513690, 292736
BELICE | Centro de Intoxicaciones Karl Hauser Memorial Hospital | 251494, 936939
EL SALVADOR | Ministerio de Salud Pública | 2219955 ext. 140
HONDURAS | Secretaría de Riegos | 2219306 ext. 140
NICARAGUA | Centro de Toxicología | 289-4641
COSTA RICA | Centro Nacional de Intoxicaciones | 223-1028
PANAMA | Centro de Investigaciones e Información de Medicamentos y Tóxicos | 289-2141

MEDEIAS PARA LA PROTECCION DEL AMBIENTE:

TOXICO PARA PECES, NO CONTAMINE LAGOS Y ESTANQUES CON ESTE PRODUCTO O CON ENVEJACES O EMPAQUES VACIOS.

MANEJO DE ENVASES, EMPAQUES, DESECHO Y RMENANTES: Perfore los envases vacíos enjuguados y enterosles a una profundidad de 4 cm sobre la boca superior del suelo, lejos de fuentes de agua. Las plaguicidas no utilizados, guárdelos en un envase original bien aislado y ecológico.

EN CASO DE DERRAMES RECOGÁS CON ATENCIÓN A ALGUN MATERIAL ABSORBEDOR Y LOS ENVEJACES VACÍOS PERFORADOS, EN AMBOS CASOS ENTERÁS A NO MENOS DE 40 CM DE PROFUNDIDAD, LEJOS DE FUENTES DE AGUA Y CASAS DE HABITACIÓN.

EL USO DE LOS ENVASES O EMPAQUES EN FORMA DIFERENTE PARA LO QUE FUERON DISEÑADOS, POSE EN PELIGRO LA SALUD HUMANA Y EL AMBIENTE.

AVISO DE GARANTÍA: Las instrucciones para el uso de este producto reflejan los resultados de la experiencia de la compañía basada en ensayos de campo y uso práctico. Dichas instrucciones se creen dignas de confianza y deben observarse cuidadosamente. Es imposible, sin embargo, eliminar los riesgos inherentes al uso de este producto. Cualquier daño al cultivo, silla de ruedas y otras consecuencias indeseables, pueden ser el resultado de factores imprevisibles, pero no limitados a condiciones climáticas, presencia de otros materiales, el método de uso o aplicación, los cuales están fuera de control de Cyanamid Interamerican Corp. El usuario debe asumir dichos riesgos.

Cyanamid Interamerican Corp. y el registrante garantizan que el producto se ajusta a la descripción química de la etiqueta y que se concentrantes aplicado como se indicó en el etiqueta cuando se usa de acuerdo con las instrucciones y son a los riesgos mencionados anteriormente.

Cyanamid Interamerican Corp. no da ni autoriza a ningún agente o representante para dar ninguna otra garantía, expresa o implícita, y no puede garantizar la idoneidad para cualquier fin determinado.

FORMULADOR:

QUIMICOS AGRICOLAS INSECTO, S. A.
Ticpital, Escuintla, Guatemala

IMPORTADO POR:

CYANAMID INTERAMERICAN CORPORATION
SUCURSALES GUATEMALA
2a. Calle 21-24, Zona 15, Vista Hermosa II
Teléfonos: 2690915, 2599615

DISTRIBUIDO POR:

PAÍS | NÚMERO DE REGISTRO | FECHA DE REGISTRO
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UNIT # 5

PLANT PROTECTION PRODUCTS RISKS TO HUMAN AND ENVIRONMENT

5.1 RISKS TO HUMAN
5.2 RISKS TO THE ENVIRONMENT
UNIT # 5.1 RISKS TO HUMAN

INTRODUCTION

The housewife should understand that when their husband or other members of the family constantly work with plant protection products, it is necessary not to forget and to follow the warning and precaution measures that appear in the label and the pamphlet; on the contrary, accidents may occur.

For this reason, it is essential to know, the danger that involves the use and management of plant protection products; the way how these can enter to the human body, the different absorption grades in the skin; the signs and symptoms of an intoxication associated with the main chemical groups someone works with; the types of intoxication that may occur (acute, retarded and chronic), and the First Aid that can be given in the case an intoxication occurs. These knowledge would allow to prevent and avoid accidents that could have fatal consequences.

The main titles of the subjects in this workshop:
- Risks or associated dangers to plant protection products.
- The media lethal dosage (LD50).
- Ways through which the plant protection products enter to the human body and absorption grades in the skin.
- Signs and symptoms of intoxication by the more common chemical groups.
- Types of intoxication: Acute, retarded and chronic
- First Aid in case of intoxication

OBJECTIVES

At the end of the activity, the housewives would be capable to:
- Recognize the dangerous categories that identify the different plant protection products.
- Identify and recognize the risks to which people are exposed when they use plant protection products;
- Recognize the routes through which the plant protection products enter to human body;
- Understand the different absorption grades of the skin when this is exposed to plant protection products.
- Recognize the different signs and symptoms of intoxication provoked by plant protection products;
- how to provide First Aid when an intoxication occurs.
REQUIRED TIME
60 minutes

STEP # 1 PRESENTATION AND DISCUSSION: HUMAN RISKS ASSOCIATED TO PLANT PROTECTION PRODUCTS.

The plant protection products are useful for the control of pest organisms, but used in an inappropriate way causes accidental and occupational intoxications, besides of the intoxications and death for intentional ingestion with suicide purpose.

The previous situation proves that the plant protection products used in an irresponsible manner may be dangerous, the way to identify the toxicity of the plant protection products, consist in identifying the color band in the labels, thus the red band means extremely or highly dangerous; the yellow, moderately dangerous; the blue, lightly dangerous and the green of very but very low danger. Also the pictograms and warning phrases in the labels and the pamphlets.

For the instructor: Organize a discussion about intoxication experiences with plant protection products. Ask any of the housewives if any of them has been intoxicated with these products, or if they know someone that has suffered this type of experience. Motivate them to talk and discuss their experiences. During the discussion, determine if the people involved knew that it was an intoxication, or if they recognized the signs and symptoms and did not know how to act.

STEP # 2 PRESENTATION: LD50

All plant protection products represent a risk or danger of intoxication or death, but some of them are more dangerous than others, to determine the endanger (toxicity) of these products, scientists achieve experiments with animals such as: rats, mice, rabbits, guinea pigs, dogs and hens. In these experiments the scientists determine the quantity of product that is necessary to kill half (50%) of the treated animals. This quantity is called the media lethal dosage and is used to assign the danger band to the plant protection products. It is important to know, that when less the dosage is, the product endanger is higher.

For the instructor: accomplish a summary getting as a result, the following conclusions:

- Incorrectly use of plant protection products may cause intoxications and possibly death.
The LD50 permits to classify the plant protection products from high to low danger.

WAYS TO DETERMINE THE LD50

- Oral
- Dermal
- Inhaled
STEP # 3 PRESENTATION AND DEMO STRATION: ROUTES THROUGH WHICH THE PLANT PROTECTION PRODUCTS ENTER TO OUR BODY ABSORPTION GRADES BY THE SKIN.

There are four ways for a plant protection product enter to the human body: By the mouth (orally); by the nose and the mouth (inhalation); and through the skin (dermal) and by the eyes. The entrance by the mouth, is the less probable route, but it can be particularly dangerous; nevertheless, the precautions to avoid it are simple:

- Neither eat, nor drink, do not smoke with the hands contaminated by these products.
- Do not store plant protection products in bottles of drinkable products or food containers.
- Do not transport or store the products together with the food, to avoid contamination.
- Keep away the rodenticide baits and the treated seeds from the food, to avoid accidental consumption.

The inhalation could be dangerous, when very volatile products are used in closed environments or because the application method produces liquid or solid particles, quite fine can be inhaled. The use of respiratory masks and to accomplish the applications in appropriate hours are precautions that must be considered.

The most probable contamination is through the exposed skin. It can occur not only by the effect of a spilled or splash of a concentrate or a mixture, but also using contaminated clothing, the use of defective equipment or by continuous exposition to the pulverization. These products pass rapidly from the clothing to the skin and can enter the organism inclusive, through healthy skin and without wounds. The eyes, mouth, tongue and the genital region are zones particularly vulnerable. During hot weather, special measures should be taken due that the sweat increases the absorption capacity by the skin.

For the instructor: Use illustrated sheets where the penetration routes of plant protection products are signed, and the different absorption grades by the skin. Help yourself with the enclosed sheets.
BODY ABSORPTION ROUTES

- Eyes
- Nose
- Mouth

SKIN
SKIN ABSORPTION GRADES

35% Skull

40% Forehead

50% Ear conduit

20% Abdomen

8% Forearm

10% Palm

99% Scrotum

15% Foot
STEP # 4 PRESENTATION: SIGNS AND SYMPTOMS OF INTOXICATION.

