Identificación de residuos tóxicos en miel de diferentes procedencias en la zona centro del Estado de Veracruz

Identification of toxic residues in honey from different sources in the central zone of the State of Veracruz

Antonio Perez Pacheco
Universidad Veracruzana
anperez@uv.mx

RESUMEN

En el presente trabajo se analizaron muestras de miel procedentes del municipio de Amatlan de los Reyes, Ver. Y Esperanza, Puebla. Para determinar residuos de plaguicidas organoclorados y organofosforados, la toma de muestras se realizo en las primeras semanas del mes de Enero, posteriormente se procedió a analizar las mieles, por medio de métodos cualitativos con 3 repeticiones c/u.

Los resultados obtenidos en el análisis cualitativo para organoclorados encontramos presencia de Toxafeno, DDT, DDD Metoxicloro y DDD/DDT. Indicando la persistencia de estos plaguicidas que trasciende en la producción apícola en ambos municipios así como en 3 pruebas para la miel comercial Carlota.

Palabras Clave: Residuos tóxicos, miel, Veracruz

Abstract

In this work, samples of honey from the town of Amatlan of Kings, Ver Y Esperanza, Puebla analyzed. To determine residues of organochlorine and organophosphorus pesticides, sampling was performed in the first weeks of January, then proceeded to analyze the honeys, through qualitative methods with 3 replications c / u.

The results of qualitative analysis for the presence of organochlorine find Toxaphene, DDT, methoxychlor and DDD DDD / DDT. Indicating the persistence of these pesticides that transcends beekeeping in both municipalities and in 3 tests for commercial honey Carlota.

Key Words: Toxic waste, honey, Veracruz.

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1. INTRODUCTION

The environmental impact that exists throughout the world and especially in our country, generated hundreds of factors have made the environmental, social and food security is mainly a constant concern that leads to the introduction of more and new methods and / food or chemical analysis systems.

Mexico, a country with a huge natural diversity and potential major producer of basic foods of animal and vegetable origin mainly, it will always be highly exposed to toxic waste. It is alleged that before 1950 in Mexico, agriculture (main food producing activity) pioneered the use of synthetic pesticides to control pests and diseases. Mexico produces pesticides such as parathion and malathion are organophosphates, but most of them are organochlorine compounds such as DDT, HCH and toxaphene, whose use is already banned in other countries. Realizing that food contamination is one of the most severe in Mexico. Researchers believe that government entities more than 90% of the food you eat are contaminated or unfit for consumption. (Lopez, 2001).

FAO (Fund for Food and Agriculture, UN) and Secretary of Health of Mexico, declared that biological contamination of food produces an average of 60,000 deaths and 6 million patients a year in Mexico.

As we can see how much large amounts of agrochemicals are used in our country as in many others, although more than 90% of the population know the harm they are used without a measurement and control. That beyond providing and delivering quality products, some producers generate a significant number of people made aware of the products they consume and is home mainly chronic digestive diseases by their levels of toxicity.

However, thanks to dedicated to controlling these toxic agents countries worldwide studies have found it necessary to establish maximum permissible levels for these products for human consumption.

Similarly there are governments that already have food safety standards that prohibit the use of chemicals, fertilizers and others. By considered highly toxic or that exceed levels considered, damaging human health and much of the biosphere.

Activities undertaken by FAO in conjunction with other relevant agencies of the United Nations and other international organizations developed a Code of Conduct on the Distribution and Use of Pesticides.

2. BASIS

2.1 PESTICIDES AND CLASSIFICATION

A pesticide is any substance or mixture of substances intended for preventing, destroying or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animals causing harm during or otherwise interfering in production , processing, storage, transport or marketing of food, agricultural products.

Some authors separate the ores pesticides pesticides organic pesticides, which are subdivided into organophosphates and organochlorines. Although other classifications range from the insecticides, fungicides, herbicides, etc. (Derache, 2001).

Table 1. Classification of insecticides.

