



University of Jordan
Faculty of Medicine



Medical Committee
The University of Jordan




Community Medicine



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|---------------------------------|---|----|---------------------------------------|------------------------|----|
| Lecture Title: | Dr. Madi Al-Jaghbeer | | | | |
| Date: | 28 | 10 | 2013 | Lecture Number: | 21 |
| <input type="checkbox"/> Slides | <input checked="" type="checkbox"/> Sheet | | <input type="checkbox"/> Other: | | |
| Lecturer: | Pesticide-Related Maladies | | | | |
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Pesticides

We talked about pesticides and how to classify them and the mode of action. The reason behind the examples which have been mentioned is to make things real life story!

Please refer to the slides!

One example of the usage of pesticides is what happen in Syria where mass destructive weapon out of pesticides are used there, and if you noticed what happen to people they died without having any external effect, that's mean that they affected by inhalation ,and we will see later that these chemicals won't kill by contact, contact need 10 times more doses .

- Pesticides can be classified according to many criteria:
 1. Chemical nature
 2. Reentry period
 3. LD50
 4. Formula

- Pesticides can be classified depending on chemical nature:
 1. organic
 2. inorganic
 3. biological in origin
 1. **Inorganic**: like sulfur and copper.
 2. **organic**: compounds or those that do contain carbon, could be either:
 - *Botanical* (from plant origin)
where we use aerobe plant material as pesticide, examples :
 - ✓ **Rotenone**: which is extracted from the roots of certain plants; that you can take the roots, dry them, crush them and use it directly as pesticide, so they are not synthetic they are raw materials.
 - ✓ **Pyrethrum**: which is made from certain flowers; it is a lockdown agent for mesquites and it is very efficient and expensive.
 - ✓ **Nicotine sulfate**: which is extracted from the Nicotine plant or the leaves of tobacco.
 - ✓ **Strychnine**: very efficient poison; it can be used to kill even big animals like dogs and snakes.
 - *Synthetic*:
As in case of many drugs, it is firstly prepared from certain plants, then the chemists recognize its chemical formula and start to synthesize it in the lab. It is effective and easy to use ,example:
 - ✓ **Pyrethrum**: is very expensive, so its chemical formula was recognized and now it is synthesized in the lab as **pyrethroids**.

Pyrethroids have a similar effect to pyrethrum, but it is cheaper, much easier to use and specific in their activity.

It's the same thing with medicine: first you might discover a plant which has certain good effect, then you learn about its chemistry and start to make it in the lab.

3. **Biological origin:** these are creatures like microorganism could be bacteria, virus, fungi those creature are capable to cause disease in given pest species, the most important one is the bacteria! If I don't want certain pest I find the bacteria which can make certain diseases to this pest, example:
- ✓ Bacterium bacillus thuringiensis BT:
which has been used effectively against some species of caterpillars. This is a new technique to be used, and it is not commonly used because we are afraid that they undergo mutation, and if that happen then they will change their behavior so we are afraid from creating a new microbe that they may affect us or other animals as well.

○ We might have the pesticides in different formulas: liquid, wettable powder, mulch, highly concentrated liquid, low concentrated liquid, bait, powder. And the formula might affect the way that this pesticide implies its effect on human being; the same material in a powder formula can have different effect when it is in a liquid form because the route of entry to the body have changed.

Note: when you read this slide you don't have to go in details just know the names 😊

-info: the way we synthesis the drugs is the same way we synthesize the pesticides that's why some farmers called the pesticides plants drugs.

- Another way to classify pesticides, depending on reentry period.
Reentry period: how much time we need to stay away from a place that has been sprayed with pesticides. The time is determined depending on the kind of the pesticide. Examples:
 - ✓ Agrimycin : 12 hours its seems like antibiotic
 - ✓ Daconil: 48 hours Is the worst because it has the largest REP.
 - ✓ Malathion: 24 hours
- Another REP importance: after you use the bomb (mass destructive weapon) you should wait for a while before you get in, so people might come to see what happen and affected by this bomb.