When an intoxication occurs, there are many indications that allow to recognize it, those indications, are known as symptoms and signs. The symptoms are sensations that only the intoxicated person can feel, for example: headache, anxiety, blurry vision, etcetera. The signs are manifestations that occurs in the patient but can be observed by a second or more persons, as for example: sweating, corporal tremors, vomits, etc. The symptoms and signs of a light intoxication include: headache, fatigue, dizziness, blurry vision, sweating, nausea, vomits, abdominal cramps, salivate and contractions (dwarf) of the pupils. A moderately serious intoxication, besides the previous symptoms, can produce indisposition and chest pressure, the pupils contraction, low cardiac rhythm, muscular tremors, confusion, lack of muscular coordination, difficulty to speak and Psychosis (strange and maniac behavior). The mortal intoxication can have many manifestations that includes fecal and urinary incontinence, heart irregularities and deteriorated respiratory function.

For the instructor: present a story about an intoxication experience that allows to distinguish symptoms of signs. Ask the participants to distinguish these signs and symptoms. Clear doubts. Present the enclosed material.

An 18 year old worker asked for medical attention to the health centre by nausea, dizziness, salivation, blurry vision, respiratory difficulty, weakness and uneasiness for two hours of duration. He informed that he started the plant protection products application at six O’clock in the morning, at seven drank water from a water bottle, he ate a pair of tortillas with beans. An hour later he began with discomfort, reason why he decided to suspend the application and consult a health centre.
SLIGHT SIGNS AND SYMPTOMS

- tired
- headache
- dizziness
- sweaty

MODERATE SIGNS AND SYMPTOMS

- blurry vision
- vomiting
- cramps
- stomachache
DANGEROUS SIGNS AND SYMPTOMS
STEP # 5 PRESENTATION: TYPES OF INTOXICATION.

The provoked intoxications by plant protection products are of three types: acute, retarded and chronic. The acute intoxications, are of short term. A person can intoxicate entering in contact once or many times in less than 24 hours with the plant protection products. The symptoms and signs of intoxication develop rapidly. The retarded occur by frequent expositions, repeated to the plant protection products during periods of many days or weeks. The symptoms and signs appear in a light intermittent manner or after months of expositions. The chronic intoxications that show in a long term due to the plant protection products accumulation in certain tissues and body organs, until long time later, inclusive years the intoxication symptoms appear. All persons that use plant protection products must recognize which are the symptoms and signs of intoxication by chemical groups with which they work, reason why here are described:

- Intoxications with organochloride: The first symptoms and signs are: General pain, headache, irritability, dizzy, nausea, vomiting. Later the intoxicated person might present involuntary muscle contractions, tremors, respiratory difficulty, convulsions and enter in a state of comma.

- Intoxications with organophosphorus and carbamates. At the beginning the following effects are observed: headache, dizzy, fatigue or tiredness, blurry vision, excessive sweating, abundant saliva, tearing, stomachache, diarrhoea, nausea and vomiting. The subsequent steps are characterized because the patient presents weakness, incapacity to walk, chest pain, contractions and muscle spasms, contracted pupils that do not react to the light. The final step comprehends the following characteristics: Loss of reflections, unconsciousness, breathing difficulty, involuntary urinate and defecate and death comes if medical treatment is not administered.

- Intoxications with pyretrines and pyrethroids. The first symptoms that the intoxicated person show are: tingling in the eyelids and the lips, conjunctive and mucous irritation, sneezing. Afterwards he presents intense itching, skin stains secretion and nasal obstruction, excitation and convulsions.

- Intoxications with bypiridiles. In the intoxicated person it might produce skin irritation, irritation of the conjunctives, general discomfort, weakness, sores and burns in the mouth, abdominal pain, respiratory failing, thirst, bleeding nose, lung, kidneys and liver damage.

- Intoxications with herbicides of the phenoxi group. The acute intoxications with herbicides of the phenoxi group at the beginning provoke loss of appetite, irritation of the exposed skin, dizziness and intestinal tract irritation. Later, the intoxicated presents exhaustion, vomiting, thoracic and abdominal pain, muscle tremors, mental confusion, convulsions and comma.

For the instructor: Use the illustrated sheets that appear in this presentation, they will help you in the teaching process.
Signs and Symptoms of Organochloride Intoxication

- General discomfort
- Headache
- Dizziness
- Vomiting
- Nauseas
- Tremors
- Convulsions
- Comma
- Lack of breathing
Signs and Symptoms of Organophosphorus and Carbamates Intoxication

- Headache
- Contracted pupils
- Dizziness
- Abundant saliva
- Blurry vision
- Breathing difficulty
- Vomiting
- Transpiration
- Nauseas
- Tremors
- Stomach Cramps
- Diarrhoea
- Weakeness
- Convulsions
- Comma
Signs and Symptoms of intoxication by Pyretrines and Pyrethroids

Tingling:
- in eyelids
- in lips

Conjunctive and mucous irritation

Sneezing

Intense itching

Spots in skin

Secretion and nasal obstruction

Excitation

Convulsions and comma

Lack of breathing
Signs and Symptoms of intoxication with Bypiridiles

Skin irritation

Conjunctive irritation

General discomfort

Weakness

Sore spots and burns in the mouth

Abdominal pain

Respiratory failure

Thirst

Bleeding nose

Lungs, kidneys and liver damage
Signs and Symptoms of intoxication with Herbicide of the Phenoxi Group

Appetite loss
Skin irritation
Dizziness
Intestinal tract irritation
Exhaustion
Nauseas y vomiting
Thoracic and abdominal pain
Muscular tremors
Mental confusion
Convulsions and comma
Lack of breathing
STEP # 6 PRESENTATION AND SIMULATION: FIRST AID IN CASE OF AN INTOXICATION WITH PLANT PROTECTION PRODUCTS.

The First Aid consist in the help that a person that is not a doctor could give to an intoxicated person with plant protection products, with the purpose of:

- To preserve his life
- to prevent health deterioration, and
- to promote the recuperation

It is convenient to remind that First Aid are useful to help and relieve the intoxicated person until he or she reaches medical assistance. First Aid cannot replace medical support.

The procedures of specific First Aid, according to the entrance route of the plant protection product to the organism, is described as follows:

**Intoxication by dermal via:**

- Act with rapidity avoiding the auto contamination during the procedure.
- Remove the intoxicated person of the area where the accident occurred (stop the exposition).
- Take off the contaminated clothing.
- Shower the intoxicated or wash the skin completely with water and soap.
- Ask for medical help and must carry the label and the pamphlet.
Intoxication by respiratory via:

- Act quickly avoiding to auto contaminate
- Remove the intoxicated person of the contaminated area
- Loosen the clothing of the intoxicated or take it off if it is contaminated, the skin must be washed with water and soap.
- Help the intoxicated person with artificial respiration or with oxygen by nasal via, if it is necessary.
- Ask for medical help and carry the label or the pamphlet.

Intoxication by oral via:

- Act quickly, stop the exposition, take off the contaminated clothing and shower the intoxicated person,
- Induce to vomit if there is no contraindication in the label or the pamphlet;
- Give a drink of activated coal suspension (3 pills of activated coal in half glass of water)
- Ask for medical help and carry the label and the pamphlet.
Intoxication by ocular via:

- Wash quickly any splash that occurs in the eyes during 15 minutes; with plenty of clean water, every ten seconds, must turn over the eyelids. Avoid to contaminate the other eye.
- Cover and immobilize the eye using a clean and dry cloth.
- Ask for medical help, carry the label and the pamphlet.

In all cases of intoxication it is necessary to determine the causes that occasioned the accident, to execute the pertinent corrections.

For the instructor: Consult the document: First Aid: Procedures” that appears in annex 02, so that better options could be proposed. Organize work groups and assign them an intoxication by plant protection products case so they achieve a First Aid simulation.
CHAPTER 5.2 RISKS TO THE ENVIRONMENT

UNIT REVIEW

In this unit, the housewives would have the opportunity to know the environmental dynamic of plant protection products when they are applied over their crops. They would recognise that when a plant protection product is applied, many things may occur. At times, the products reach to the area that is going to be treated and keeps in it for a long time, producing residuals over the treated vegetables contaminating the food. Nevertheless, in other occasions, the product disappear rapidly after its application because it introduces in the environmental dynamic, whether it is evaporated, towards the atmosphere, leached, towards the subway waters; drained towards the superficial waters; absorbed or adhered to the soil particles; photolysed by the solar light action, etc; provoking air, soil and water contamination. In other occasions, the product does not even reach the designed treated area, on the contrary, it suffers dragging by the air currents and deposits in not desired areas, contaminating other environments. Besides they would know that the incorrect use of plant protection products might increase the resistance problem of the pests organisms and the population destruction of benefice organisms. To complement the process of teaching-learning would know some measures and actions that may be followed to diminish the undesirable effects or the plant protection products in the environment.

The titles of the main subjects are:
A. Environmental dynamic of plant protection products (Forms of how the products degrade)
B. Plants, water, soil, and air contamination;
C. Problem of resistance and destruction of the benefice organisms;
D. Measures to diminish the environmental impact.