<table>
<tr><td>Insecticidas minerales</td><td colspan="3">Insecticidas Orgánicos de síntesis</td></tr>
<tr><td rowspan="3">-Compuestos
-Arsenicales
• Arseniato de Pb
• Arseniato de Na
-Azufre
-Compuestos fluorados
• Fluoruro de Al, Ba
-Derivados de mercurio
-Derivados de selenio
-Compuestos a base de sílice, cuarzo magnesio.</td><td>Organofosforados</td><td>Organoclorados</td><td>Carbamatos</td></tr>
<tr><td>-fosfatos
-Fosforamidas
-Tiofosfatos y
-fosforotiatos
-Halogenofosforamidas
-Fosfonatos
-Pirotiofosfatos
-Mercaptotifosfatos y metileno (bis)</td><td>-Grupo DDT
-Grupo HCH
-Grupo de Clordane (Heptacloro, aldrin, dieldrin)
-Derivados de la esencia de terebentina (endusolfan, Toxafeno)
-Derivados nitratos de fenoles y cresoles (DNOC, dinoterbe)</td><td>-Aldicarbe
-Carbaril
-Carbofuran
-Dioxacarbe
-Formetanate
-Isolane
-Metiocarbe
-Metonil
-Pirimicarbe
-Promeacarbe
-Vapam</td></tr>
<tr><td colspan="3">Insecticidas diversos</td></tr>
<tr><td colspan="3">-Insecticidas de origen vegetal (nicotina, piretrina, retenona)
-Piretrinoides de síntesis
-Productos sinergistas (piperonil butóxico, sesosamo, sulfóxido)
-Productos atrayentes (sexuales o nutritivos)
-Sustancias revulsivas o apetitosas
-Quimioesterilizantes (afolato, teopa)
-Repulsivos
-Reguladores del crecimiento
-Productos bacterianos</td></tr>
</table>

Fuente: tabla de Insecticidas (R. Derache, 2001)

2.1.1 MINERALS PESTICIDES

By the year 1845 at that time were known great benefits of using fungicides copper and mercury salts, used to treat seeds; and it was not until 50 years later when the insecticidal properties of copper arsenite (Doryphoros), the herbicidal properties of sulfuric acid, iron sulphate, copper nitrate, chlorates and perchlorates were introduced in the market as other charitable options crops. Already at that time there were plant material consisted essentially of minerals and some natural and organic (pyrethrum, rotenone, nicotine, petroleum oils) and synthetic (hydrocyanic acid, chloropicrin, methyl bromide).

2.1.2 organic pesticides

According to records by the year 1902 already it started to develop organic pesticides such as benzoquinone, a very strong and aggressive fungicide, and in 1927 they released the carbamate insecticides organophosphates, which knew had a high commercial use, and 1951 there were some urea derivatives (herbicide). (R. DERACHE, 1990).

In most organic insecticides currently used and also they have the same effect and are still using nicotine, derris (rotenone) and pyrethrum.

Nicotine acts as non-persistent contact insecticide against aphids, capsids, leaf miners, codling moth and thrips in a wide variety of crops. Kill vertebrates that mimics acetylcholine when combined with the acetylcholine receptor at the neuromuscular junction causing twitching, convulsions and ultimately death. Nicotine acts as fixed contact and stomach poison; and also it acts as a toxic vapor, however its use is declining rapidly, replaced by synthetic insecticides.

Rotenone mainly from Derris elliptica East Indian and other South American species called Lonchocarpus. A botanical insecticide, and paralyzes insects by inhibiting the re-oxidation of nicotinamide adenine dinucleotide. It is also a fish poison, but generally poses little risk for mammals, except for pigs. Rotenone is an extremely safe insecticide garden, since it is easily degraded by light and air, it leaves no residue and has been widely used.

Pyrethrum is a contact insecticide obtained from the flower heads of Crysanthemum cinerariaefolium, or better known as chrysanthemum, pyrethrum owes its importance to the speedy demolition remarkable action (a few seconds) has on flying insects, coupled with the very low toxicity to mammals due to its rapid metabolism to non-toxic products, is not

persistent and leaves no toxic residue, which does not tend to develop resistant insect populations.

2.2PLAGUICIDAS AND OBJECTIVES

All types of pesticides kill unwanted or those who wish to control (insecticides, miticides, nematicides, fungicides, etc.), interfering with the life cycle (development and / or reproductive process) organisms, blocking metabolic processes and functions vital organisms.

Examples of commercial compounds and chemicals that attack different organisms and pests:

Insecticides and miticides

· Organochlorides: Derivatives cyclodiene (aldrin, dieldrin, endosulfan, mirex), derivatives of 2,2-diphenyl ethane (DDT, dicofol), cyclohexane derivatives (lindane), policloroterpenos

· Organophosphates: Phosphoric esters: orthophosphate, pyrophosphate (TEPP, dichlorvos) Thiophosphoric esters: phosphothionates, fosfotiolatos (parathion, fenitrothion), diotiofosfóricos esters (dimethoate, methidathion, malathion), amides of phosphoric acid, pyrophosphoric acid amides, phosphonates (trichlorfon), tiofosfinatos

Herbicides

· Inorganic (ammonium sulfamate, borates)

· Organic: petroleum oils derived organoarsenicales (DSMA, MSMA), fenoxialifáticos acid (2,4-D, MCPA), substituted amides (propanil), substituted ureas (diuron, linuron), carbamates, pyridine derivatives.