- REP might reach 4 or 5 hours depending on the formula, the more they evaporate faster the shorter REP.
- The pesticide that sprayed on streets has no REP, but you should be careful when you use pesticide in your home to wait for the REP.
- Another classification depending on LD₅₀ (lethal dose 50):
Its labeling the toxicity of the substances whether extremely hazardous, highly hazardous, minimal hazardous, moderate hazardous.

And here come the importance of the formula of pesticides!

Refer to the figure please!

Sarin and tabun are used as mass destructive weapon, extremely hazardous you need 1 g to kill 1 kg of the human.

That's why the people who die from this material look like they were dropped in a sea and they can't swim so they start to drown, the same thing will happen in real but they drawn from their own body fluid <dry drowning> and they start to gasp air without been able to breathe, within few minutes or seconds he will die. It is very painful killer so it is forbidden worldwide.

Story:

Before 12 years in Japan someone come with new religion ,and he convinced some people to follow him ,one day he convinced his followers that Japanese don't deserve to live and they should kill them so the best way he think of is to use Sarine containers, primitive way and very cheap substance and easy to use, he chose 4 persons to do so, they had to go to sub way and open this containers there so the fluid in the container will evaporate quickly(convert to gas) and start to kill people , however one of these persons was a doctor so he realized that this plan is bad and this religion is bad and as a doctor he should help people not kill them so he stopped everything ,and call the government. And they discover a huge manufactures of this substances in Tokyo its plan to damage Tokyo.

- Another classification is according to Signal words:
 - ✓ Danger : very toxic
 - ✓ Warning : moderately toxic
 - ✓ Caution :relatively toxic
- Non-toxic completely substances can't be found on our world even water ! .
- One of our problems as doctors with these substances is that these substances should be labeled with the active ingredient, the sign syndrome of these substances and the first aid if we have a poisoning case which is the anti-dote.
Anti-dote: ترياق
- Another problem: you might treating the patient according to the label and he is not responding because in this container there is not only active ingredient, ex: pyrethroid in a container could be 0.1 mg and the rest is adjuvant, and here is the problem that these adjuvant could be harmful.

Swine flu appeared in the 90's of last century in USA and many people had a toxic and complicated due to the adjuvant in vaccine of the swine flu.

- **Adjuvant:**

are chemicals added to pesticides principally to increase its effectiveness or reduce phyto-toxicity.

- Stickers: to stick in the agent.
- Spreader: to spread not stay in one place.
- Penetrator: to enter the plant systemic type of pesticide.
- Emulsifiers: used to solve the water-insoluble material.
In our body the emulsifier is the bile that solves the fat.
- Wetting agent: if the substance is powder and I'll convert it to gas.

- The biggest and 3d problem is the contaminants:

some time the contaminant of that container become more effective than the active ingredient like dioxin inside the container of herbicides, herbicide is not much harmful but the dioxin is harmful very much so we should consider the purity!

You, as a consumer, need someone to help you to decide wither is it healthy to buy something or not and this is the purpose of having the National Association for Consumer Protection.

By now we finished the classifications of pesticides \o/

- There are 4 ways in which we can expose to pesticides:

1. Inhalation
2. Oral
3. Ocular
4. Dermal

And there are other ways like: by the ear or by injection but not so common.

- How can you tell what is the pesticide? Some of the pesticides have the same sign symptoms.
Pinpoint pupil caused by organic phosphorus and carbamate and sometimes morphine. The Dr will explain that later as he said.
- There is a need for poisoning centre to control the cases that exposed to poisoning by pesticides and others things, and to know exactly the pesticides that poisoned the patient so you can treat him. So you, as a Dr and even mothers at home, can call this center and know the first aid and the antidote so you can help your patient quickly.

Good luck and please refer to slides!

"I can accept failure, everyone fails at something. But I can't accept not trying".

-Michael Jordan