OBJETIVES

At the end of the activity, the participant housewives would be in capacity of:
- Identify and recognise the processes that implicate the environmental dynamic of plant protection products when being applied;
- Recognise the manners how the plant, water, soil and air contamination occur;
- Identify and recognise the processes by which, plant protection products can be degraded in the environment.
- Recognise the problem of the resistance and destruction of the benefice organisms;
- Take measures and actions to diminish the undesirable effects derived of the use of plant protection products
STEP # 1 PRESENTATION: ENVIRONMENTAL DYNAMIC OF THE PLANT PROTECTION PRODUCTS.

When plant protection products are applied, the objective is to contact these substances with the organisms that have reached its pest condition in most of the cases. A minor percentage of 5% enters in contact with the pest and a 95% remains in the environment. These products that remain in the environment start to be degraded by the action of diverse biotic and abiotic processes, for example: can be putrid by the action of the light, water, air and by diverse organisms, also can be adhered, vaporised, leached, drained and have a different destiny as planned initially, provoking contamination of other environments. Everything mentioned before constitutes the environmental dynamic for the plant protection products. To understand this dynamic, is very useful to know and predict the environmental risks that implicates the use of those products, likewise to adopt the measures and actions that permit to reduce or minimize them.

For the instructor: use the pictures that show the different stages and processes involved in the environmental dynamic of the plant protection products that appear in the next pages.

STEP #2 PRESENTATION: PLANTS, WATER AND SOIL CONTAMINATION; AND SOME ACTIONS TO MINIMIZE IT.

Many times the plant protection products have a different destiny that the one initially planned, that way provoke water, soil and air contamination. Likewise provoke contamination in our crops when we spray them with the purpose of protecting them from the pest organisms.

Plant contamination: The plant protection products can reach to the plant surface through some of the following actions, whether if it is in an individual or combined way: direct application, drag or drift effect, residual precipitations that are in the atmosphere and the irrigation with contaminated waters with rests of these products, once they reach the plants surface are metabolised and transformed, to activate or deactivate, increase or diminish the capacity of producing toxic effects for the same plant or for other organisms and contaminate the vegetables that we consume, making them no apt for its consumption, because they contain residual levels that surpass the maximum limits of residuals permitted and established by Comité Conjunto del Codees Alimentarius FAO/OMS. Some actions that can reduce this risks are: Use plant protection products, that are authorized by the competent organism that watches for the harmless food; respect the lacking periods; avoid the crossed recontamination of other agricultural fields; application in adequate hours, to avoid drift and drag of contaminants; use good quality water, etcetera.

Water contamination: The contamination of superficial and underground waters with plant protection products can be provoked by various actions and/or processes, for example: direct applications, drift or drag during the application; deposit of soil
particles with remains of adhered products; drag of superficial layers of contaminated soils, wash dawn by rainwater; wash of application and protection equipment in superficial water fountains (rivers, lakes, ponds, etc) leaching of product residues localized in the application surface, etcetera. The establishment of mitigation areas is very important to avoid the contamination of water fountains, channels and irrigation ditches; the methods of soil management and conservation, also reduces the risks by this type of contamination to occur. To minimize these risks, must be followed the precaution measures and management that are offered in the label and pamphlet of the plant protection products.

Soil contamination: Soil is the final receptacle of residuals of plant protection products as water contamination, the actions and processes that take part in its contamination are the same.

Air contamination: The dynamic of plant protection products leftovers in the atmosphere is influenced by the product concentration in the air, the temperature, the wind, the product volatility, and other physicist-chemical characteristics. Processes as the evaporation, eolic erosion and the drift, are responsible for contamination. Some useful actions to reduce these risks are: to make the application in the freshest hours and without much wind, select products of lower volatility, select application technologies that reduce the drift and drag, etcetera.

For the instructor: use pictures that allow to illustrate these types of contamination. Ask the housewives about actions that can be done to minimize the environmental contamination. If it is possible make them all give new ideas.

STEP # 3 PRESENTATION: RESISTANCE PROBLEM AND DESTRUCTION OF BENEVOLENT ORGANISMS

Other of the environmental problems derived of the misuse of plant protection products, and that has repercussions over the control possibilities of pest organisms, are the resistance and the destruction of benevolent organisms. The application of plant protection products in a repeated manner, the dosage increment, the decrease of intervals between one application and other, the product mixture, the dependence of a unique control alternative, propitious the selection of pest organisms that can tolerate or resist higher dosage than the required to kill the majority of the population, at the same time destroys and/or reduces the benevolent organisms population. To manage the problem of resistance and destruction of population of benevolent organisms, the IPM adoption, the selective use of plant protection products and the guidance recommendations that appear in the label and the pamphlet would be some of the actions to follow.

For the instructor: make reference of experiences in which resistance is being reported, ask the housewives for this kind of experiences, make conclusions. Finish the activity with a summary.
The environmental destination of a chemical compound:

- Photodegradation in soil surface
- Washed by rainwater
- Microbiological degradation
- Leaching
- Volatilisation
- Plant absorption and transposition
- Soil adsorption, absorption and desorption
- Chemical degradation
UNIT # 6

SAFETY FOR FARMERS: PROTECTION FOR FARMERS THAT MANAGE AND USE PLANT PROTECTION PRODUCTS
UNIT # 6 SAFETY FOR FARMERS: PROTECTION FOR FARMERS THAT MANAGE AND USE PLANT PROTECTION PRODUCTS

UNIT REVIEW

The farmers and their families are a group of workers that with frequency are buying, transporting, give in doses, mixing, applying, eliminating and storing plant protection products. In dosage activities, mix and application, often have direct contact with the products, reason why they expose themselves to suffer some type of intoxication; reason why in the present unit the housewives will learn the necessary precaution measures to take to reduce the risks of suffering an intoxication; they will know the clothes and the personal protection equipment necessary and will learn to make some of these garments so that their husbands protect themselves in the accomplishing of these activities. Part of the unit will be the teaching of the personal hygiene measures that should be practised before, during and after having used plant protection products, the way of washing and keeping the clothing and the personal protection equipment.

The titles of the main subjects are:
A. Importance of the precaution and security measures during the management process and the use of plant protection products.
B. The clothes and the personal protection equipment.
C. The personal hygiene before, during and after the managing and use of plant protection products.
D. Washing and maintenance of the clothes and protective equipment.

OBJECTIVES

At the end of the activity the housewives would be able to:
• Recommend and adopt precaution measures, security and personal hygiene that are necessary to manage in a responsible way the product and avoid intoxications.
• To know the parts of the clothes and the personal protection equipment.
• Use the clothes and the personal protection equipment in a correct manner.
• To manufacture some parts of the personal protection equipment (mask, back protection)
• To wash in a correct manner and give maintenance to the clothes and the personal protection equipment.

TIME REQUIRED:

60 minutes.
STEP # 1: PRESENTATION AND DISCUSSION: PRECAUTION MEASURES, SECURITY AND PERSONAL HYGIENE DURING THE MANAGEMENT PROCESS AND THE USE OF PLANT PROTECTION PRODUCTS.

Always that a plant protection product is going to be used, you must keep in mind that these products are toxic and therefore dangerous for the user, for animals and environment, therefore they must be used with care. For the management and use of these products certain precautions and personal hygiene measures exist, that must be followed, to reduce the risk of suffering intoxication, here are some of them:

- Correct identification of the pest organism. If it is possible, use no chemical alternatives of management for its control. When the utilisation of plant protection products is strictly necessary, ask for advice to the specialists in this matter and select the appropriate product.
- **Read the label and the pamphlet.** Before using the product, it is indispensable requirement to read the label and the pamphlet, to understand the precautions and warnings of use, to know the symptoms and signs of intoxication and the agronomic information of the product presented. If one does not know how to read ask for help to someone who can.

- **Utilisation of clothes and personal protection equipment.** The tag and the pamphlet indicates the correct clothes and protection equipment, those recommendations should be followed.

- **Use the more adequate application equipment and review its good condition.** Do not use equipment with leaks and spillages, since this represents risks of skin contamination.
- **Avoid skin contamination.** When dosage, empty, pour and mix the concentrated product, avoid sprinkles or spillages over the skin or the clothes. If this may occur, take off the contaminated clothes and wash immediately the affected area with abundant water and soap if it is necessary. Wash also the contaminated clothes with water and soap.

- Use original products with warranty seal and label.
- Use containers and adequate equipment to measure, transfer and mix the products.

- Never use uncovered hands to mix or blend liquids.
- Always apply towards the wind and avoid getting in touch with the sprinkling. Avoid touching the leaves and plants recently sprayed.

- Clean the nozzles when obstructed the correct way, use water, a wood stick or a grass straw. Avoid its cleanliness blowing with the mouth or using a nail or wire.
- Do not eat, drink or smoke, while plant protection products are been used or managed.
- Do not touch with the hands or dirty gloves, the face or other skin area.
- Before eating, drinking or smoking always wash the hands and the face.
- Take off the contaminated protection clothes, wash them daily and separated from the rest of the family clothing.
- Shower with abundant water and soap after each application activity and dress with clean clothes.

For the instructor: Use illustrated sheets or photographs that demonstrate good and bad actions. Discuss and anime the housewives to point the failures.