Fungicides

· Inorganic sulfur, copper, mercury

· Organic: dithiocarbamates, thiazoles, triazines (Anilazine), substituted aromatic (HCB, chlorinated di), you dicarboxiimidas (sulfonamides) (captan, folpet), dinitrophenols, quinones (chloranil).

2.2 organochlorine (OC)

The group of organochlorine pesticides, can be defined as a hydrocarbon with high content of chlorine atoms, it is characterized by its high chemical stability, which means that, under natural conditions hardly degrade and therefore persist in the environment. are substances with high lipid solubility (soluble in fats), it should be that bioaccumulate in organisms alimentarias--through chains giving rise to serious pollution and mortality in species for about 16 weeks. Relatively high toxicity to insects but low for humans. Its use is domestic and agricultural.

2.2.1 CHEMICAL STRUCTURE

Among them they are classified according to their chemical molecular structure:

I. Halogenated alicyclic hydrocarbons (HCH, lindane)

HCH (hexaclorociclohexano)

DL50 Oral aguda: 88 a 91 mg/kg.

DL50 Dérmica: 900 mg/kg.

Toxicidad Crónica: 10mg/ℓ

Hexachlorocyclohexane is manufactured by treatment of benzene with chlorine in the presence of ultraviolet light, without catalysts. It has a wide persistence of 80 weeks in the United States is known as BHC and often also called Lyndane, the name comes from its original isolation, carried out by Van der Linden (1912).

II Halogenated aromatic hydrocarbons (DDT, p, p'DDT, p, p'DDE)

Pure as DDT compound quickly penetrates the insect's cuticle, damaging rapidly, is stable to heat, so it can volatilize without suffering changes (Cremlyn, 1982). DDT was widely used on, particularly in agriculture, which consumed 80% of its production, as a result quickly began to affect the reproductive capacity of many species, which indirectly incorporated it into their bodies. This product was banned in nine countries and restricted in 18. Presents tags as SC (suspected of causing cancer), RET (toxic effects on the embryo, can cause abortion) and TPE (toxic to fish) for the Environment Protection Agency US Environmental registration is canceled. It is a product registered by SARH. (Lopez, 2001)

Chlordane: Chlordane insecticidal properties (2, 3, 4, 5, 6, 8, 8-octacloro-2,3, 3a, 4, 7 7th-hexahydro-4, 7-metanoideno). Were reported in 1945 was the first notable member new group of organochlorine insecticides. Chlordane Heptachlor also contains some generally having greater insecticidal effect than chlordane. MTPA is known to be (very toxic to birds) and MTPE (very toxic to fish); in animal tissues in insects and in plants, heptachlor epoxide becomes. It is prohibited in 15 countries and more restricted in 8; It is SC (suspected of causing cancer) and T (teratogenic; substance that tends to cause malformations in a developing fetus). It is a product registered by SARH.

- DL50 Oral aguda: 457 a 590 mg/kg.
- DL50 Dérmica: 1600 mg/kg.
- Toxicidad Crónica: 150mg/ℓ

Cyclodiene III Halogenated derivatives hydrocarbons (aldrin, dieldrin).

Aldrin and Dieldrin: are the best known members of the cyclodienes insecticides and are named for Diels and Alder, the discoverers of the diene synthesis. Both compounds are chemically very stable and do not react even with caustic soda. (Cremlyn, 1982) are some of the most active general contact insecticides as DDT, are lipophilic and persistent, but have little systemic action and therefore are relatively ineffective against sucking insects. However, soil pesticides are excellent and are the best compounds for the control of termites. Dieldrin is remarkably effective against parasites such as moscaradas ectoparasites, lice and ticks. Also it used to protect fabrics against moths, beetles and clothes against flies root carrot and cabbage.

Endosulfan has a spectrum of insecticidal similar to aldrin, except that it is also a miticide, in common with most organochlorine insecticides, cyclodienes are very persistent lipophilic molecules which are not readily biodegradable and tend to accumulate in the environment , cyclodiene insecticides derivatives possess significantly higher acute toxicity to mammals compared with DDT and lindane. Symptoms of poisoning cyclodienes clearly show that act on the nervous system where biochemical studies show that action may be in the axon or synapses, causing convulsions and dizziness. (Cremlyn, 1982)

(1, 2, 3, 4, 7, 7-hexaclorobiciclo- [2, 2, 1] heptane-5, 6-bisoximetilensulfito).