STEP # 2. PRESENTATION AND DEMONSTRATION. THE CLOTHES AND THE PERSONAL PROTECTION EQUIPMENT: CORRECT WAY OF DRESS AND UNDRESS.

To reduce the intoxication risks, besides the used precautions and personal hygiene measures described previously, the use of clothes and personal protection equipment is recommended. The basic components of clothes and personal protection equipment includes:

- Long sleeve shirt and long pants, both should not have pockets or bags;
- Rubber gloves without lining;
- Rubber boots without lining;
- Wide wing hat;
- Impermeable apron or gabardine;
- Glasses or face protective mask;
- Masks and/or breathing filters when extremely dangerous products of are going to be used.

For the instructor: Provide of different types of suits and protection equipment and give them to the housewives so they see and analyse them, respond to their questions. Explain the correct manner of using the suits and the equipment. Explain the correct manner of taking it off.
TYPES OF PROTECTION SUITS
STEP # 3. PRESENTATION AND DEMONSTRATION: EQUIPMENT DESIGN AND PROTECTIVE CLOTHES.

A good number of farmers do not use all the clothes and the personal application equipment for different reasons; some argue incommodiousness; others the high cost of the components, and also exist those do not know its importance.

The truth is that there is no cheap clothes and protection equipment, flexible, easy to use, and that at the same time provides complete protection.

Nevertheless, there are alternatives for people of limited resources, that can be done according to the characteristics of each country and that offer an acceptable degree of protection.

It is convenient to indicate, that the inadequate clothes and protection equipment or the carelessness in its maintenance and washing can increase the risks instead of diminish them.

In the enclosed material are proportioned, some designs to make clothes and some protection equipment.

For the instructor: Make a demonstration of how to make the clothes and protective equipment with local resources. Ask the housewives to make a plastic apron and a mask using plastic containers.

STEP # 4: PRESENTATION: WASHING AND MAINTENANCE OF THE CLOTHES AND OF THE PROTECTION EQUIPMENT.

The clothes and the personal protection equipment should be kept in good conditions so that it does not have breaks or worn out parts from where the product can contaminate the skin.

The boots should be examined frequently so they can be repaired or changed according to the case.

The clothes and the other parts of the equipment should be washed at the end of each working day with water and soap.

It has to be washed separated from the clothes of the rest of the family and put it away.

Some suggestions to wash the protection clothes:

1. Always use protection (rubber gloves or plastic bags) when washing the contaminated clothes with plant protection products.

2. Wash the clothes daily when plant protection products are applied. Remember it is easier to remove these products daily than to remove them when contamination is accumulated.

3. Wash the contaminated clothes with plant protection products separated of the clothes that are not; since the residuals can be transferred to these.
4. Always pre-wash the contaminated clothes. This can be done wetting the clothes in an adequate container or spraying it with a hose. The pre-wash is especially effective when powders are used.

5. Wash few contaminated clothes using plenty water each time.

6. Use warm or hot water only. Cold water is not effective to remove the pesticides during the washing cycle. Wash two or three times the clothes when it is highly contaminated.

7. Clean the washing pile after washing contaminated clothes.

8. Dry the clothes under the sunrays.

9. The contaminated waters should not be thrown in any place close to the house or the water fountains, it must go into a hole far from the house or the water fountains. This way we contribute to the adequate management of the environment.

For the instructor: When the unit is ended, makes a recapitulation. Make questions to the housewives. Clear up doubts if there are questions.
SPECIFICATIONS FOR THE PROTECTIVE SUIT

OBJECTIVE
Protect the worker when pouring, mixing, loading and applying plant protection products; when advisable take precautions in hot climate conditions.

BASIC REQUIREMENTS
Protection to an ample gamut of plant protection product formulations. Long lasting, comfortable, light and cheap.

DESIGN
The two-piece protective suit (shirt and pants) provides enough ventilation at the same time keeps its protective properties. It permits the maximum flexibility to the user, so that one piece or both can be used separately, depending on the type of work and the application method.
The upper part of the suit can be opened or closed by the sides by tying the waist and elastic wrists. The pants should be of a simple cut and with the classical waist. The picture shows the suit dimensions, and these can vary according to the average height of the country people where it is used.

MATERIAL
100% cotton of 110 to 150 grams/square meter of weight. The fitting material is cotton since the field evaluations have shown its protection, being the most comfortable material and long lasting compared with other light and synthetic protection materials. It can be obtained for accessible prices.

ALTERNATIVES
Appropriate alternative materials include those combinations of polyester, cotton and not woven polypropylene, that are as comfortable as cotton. It is not as lasting as cotton therefore, they should be replaced with more frequently according to the type of work accomplished.
An alternative could be the PVC or polyethylene one-piece suit (with or without sleeves) with side openings. This suit has the advantage that provides additional protection in case that a backpack sprinkler is damaged. They can be used in sporadic cases, as a temporal and economic measure, bags or clean empty plastic sheets. If the one-piece suit specifications are executed, even though variations may exist.

ADDITIONAL INFORMATION
The suits that is shown in the pictures, are not normally at the disposition of the manufacturers, so any person can make it according to the specifications.
TWO PIECE PROTECTIVE SUIT

(All dimensions in centimeters)
ONE PIECE SUIT

(All dimensions in centimeters)

ALL EDGES FOLDED AND JOINT BY HEAT

SHOULDER JOINT OF DOUBLE THICKNESS AND JOINT BY HEAT

ALL CORDS OF DOUBLE THICKNESS FOLDED AND JOINT BY HEAT

60

70

45

45

21

24

55

40

39
PROTECTIVE MASK

(All dimensions in centimeters)

FOAM BAND
28 cms long (in the back)

SUBJECTION STRIP (VELCRO TYPE)
28 cms long (in front)

FLEXIBLE ACETATE
(FRONT)

ROUNDED EXTREME

*SPONGE

HEIGHT LATERAL

28

18
ALTERNATIVE CLOTHES

This kind of cloth and protection equipment is of low price and some of the garments can be manufactured by the same farmer and/or housewife with easy acquired resources.

MATERIALS

- Cap or hat
- Long sleeve shirt
- Plastic bags or gloves
- Pants
- Boots
- Plastic apron (It can be done using a meter of plastic)
- Mask (It can be done using a plastic bottle)
- Two meters of plastic rope or strap
- Adhesive tape
- Scissors
- Jackknife / knife
- Marker
- Meter (Ruler)
- Rubber bands
STEPS TO MANUFACTURE A PLASTIC APRON.

REQUIRED MATERIALS: Scissors, marker, meter, rubber bands, adhesive tape, a meter of thick nylon.

Step # 1: Cut the meter of nylon in one of the extremes, as shown in the photograph.
Step #2: Fold the meter of nylon in half. Mark in the corner of the fold with a marker a ratio of 10.5 centimeters to make the neck hole in the apron, observe the photograph.

Step #3. With the scissor cut the mark in the fold to make the hole for the neck. Extend the apron and would remain a similar to the figure on page 188 of this manual.
Step # 4. Make a cut of 2 centimeters long, in a localized point at 70 centimeters from the inferior extreme of the apron and 4 centimeters of the closest edge. As shown in the photograph. Repeat the same operation in the opposite side.

Step # 5. Using adhesive tape reinforce the surrounding areas to the place where the described cuts in previous step were done to get a long lasting apron.
Step # 6. Cross an plastic rope or strap of 2 meters long by the cuttings previously done, this will permit you to fasten the apron to the waistline.
Step # 7. Congratulations! You have made your own a protective apron.

PROCEDURE TO MANUFACTURE
A PROTECTIVE MASK

Step #1 Use a discardable plastic bottle of 2 liters, using 2 rubber bands as a guide and a marker to delineate the places where the cuts are going to be done to eliminate the tip and the bottle base. The photograph illustrates the procedure.
Step # 2. Using a cutting tool, make a hole where the respective cuts should initiate. Observe the photograph for a better comprehension.-

Step # 3. Cut the tip and the bottle base, leaving the cylinder that forms the central part.

Step # 4. Proceed to cut the cylinder as shown in the photograph. The clearest and more transparent part should remain intact, since it is going to be used in the front the face.
Step # 5. Adjust the plastic lamina obtained at your face size in order to be able to cut the excess. Observe the photograph.

Step # 6. Cut the plastic lamina excess, as shown in the photograph.
Step # 7. With a cutting tool, make two lateral holes in the plastic mask. These holes would be used to place the plastic rope or strap that would permit you to fasten the mask to your head.
Step # 8. Cover the mask edges with adhesive tape to avoid being injured by the plastic edges when placing the mask over your face. Observe the photograph. Other alternative could be to refine the edges.

Step # 5. Congratulations! You can now wear your mask with a hat.
Step # 6. **Very Well!** If you made a cut of 20 centimeters long in the upper part of the mask, this can also be used with a cap.

UNIT # 7

PURCHASE, TRANSPORTATION, STORAGE AND ELIMINATION OF EMPTY CONTAINERS OF PLANT PROTECTION PRODUCTS.
UNIT # 7 PURCHASE, TRANSPORT, STORAGE AND ELIMINATION OF EMPTY CONTAINERS FOR PLANT PROTECTION PRODUCTS.

UNIT REVIEW

In this unit, would remember the housewives the importance of identifying the pests organisms that exist in the cultivated fields; before the selection of the most adequate plant protection product. Then they would learn and recognise, that at the moment of the purchase, must insure that the products are in good conditions and are originals. They would also learn the rules to accomplish safe transportation and storage of plant protection products, thus the correct elimination of residuals.

The titles of the main subjects are:
A. Purchase of the adequate product
B. Rules for the correct transportation
C. Rules for the correct storage
D. Rules for the correct elimination of residuals

OBJECTIVES

At the end of the activity, the participant housewives would be in capacity of:
- To remind her husband and other members of the family, the importance of selecting and acquiring the most adequate plant protection product to the phitosanitary problem in their crops.
- During the purchase be able to examine the condition of the containers of plant protection products (label, guarantee seal, etc.)
- Transport the plant protection products in a correct and safe way;
- Store the plant protection products in a correct and safe way, and
- Eliminate the correct way the empty containers, residue and remainders of plant protection products.

TIME REQUIRED

45 minutes.
STEP # 1 PRESENTATION: PURCHASE OF THE ADEQUATE PRODUCT

Before buying a plant protection product, it is important to identify the phitosanitary problems that exist in the crop. To be sure that the selected product is the correct one, it is convenient to ask specialists in this matter for advice. Before using the product the label and the pamphlet instructions should be read carefully.

At the moment of the purchase, examine that the products is original, that the container is correctly label and is not in bad condition (poured and/or dented), and besides make sure it has a guarantee seal.

Do not accept damaged containers (broken or poured) or that are not the manufacturers originals, or that are inadequately tagged; since this may provoke problems during the transportation, use and storage. Remember that the repacking of plant protection products is an illegal activity.

For the instructor: Use illustrated sheets or photographs, where the correct and incorrect is presented. Ask questions to the housewives and analyse their answers. Motivate their participation. You can help yourself with the enclosed visual material.
STEP # 2 PRESENTATION: RULES FOR THE CORRECT TRANSPORTATION

In order that the transport operation is as safe as possible and to be able to react efficiently in case of an accident; in the dealings and places where the farmers or other members of the family buy plant protection products, the following norms must be followed, paying special attention and assure that no persons or their belongings and food products are in risk for leaks or contaminated containers.

Separation between passengers, cattle and merchandise. Whenever it is possible, plant protection products should not be loaded in vehicles that transport passengers, animals, foods and other substances for human or animal consumption. If this is not possible, then separate the plant protection products as much as possible, from the passengers and of the rest of the luggage.

Safe load. Load and unload plant protection products containers carefully. Never put over them heavy merchandise that might flatten the containers, nor throw them from the height. Surpassed nails, metallic stripes and splinters of wood that might exist in the vehicles, can perforate the containers and produce spilling; all these obstacles should be eliminated before loading. After the unloading, the vehicle should always be cleaned.

For the instructor: Follow the indicated procedure in the previous step.
STEP # 3 PRESENTACION: NORMS FOR SAFE STORAGE

The plant protection products are expensive merchandise that could be damage and remain useless, inclusive they can be dangerous if they are not stored in the adequate conditions. Read the label and the pamphlet and follow the storing instructions, avoid specially extreme temperatures, it is safe to do so. It is necessary to plan the purchases with care, to reduce the storing time and avoid residuals. The storing places should be safe, out of the reach of the children and no authorised persons, animals, foods and water fountains. The food and drinks containers should never be used to keep these products. In the field, it is very important to avoid storing these products in houses, keep these products in their original containers and correctly closed, keep them out of the reach of the children, preferably locked in independent boxes, and where they can never be confused with foods or drinks. It is very important to keep them dry, but far away from the fire, and in a place where they do not receive the sunlight directly.

For the instructor: Use the procedure in step # 1

CORRECT STORAGE

STEP # 4 PRESENTATION: NORMS FOR THE CORRECT ELIMINATION OF RESIDUALS

The following are considered residuals of plant protection products: subdued products, residuals and/or pouring, diluted products, empty containers, contaminated clothes and materials used for cleaning spills and application equipment.

To avoid the trouble that means the elimination of residuals, the responsible management of plant protection products from the moment of its purchase until the application, is important, since this can reduce the complications.

Undoubtedly residuals are always produced, which should be eliminated through safe methods. For those who practice safe elimination methods, clean the areas and contaminated objects to reduce the environmental contamination.
The general principles that should be fulfilled are:

- Always obey the local legal rules according to the theme.
- Always eliminate residuals when they happen; avoid the accumulation of big quantities.
- Read the label and pamphlet of the product to know the specific instructions.
- Ask for the advice of an expert when doubts may come.
- Eliminate residuals in a way to avoid the risk of people, domestic cattle, fauna and wild flora, crops, stored foods or water fountains.

Procedure when a spill occurs:

In case that a spill may occur, it should be proceeded as follows:

- Use the clothes and personal protection equipment.
- Keep away people and animals.
- Do not smoke, or use illumination with free flames close to the spilling.
- Damaged containers should be eliminate far away from the housing and water fountains and where the soil can absorb the spill.
- Stop the spill using ground or sawdust, sweep carefully the contaminated material, pick it up and bury it, where there is no possibility to contaminate the spring and water sources.
- Wash carefully all contaminated areas with water and soap.

If someone gets contaminated:

- Take off and wash the contaminated clothes.
- Wash repeatedly the skin affected, with water and soap, if it is necessary ask for medical help.

If any foods has been contaminated:

- Burn or bury deeply in the ground. The contaminated foods should never been eaten or given to animals. This might be fatal.

Procedure to eliminated empty containers: Triple-wash.
After using plant protection products the containers remain empty, with residuals of the used product, and that need to be discarded in a correct and safe way, to avoid the contamination of human beings, domestic animals and the environment (air, soil and water). It should be remind that the containers of plant protection products should never be used for human or animal consumption water or food.
It has been proven, for example, that empty containers of liquid formulations can keep in its interior certain product quantity, thus a container of 20 liters can retain 60 millilitres of the original concentrate. Therefore, before its elimination and final deposition should be subject of triple wash to obtain economy, health and ecology, for that the procedure that appears in the illustration of page 100 should be followed. The containers triple washed should be perforated to make them useless and then taken to the closest collect centre for its destruction.

For the instructor: Besides the presentations, make demonstrations of the safe and correct way to stop and clean up a spill and the safe way to manage and eliminate the empty containers.
MINICENTRE OF CROP PROTECTION PRODUCTS
EMPTY CONTAINERS
RECOLLECTION
TRIPLE WASHED
AND USELESS
UNIT # 8

HOUSEHOLD PESTS AND HOW TO CONTROL THEM
UNIT No. 8 – HOUSEHOLD PESTS AND HOW TO CONTROL THEM

UNIT REVIEW

One of the purposes of this unit is to teach housewives the main household pests that can exist at home and the risks that their presence represents by affecting the health and well being of the dwellers.

Another purpose is to teach the biology, habits and damage that they can cause and some alternatives for their control.

The title of the main subjects is the recognition of habits, damage and control of:

A. Cockroaches  
B. Bed bugs, lice and fleas  
C. Flies and mosquitoes  
D. Stored products pests  
E. Rats and mice

OBJECTIVES

- To identify household pests at home  
- To recognise their habits and damage they cause, and  
- Know different alternatives for their control and management

TIME REQUIRED

60 minutes

STEP No. 1 – PRESENTATION: HOUSEHOLD PESTS

Man’s home is the place where some organisms have chosen to live and where they remain, contaminating and destroying his food, affecting his well being and damaging his health by transmitting him serious diseases.

These are the main organisms that can be mentioned: Cockroaches, bugs, lice, fleas and other ectoparasites; flies and mosquitoes, weevils and moths from stored grains; termites, ants, rats and mice.

To the instructor: bring to class examples or pictures with the domestic mentioned pests. Try making the housewives to examine, identify and recognise the pest organisms.
**STEP No. 2 - PRESENTATION: COCKROACH**

**Recognition:**

There are several cockroach species, such as the American cockroach; the German cockroach, the Oriental cockroach, the brown cockroach, etc. The American cockroach is known with several names; for example: flying cockroach, hot climate cockroach or tree cockroach. This is the largest cockroach specie, measuring up to 4 cms. long. It is
redish-brown, with colours that go from brown to light yellow. Male and female adult cockroaches have wings; in the male, the wings come out from the abdomen. Usually, they are flat in front and the body is sometimes smooth and other times hairy. Their antennae are long, like a thread, which they use to know what is going on around them. Their mouth is the chewing type. In the nymph state they have no wings or they have them partially developed, depending on their age.

The female adult, once fecundated, deposits her ootheca the day after it is completely formed. In houses, she prefers to leave it in protected areas, where there is enough food. In the field, she prefers humid places, where there is rotten wood. The ovules are formed weekly, producing from 15 to 90 of them; each one contains from 14 to 16 eggs, which, after being incubated at normal environmental temperature will liberate nymphs in their first state, after 50 to 55 days. The nymphs have their first molting inside the ootheca, staying inside it. Young nymphs are grayish-brown; they will molt from 9 to 13 times before reaching maturity; around the fifth molt they will acquire the redish-brown coloration. To complete the whole cycle they require from 160 to 971 days. Under optimal conditions they can live up to 14 months.