• Acute Oral LD50: 55-220 mg / kg.

• Dermal LD50: 359 mg / kg. (Skin irritation at concentrations greater than 1%)

• Chronic toxicity: 30 mg / ℓ

It dissolves in organic products, is very persistent (approx. Up to 104 weeks), it is also known as Thiodan or Clortiepin currently prohibited in three countries and six restricted. It is MTPE (very toxic to fish) is SC (suspected of causing cancer). Is RET (toxic effects on the embryo, can cause abortion). It is a product registered by SARH.

2.2.2 Mechanisms of Action

It has been shown that most of organochlorine insecticides cause hematomegalia and microsomal enzyme inducers, that transform them into epoxides derivatives, highly reactive and biologically very active, especially against protein macromolecules and nucleic acids.

This large number of insecticides (organochlorines, organophosphates), in addition to its primary toxic action, exert significant changes in cellular metabolic processes, acting on key enzymes such as oxidases (breathing), phosphorylases (glucose metabolism), esterases, dehydrogenases , etc.

Most organochlorine insecticides are poisonous to the nervous system of insects and mammals, the mechanisms differ from one product to another, DDT acts on the motor and sensory nerves and the motor cortex, altered transport of sodium and potassium ions, disrupting membrane potentials, muscle tissue level DDT It could also block the formation of A.T.P.

Cyclodienes chlorinated pesticides (aldrin, dieldrin) they are also potent neurotoxic at CNS modifying the relationship between amino acids and increased levels of ammonia in the brain).

2.3 Organophosphates

Organophosphates are a group of artificial pesticides used to control populations of insect-pests.

During the Second World War brought a great revolution in the chemical industry. This framework appeared organophosphates as exclusively military development (nerve gas) and after the war, a large agricultural use. Thus they appeared in the 50s parathion and malathion, which were consolidated as organophosphates primarily agricultural insecticides and their use greatly increased the banning of organochlorine.

Organophosphates are synthetic organic substances, formed by a phosphorus atom bonded to four oxygen atoms, or in some substances to 3 oxygen and one sulfur. One of the phosphorus-oxygen bonds is quite labile and phosphorus released from this "free group" is associated with acetylcholinesterase inhibiting nerve transmission and causing death. Its main features are its high toxicity, low chemical stability and no accumulation in tissues, this being so positioned in advantage over organochlorine low degradability and high bioaccumulation.

There have been several decades many cases of insect resistance to organophosphates, mainly due to excessive use of these insecticides. Furthermore, there is cross-resistant to carbamates. This means that resistance to carbamates brings about resistance to organophosphorus, and vice versa. Because of these serious problems must be carefully evaluated with the use of these insecticides and not overload the cultivation thereof.

Endosulfan, malathion, parathion (member of the "dirty dozen"), lindane, etc. are some of the organophosphates that have flooded the market. Currently many organophosphates have been banned in several countries and this list is continuously increasing worldwide.

2.3.1 CHEMICAL STRUCTURE

They are essentially phosphates. They break down more easily and are less persistent in the environment with respect to organochlorines, but more dangerous to humans because they have a high degree of toxicity.

Many of them are systemic, that is, they are absorbed by plants and introduced into the vascular system of plants, acting both in sucking insects as well as on people who eat the food, even if it is pre-washed.

Also derivatives of phosphoric acid herbicides such as glyphosate.

They enter the body dermal, respiratory, digestive and conjunctiva. When the active ingredient is dissolved in organic solvent, product absorption through the skin is facilitated. The dermal route is responsible for a high percentage of poisoning.

The average life of organophosphates and their biotransformation products is relatively short (hours to days). Its biotransformation is done by oxidases, hydrolases and transferases, mainly liver enzymes. The removal takes place by urine and feces fewer.

The first biochemical effect associated with organophosphate toxicity is the inhibition of acetylcholinesterase. In the nervous system there is a protein having enzymatic activity stearic; this, when it is phosphorylated by the pesticide, becomes what is called neurotoxic esterase, responsible for the delayed neuropathy. They are biodegradable and do not accumulate in the body.

They present special problems because when some organophosphorus combination, various effects, among others, synergy, potentiation and inhibition of detoxification occur. For example we have, malathion. Studies in xenobiotic metabolizing enzymes in liver and brain of rats, they found that endosulfan can also increase Malathion toxicity by inhibiting the action of detoxification enzymes.