**Habits:**

Cockroaches are omnivorous; they eat a great variety of food material, preferably with starch and sugar. They can eat milk, grease, meat, cakes, cereals, sugar, sweet chocolates, and any other edible material fit to human beings. They also eat book covers, leather; her dead and wounded relatives, fresh or dry blood, excrement, sputum, nails and dead bodies.

Usually, they regurgitate part of their food and drop excrement as they move around. They also drop a nauseating secretion through their mouth and through the gland openings from their body, giving a persistent and typical smell to food and utensils with which they are in contact.

Cockroaches are nocturnal, since they walk and eat during the night and hide in dark places during the day. Small spaces, such as narrow cracks in dark and humid areas are specially adequate for their hideouts. They can live in the sewerage system, piled up wood, as well as existing holes under the roofs and can be transported by man from one building to the other in furniture and domestic appliances; in cardboard boxes or other containers, specially if they are dirty.

**Damage:**

Cockroach presence is commonly detected due to the damage they cause or the faecal material they leave behind. These tracks are useful to recognise an infestation. The marks left due to their chewing activity when they eat can help to determine their existence and to identify the risks persons are exposed to, due to their habits and their stay in dirty places such as garbage cans, dumps, sewerage system, kitchen and sanitary
service, scattering in their search for food, disease producing agents. The damage caused by cockroaches, due to food contamination is bigger than the damage caused for what they eat. Cockroaches are vectors of the polio virus; of approximately ten species of pathogen bacteria, including what it seems to be the leper bacteria. In experimental conditions it has been demonstrated that cockroaches house pathogen organisms of mice encephalitis: the yellow fever. They are also vectors of cholera bacteria agents, pneumonia, diphtheria, tetanus, tuberculosis, and certain types of allergies to which some persons respond with hives, sneezing and severe watering.

Cockroach management:

Comprehension of cockroach biology, habits and behaviour is essential to manage and control this pest. Management and effective control of the cockroach pest require a plan and to follow next steps:

1. **Supervision and diagnostic:** Locating most hiding places will determine the type of alternative to be applied. For a good inspection, the behaviour and habits of this pest must be born in mind.

2. **Cleaning up:** Elimination of food leftovers, humidity and hideouts is important to manage pest population.

3. **Exclusion:** It includes procedures to prevent moving to other rooms, floors, other places, and exterior invasions; for example, sanitary repairs, use of sticky traps, use of heat.

4. **Pesticide application:** A careful selection of the insecticide and its application close and inside the hiding places will give a better control than when it is applied where roaches only walk occasionally.

5. **Education and following up:** Continuous supervision and cleaning up are fundamental to manage this pest. Insecticide application must only be done when it is absolutely necessary.

**Note for the Instructor:** Aid yourself with pictures that will let you explain the pest’s biology and the differences between the American and the German cockroach.
AMERICAN COCKROACH

GERMAN COCKROACH
COCKROACH BIOLOGICAL CYCLE

STEP No. 3 – PRESENTATION: BEDBUGS, LICE AND FLEAS
Recognition of bedbugs

Bedbugs and their family are a specific pest for man and domestic animals. The only food consumed by the bedbug is blood from humans and animals.

Adult bedbug is 5 mm long and 3 mm wide. Her colour is brown-redish; it is flat and with oval form. After eating, the body of the bedbug gets bigger and is less flat. It has a mouth device to drill the skin and suck the blood from her victims.

Her eggs are elongated and usually they get stuck to the surface where they were laid. It is not exactly known whether they are laid directly on the host, but they are usually found on surfaces close to the place where the host sleeps or nestles. The female can lay up to 200 eggs (about two eggs a day). Eggs emerge in 6 to 17 days, producing small nymphs, almost transparent, similar to the adults. The nymphs must nourish from blood during each phase to be able to moult. They go through five different phases before becoming adults. As soon as they reach adulthood, they mate, being able to complete their cycle in 4 to 9 weeks.

Humans are the favourite hosts of bedbugs, but if necessary, they nourish from other animals, such as domestic fowl, mice, rats, dogs and cats. Normally they eat at night.

Habits:

During the day, bedbugs hide in holes and cracks; they can easily go through these places thanks to the flatness of their bodies. Typical places where they hide are mattress creases, springs; bed cracks and holes, furniture upholstery, etc. They can be located by looking for faecal material left behind in the places they visit.

Damage:

During some experiments made, it has been found that bedbugs carry infectious agents responsible of diseases such as anthrax, yellow fever, typhoid fever, etc. However, there is little evidence that they carry these infectious organisms under normal conditions; therefore, they are not considered an important factor in the transmission of these diseases.

Management of bedbugs:
Bed bugs can be satisfactorily controlled, using domestic spray insecticides which include active ingredients, such as propoxur, some pyrethroids, resmethrin and pyretrines. Mattresses should be treated, specially their seams, creases, and buttons. Also orifices, cracks and furniture close to the bed must be treated. Treatments must be made during the morning, so the insecticides can have enough time to perform their toxic action and mattresses can be used at night.

**Recognition of habits and damage caused by big-nose bugs:**

Big-nose bugs sometimes cause people quite severe and painful bites. Most of these bugs are predators of other insects; however, some of them only nourish from blood. The species that nourish from blood are important vectors of agents that cause Chagas disease (**American Trypanosomiasis**)  

Bedbug infestations are associated with houses built of straw or loose material. This is particularly true in situations where the immediate area surrounding the house and the water well is open to domestic fowl or other animals. They can also invade new houses built by the beach or in the perimeter of urban areas, because they are attracted by light.

These bugs are usually brown or black, marked by colourful orange or red spots.

When some persons are bitten, they present allergic reactions that can include nausea, heart beats, difficulty to breath and strong itching.

**Management of big-nose bugs**

The type of material with which houses are built can have a definite influence in the number of big-nose bugs. Roofs and walls made of straw host more bugs than tin roofs and its number is reduced even more when adobe walls are covered with lime.

A reduction in the number of domestic animals helps to lower the infestation level of these vectors of **Chagas** disease and also the population of other bugs.

Domestic insecticides, natural and synthetic pyrethroids are effective to control them and are safe to be used inside the houses.

**Recognition of habits and damage caused by lice:**
Lice are wingless parasites that attack hot blood animals. There are two types of lice: sucking lice that nourish from blood; and biting lice, that eat skin scales and its secretions.

**Sucking lice:**

For most sucking lice species their life cycle occurs while on the host. The adult female lays the eggs on the host’s hair and, in the nymph states as well as in the adult state, they nourish from the host’s blood. Three sucking lice species parasite man: body louse, head louse and crab louse.

**Body louse:**

It is a very important and dangerous parasite for humans, as it is the vector of typhoid and recurrent fever. Sometimes circumstances make that a large number of persons be piled up in the same room, under unsanitary conditions, which favours the development of large populations of body louse and contributes to the emergency of typhoid fever.

This louse stays in the host’s body only during the feeding process. When it is not eating, it hides inside the host’s clothes, where it lays its eggs. It can be transmitted from host to host through the bed cloth that has recently been used by an infested person.

**Management of body louse:**

To control body louse it is necessary to treat the body of the infested person with medicated soaps that can be purchased at drugstores. Dressing and bed cloth must be frequently washed.

**Head louse:**

All the stages of this louse’s life cycle happen in the host’s body. The eggs are stuck in the host’s hair. This louse can be spread by sharing personal objects, such as hats, brushes, combs, towels, etc.

**Management of head louse:**

At school, as well as at home, there must be a close supervision to detect louse infestations in children’s heads. Sharing personal objects, like the ones described in the previous paragraph, must be avoided. Chemical control of this specie involves direct treatment of the host, using insecticide powder and shampoo, which can be found at drugstores. Cleaning pillows, hats, caps, wigs and other articles that are used on the head, with hot water above 51° C, during 10 minutes, helps to eliminate them.
Body lice or crabs:

Although body lice or crabs are associated with the pubis and anal region, they can also be found in hairy skin all over the body. All stages of this insect’s life cycle occur on the host’s body. Crabs do not move much and stay still during several days with their oral devices stuck to the host’s skin. Transmission of crabs from one person to the other only occur when there is contact between both body regions where they are located.

Management of pubis lice:

Control measures for this insect include treatment to the host and the recommendations are similar to the ones given for head lice.

Recognition, habits and damage caused by fleas:

Fleas are small, wingless insects. When they are observed from the front, their body is narrow from side to side; this allows them to move easily throughout the animals hair, in the clothes of human hosts; in the rugs texture; upholstery and mattresses creases; in very narrow areas, such as cracks, and even under the soil and inside subsoil areas. They have sharp sucking oral pieces that let them penetrate the host’s skin and suck their blood. Their legs are long and powerful, which let them jump. They have a complete metamorphosis; their eggs are soft and round with light colours. They are frequently laid on the host, although they can also be deposited on the soil. As eggs are not stuck, they fall and emerge on the soil, mattresses, bedclothes, upholstery and rugs. Larvae are small, active and similar to a worm; they eat all types of organic waste and develop well when they eat excrement with non-digested blood from adult fleas.

Fleas carry infectious organisms; some of them are typhoid transmitters.

Fleas management:

The steps to be followed for a flea management programme include diagnosis activities; identification and inspection; educational activities, cleaning and use of chemical treatments, using special authorised insecticides.

Note for the Instructor: Use illustrations to explain the biology of these pests. Bring some species to the participants for their identification. Ask housewives about their experiences to manage these pests.
FLEA BIOLOGICAL CYCLE
STEP No. 4 – PRESENTATION – FLIES AND MOSQUITOES

Flies and mosquitoes belong to the diphtherous order.

Flies

Flies of various types have affected man and his well being for thousands of years. Some flies suck blood; others eat carrion. Many flies transmit diseases; others become pests in crops; others live from other insects, whilst others contribute to plants pollination. All flies go through a complete metamorphosis; larvae do not have legs and the head often shrinks, and it can hardly be noticed as it retracts toward the thorax. Adult flies do not have a jaw but have a special oral device to lick and suck or bite and suck. In unit No. 2 of this manual the medical importance of domestic and garbage flies is described.

Note for the Instructor: Use some illustrations to explain flies biology. Explore how much the participants know about them.

Mosquitoes

The difference between the mosquitoes and the flies is that they have a penetrating oral device (proboscis), scales in the back margins and in the veins of their wings. Mosquitoes have a complete metamorphosis. They lay their eggs one at a time or in a bunch on a wet surface or in a place where they can have humidity when there is a flood. Mosquito larvae and pupae live in the water but must go to the surface to get air or get it from the portions of the plants underneath the water.

Larvae go through four states to form the pupa. When the adults are ready to emerge, the pupa swims to the surface and breaks the pupa skin. The adult works to get out of the pupa skin and uses it as a support to harden its body until it can fly. Usually males emerge first and wait close by to mate with the females after they emerge. Most of the female mosquitoes eat a meal based on blood before depositing their fertile eggs. The male’s oral device is not appropriate to suck blood; therefore, its nutrition is based on plants juice and nectar. Mosquitoes are of medical importance because they are the only way known of infectious transmission of agents that cause malaria, yellow fever, certain types of encephalities, dengue and philariasis.

Note for the Instructor: Use some illustrations to explain mosquitoes biology. Explore how much the participants know about them.
Management of flies and mosquitoes:

Some ideas that can be proposed to manage flies: Good sanitary measures are a basic step for fly management. It is important to eliminate garbage twice a week; use of sieve in windows and doors; use of different types of fly traps; use of mosquito traps with electricity discharge; use of toxic bait and insecticides.

To manage mosquito populations, the following ideas are suggested: Supervision and monitoring of breeding places; elimination of larvae breeding places; elimination of adult shelters; use of mosquito nets. Enforce educational and environmental health programmes and biological and chemical control.

Note for the Instructor: Ask present housewives to elaborate an integrated management plan to control domestic flies.
ANOPHELES MOSQUITO BIOLOGICAL CYCLE
AEDES MOSQUITO
BIOLOGICAL CYCLE
CULEX MOSQUITO BIOLOGICAL CYCLE
STEP No. 5 – PRESENTATION: STORED GRAINS INSECT PESTS

Stored grains Weevils (rice and corn): Recognition, habits and damage caused by stored grains weevils.

Rice Weevil: Rice weevil is also known as black weevil.

Adults are of a brown-redish color, 3 mm long. In the wings they have four rounded spots, yellow or orange. They can fly and frequently infest grains in the field and in the storage place. Larvae do not have legs, their body is small, fat and whitish and their head is tanned. Adults, as well as larvae, eat a great variety of grains. Female weevils open a hole in the grains, where they lay an egg, afterwards they seal the hole with a gel. The adults emerge later through this sealed opening and it is the first sign that the grain is damaged. The stages of larvae and pupae take place inside the grain. Since the larvae and the adults nourish with tender grains, these end up completely damaged and cannot be used.

Although rice weevils eat whole stored grains or seeds, they have been found in elaborated products, such as macaroon and pastry flower.
**Cereals Weevil:** This brownish-black weevil is very similar to the rice weevil. It is easy to differentiate it because it has marks on its back and it does not have functional wings. Due to its lack of functional wings to move around, this pest depends almost completely on man. The larvae of both weevil species are very similar and they, as well as the adults, eat stored grains, such as oats, wheat, barley and corn.

The female opens a hole in the grain, where she deposits an egg and seals the hole with a gel, the same way as the rice weevil female does.
Stored grains moth (Sitotroga cerealella): Recognition, habits and damage caused by the stored grains moth.

The adult is a delicate moth, with straw colour. Its extended wings measure 1.25 – 1.50 cms. This is the only stage that is usually observed, because the eggs are too small and the larvae and pupae live inside the seeds. The adult moth emerges through the round hole left on the seed cover. Other moth species turn into pupae in silos’ walls, cracks, openings and among the grains and have the same type of metamorphosis. All moths contaminate and destroy stored grains and flours.
Bean weevil: Recognition, habits and damage caused by bean weevil

These are small weevils with fat body, which are gray and black coloured, have short and wide beak; their dorsal wings do not cover the abdomen completely. They damage the bean grain when the larva feeds herself inside it. The grain quality is lower due to the presence of eggs, adults’ excrement and dead adults. Also, the grain gets contaminated due to fungus secondary attacks. Adults initiate the attack in the field laying their eggs on the pods. They contaminate the stored grain leaving the eggs inside the seeds. After the larvae emerge, they penetrate the grain and develop; when they are ready to turn into pupae, they cut a round area of the grain; the adult will come out later on through this window. When the adults emerge, they immediately copulate and start laying eggs. During that time they do not eat.
Management of stored grains pests:

To manage these pests it is important to maintain a supervision programme, detection, diagnosis and monitoring. Some management practices can be suggested:

1. Keep storing places clean and without pests.
2. Store grains with proper humidity, clean and healthy.
3. Grains should not be placed directly on the floor.
4. Small amounts can be stored with sand or ashes, which work as abrasive, scraping the insects body and causing their death or reducing the spaces in which they can move.
5. The use of metal silos to store grains is a good alternative, and
6. Use chemical disinfectants and protectives, after consulting with a technician and following the instructions on the products label or pamphlet.

Note for the Instructor: With the help of illustrations explain these pests’ biology. Ask the housewives to share their experiences to control the pests.

STEP No. 6 – PRESENTATION: RATS AND MICE

There are three rodent species that “share our table” which are housewives’ main worry: Domestic mouse, Norwegian rat and roof rat.
Rats and mice damage our food in the fields, in the farms, in vegetable gardens and cowsheds, during process, storage, transportation and while in the markets, restaurants and homes. Whatever rats and mice do not eat, they make it go to waste by contaminating it with their urine, faeces and hair. At home rodents damage doors, floors, roofs and walls as a result of their gnawing and sheltering activity.

Rodents are also responsible of spreading various diseases to people and domestic animals. Some of the diseases that can be spread by rodents are: rickettsia eruption, salmonellosis, fever due to rat bite and leptosperosis.

**Integrated management of rodent population**

Integrated pest management is essentially important to manage rodent populations and the following steps should be followed:

1. Rodent supervision
2. Sanitary conditions
3. Rodent-proof buildings
4. Population reduction (rodent elimination)
5. Trap programmes
6. Bait programmes

Rodent control programmes are more effective and efficient at long term when above-mentioned steps are followed.

**GREYISH-BROWN RAT**
ROOF RAT

DOMESTIC MICE
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ANNEX

FIRST AID
IN CASE OF INTOXICATION WITH PESTICIDES
FIRST AID IN CASE OF INTOXICATION WITH PESTICIDES.
Shoes, C. & Collier, C. Adapted C. Palacios.

SYNTHESIS.
The first aid are the initial effort to assist a patient while the medical help is on its way. If these procedures are administered immediately when intoxication with pesticides is suspected, can constitute the difference between to save or loose a patient.

PREPARATIONS:
Before describing the management procedures of first aid in connection with the use of modern pesticides, it is important to emphasise that wherever the pesticides are stored, managed or employed, the following elements for first aid should be on hand.

1. Water supply
2. A soft soap and cloth to wash the skin, and
3. Domestic remedies and antidotes that could be employed before transporting the patient to a medical installation.

Of the various antidotes that have been recommended for treatment of first aid in an intoxication, one of the most useful is the charcoal. Charcoal is essential for the treatment of intoxications by pesticides first aid due to ingestion and should be available for its immediate use. When it is administered in an adequate dosage, this absorbent inhibits the gastrointestinal absorption of an ample spectrum of chemical compounds. The activated charcoal, a fine black powder, odorless, insipid, is the destroyer of distillation residuals of different organic materials, for example: wood pulp, treated adequately to increase its absorption power. (Hayes, 1970)

There is a pharmochemical quality of activated charcoal that usually can be bought in any drugstore. Nevertheless, when there is no drugstore available, at home you can obtain an acceptable quality of common charcoal that can be employed to treat intoxication cases. A common practice is to burn breadcrumbs heating them in a semi-closed container until it is completely carbonized. A good quality, perhaps better, of common charcoal can be done by heating wood splinters in a closed container to exclude air in the burnt process.

The wood should be brushed or cut in small splinters and heat them until they carbonize completely. A particle can be proven breaking it sporadically to determine if it has blackened complete. The heating should continue, excluding the larger quantity of air as possible, until there is no domestic charcoal smoke. This can then be sprinkle with powder or destroyed in pieces with the hands and stored in a bottle for use in case of intoxication (Freed, 1981)

The activated charcoal is only superior to the universal antidote (2 parts of activated charcoal, 1 part of oxide of magnesium and 1 part of tannic acid) or the domestic equivalent (2 parts of burnt toast, 1 part of magnesium milk and 1 part of tea) and should always be employed.

Another preparation that should be on hand is the ipecac syrup, to induce the vomit in case of ingesting a toxic substance. The dosage is of 2 spoons for adults and 1 teaspoon for children. NOTE: Ipecac syrup, NO fluidextract.
PROCEDURES IN CASE OF INTOXICATION WITH PESTICIDES.

The first step in an intoxication emergency, except if you are alone with the patient, is to call a doctor and/or the ambulance or any vehicle that can transport him or her to the closest clinic. If you are alone with the patient, watch that the breathing is regular, the pulse adequate and that it does not occur any additional exposition. While you wait for the doctor or vehicle, or even while the patient is been transported to the hospital, these first aid procedures should be followed:

INGESTED PESTICIDES

Procedure:
1. If the pesticide is unknown, administer any of the following adsorbent agents through the mouth.
   Activated charcoal: preferred for all toxic substances except cyanide and bypiridiles. Dosage – 30 grams in 100 millilitres of water (3 tablespoons in half glass of water) as a thick suspension, or if the activated charcoal is not obtained, administer beaten egg whites. Dosage – 8 egg whites for adults; 4 egg whites for children. In the case of paraquat, an adsorbent clay as the Füller land is preferable to the activated charcoal. If clay is not obtained, then no contaminated land should be administered, then take the patient to the hospital.

2. If the pesticide is known, induce to vomit if it is recommended in the pesticides label and there are no contraindications. After vomiting, administer the activated charcoal in 100 millilitres of water (3 tablespoons in half glass of water) or beaten egg white, if there is no charcoal. Take the patient to the hospital.

VOMIT INDUCTION

If the identity of the pesticide is known, induce to vomit if it is recommended in the label. The ipecac syrup or the vomit by mechanic stimulus are two methods employed to induce vomiting. The ipecac syrup, administered through the mouth can eliminate the 90% to the 100% of the stomach content. The dosage is 2 tablespoons for adults and 1 teaspoon for children. Note ipecac syrup, NO fluidextract.
Figure # 1 VOMIT BY MECHANIC STIMULUS

Vomit by mechanic stimulus: Mechanic stimulation of the throat is where the index finger is used to induce the vomit. It is advised to use the first two fingers of the other hand to push the patients cheek between the teeth to assure that he does not bite the index finger. See figure # 1.

This procedure can extract a 50% of the stomach content and can be done immediately. As soon as the vomit occurs within a few minutes, provide the patient activated charcoal.

Procedures to avoid in cases of pesticide ingestion

1. Contraindications to the vomit induction. Do not induce the vomit if the patient:

   - is sleepy, unconscious or with convulsions, the patient could choke and die if the vomit is induced.
   - has swallowed a corrosive poison, because the product will burn the throat severely going back as it did when was ingested. Examples are the strong acids and alkalis as phenols and alkaline salts. The patient would complain of sever pain and would have signs and symptoms of mouth and throat burns.
   - has swallowed a pesticide on petroleum base. Most pesticides that come with liquid formulations are dissolved in petroleum derived products (xylene, kerosene,
   - etcetera.)
   - The words emulsionable concentrate or EC in the labels are signs of not inducing vomit, if the patient has swallowed a concentrate. If the patient has swallowed a diluted form of these products, nevertheless should force to vomit immediately.
   - If the patient is in the last three last months of pregnancy
2. The use of salt (NaCl) to induce vomit should be avoided because a severe intoxication may occur with salt in fruitless attempts to induce vomiting (Gleason et al., 1976)

3. More than two dosages of ipecac syrup should not be administered because this drug is harmful to the heart. The ipecac fluidextract should never be used to induce vomit because it is fourteen times more concentrated than the syrup. (Arena, 1978).

4. Do not administer baking powder, sodium bicarbonate and other carbonates in case of swallowing acid pesticides, because this can induce to the intestines perforation through the sudden emission of carbon dioxide.

**Inhaled pesticides**

**Procedure:**
1. If the patient is in a closed space, do not go for him or her without a breather mask.
2. Carry the patient (do not let the patient walk) to take fresh air immediately.
3. Open all doors and windows
4. Loosen adjusted cloth.

**Pesticide in the skin**

The fastest the pesticide is washed from the victim, the smaller the lesion would result.

**Procedure:**
1. Take off contaminated clothes
2. Submerge the skin in water (shower, hose, faucet, pool, irrigation channel, etc.)
3. Clean the skin, hair and nails slowly with pure soap and water. The detergents and commercial cleaners can increase the absorption of the pesticide (Maramba, 1980)
4. If water and soap are not immediately obtained, employ a clean and dry cloth to take off as many pesticide as possible from the skin and wash as soon as possible.
5. For chemical burns, cover immediately, without tighten, with a clean and soft cloth after washing with large quantities of current water.
6. Avoid the uses of ointments, greases, oils, powders and other drugs in the treatment of first aid of burns.

**Pesticides in the eye**

**Procedure:**
1. Maintain the eyelids open and wash the eye with a soft spout of current water immediately. Do not press.
2. Be careful not to contaminate the other eye, if only one eye is affected.
3. Continue the washing during 15 minutes.
4. Do not employ chemical products or drugs in the washing water because this may increase the grade of ocular lesion.
5. Turn down first to the upper eyelid and then the inferior and clean them with a wet cotton to extract any strange body.
6. Irrigate the eye once again.
7. Do not exceed more than one hour washing the eyes because dryness may provoked or inhibit the production of tears.
8. Cover the eye with a little piece of clean cloth and send the victim to the doctor, preferable an ophthalmologist.

**Other first aid procedures:**
1. Cleaning of the respiratory via and posture – is always imperative to assure a clean respiratory via extracting any strange body, as teeth, foods and secretions of the mouth and the nose, put the patient in left lateral position of Trendeleburg with the head extended and 15 to 30 degrees lower than the trunk level.

![Figure # 2 KEEP THIS POSITION WHILE YOU WAIT FOR THE DOCTOR OR THE VEHICLE AND WHILE THE PATIENT IS BEING TRANSPORTED TO THE HOSPITAL](image)

**This position:**
- Prevent obstruction of the respiratory tract due to the relaxation of the tongue and other soft tissues. If the tongue has already slipped to the throat, it should be thrown outside.
- Prevent the aspiration of the vomited material in the respiratory tract.
- Increase the drainage by gravity of the secretions of the respiratory tract.
- Prevent the additional transit of the stomach content in the thin intestine.
2. Bring the patient to the clinic or hospital. DO NOT WASTE TIME, MAKE IT QUICKLY.
3. Breathing maintenance – if the respiratory movements are inadequate or non-existent, apply artificial respiration employing a bag "ambu" or respiration mouth to mouth. See figure # 3
4. Circulation maintenance – when the pulse disappears all of a sudden and there are no detectable heart bits, apply external massage. See figure # 4.

5. Unconsciousness – never administer anything by the mouth and assure that the tongue is suspended towards in front when inserting a small blunt and hard object as a spoon or a tongue depressor, between the tongue and the palate.
6. Convulsions – insert a quilted gag between the jaws to prevent that the patient bites his tongue. Prevent additional injury by placing a pillow or a cushion under the head and not letting it fall. See figure # 5.
7. Prophylaxis and antidote medication of first aid – the atropine sulphate and the oxyms should not be swallowed by the pesticide users as a prophylactic measure because they do not prevent the intoxication. Indeed, they can create a false security sense and retard the first aid administration procedures and definitely medical treatment. The sulphate of atropine pills can disguise or retard the first intoxication symptoms and that can be prejudicial at least in two manners. The workers can go back to their work and receive more exposition or, the worker is carried to a doctor, to whom he doesn’t inform that he has already taken atropine, the intoxication diagnosis can loose or retard. In an emergency of acute intoxication, if the victim is stunned or vomiting, do not employ oral atropine as first aid measure because the dosage is too small and the victim cannot swallow. (Anón, 1974)

8. Pesticide identification – If it is possible, take the pesticide container, label or pamphlet with the doctor, in a safe way. If it is impossible, make sure he knows what type of pesticide the patient has been using. See figure # 6

![Figure # 6](image-url)