2.4 TOXICITY OF PESTICIDES

The toxicity of pesticides depends on certain factors, among which we can mention the use forms (solid liquid gas, or pulverized), the means of implementation and employment (spraying, dispersion, etc.) and conditions of use.

But the main factor that determines the toxicity of these products depends on the mode of penetration and the evolution of the product in the body (DERACHE, 2001).

2.4.1 TOXIC penetration routes

The significance for man of toxic risk seems difficult to quantify due to the difficulty of estimating the short- and long-term, however can make an assessment according to the entryways of toxic.

2.4.1.1 digestive tract

When the pesticide enters the mouth, it is swallowed. It can happen at work:

Eating, drinking and smoking when you are manipulating pesticides and their hands or impregnated gloves.

By placing contaminated objects mouth, as when the nozzle is blocked and you try to unblock, bringing it to his lips and blowing.

It is the most important route by which pesticides may reach the entire population, through residues in water and food.

2.4.1.2 through the skin and mucous membranes

The skin acts as a barrier that isolates and protects human body from the outside. It does not behave well against many pesticides, in contact with it, the cross can damage health.

There are areas of skin that are more permeable, are the mucosa (the lining of the mouth, nostrils, eyes, and genitals). These sites of pesticide exposure is even more dangerous to be much higher than absorption through the skin.

Another special case is that of wounds and other injuries where the skin is broken and isolation is lost. For them can penetrate pesticides directly.

Through skin penetrating pesticide when:

- It working anywhere in the body gets wet, and while not eliminated by washing with soap and water.

- Splatter product.

- Clothing that is being used is wet with the product or is dry, not been washed since the last time it was used.

- Anything that is wet for the product is touched, or even dry if not previously cleaned, at least with water.

2.4.1.3 AIRWAY

Some products that enter through the nose and mouth with the breathing air is absorbed, partly on the spot. The rest continues throughout the respiratory system, passing from the lungs to the blood through the "barrier" minimum separation forming alveoli. From the blood and reach the brain much of the body before passing through the liver (organ becomes less toxic to many of these products). If to this is added to the lung surface is several times higher than that of the skin, you can better understand the importance of the airway when working with these products, especially when they may enter the air as vapors or very small particles that are not visible.

This happens:

- Breathing at work (mixtures, applications, ...) and when resting (lunch, ...) in the same field or workplace (store, warehouse, ...), because the air is polluted.

- Peering unprotected for the amount of product remaining in the tank, thereby inhaling the fumes.

- In any field treated as the pesticide is not fully seated.

Therefore, favor the entry of pesticides for the airway:

- The size of particles: when are smaller (eg atomization), the more quickly spread into the lungs.

- The direction and wind speed: when sprayed into the wind it pushes the pesticide into the nose and mouth so that it can penetrate amount.

- Physical fatigue: exhaustion and heat make it breathe more and more pesticide can enter our lungs.

Knowing the gateway is essential to apply the examples discussed in the daily work, preventing penetration of toxic in any of the situations described.

2.4.2 CHRONIC AND ACUTE POISONING

A) Acute poisoning.

Depending on the nature of the toxic and poisoning will occur via an individual combination of symptoms. The earlier and more severe the neurological symptoms, the worse the prognosis.

- First phase: 0-24 hours; predomínate:

1. Digestive Symptoms:

Vomiting

Abdominal pain

Diarrhea (may be bloody).

2. Neurological symptoms:

Muscle cramps

Paresthesia (tingling).

vertigo

confusion

ataxia

hyperthermia

seizures

respiratory depression

3. Cardiovascular symptoms

hemodynamic instability

Caridiogénico shock.

4. Pulmonary symptoms

cyanosis

Pulmonary edema.

(If the gateway was inhaled and / or aspiration of gastric contents occurred).

5. hematologic manifestations:

Hemolytic anemia.

Purple.

6. Skin symptoms:

Maculo papular eruption

Eczematiforme dermatitis.

(If the gateway was skin).

-second phase:> 24 hours. Also they may occur:

7. hepatic manifestations:

Transaminase elevation.

Jaundice.

Cholestasis.

Coagulation disorders.

8. Renal manifestations:

hematuria

Oligoanuria.

B) Chronic intoxication.

You can show any symptom picture in attenuated form. Adrenal insufficiency has been described in relation to exposure to DDD. It has been implicated as etiologic factors these products in aplastic anemia, liver cirrhosis, renal insufficiency, leukemia and solid tumors.

- Agricultural Workers

Peripheral neuropathy: muscle weakness, paresthesias,

Fasciculations and flaccid paraparesis

Malaise and headache 10 days

- Production workers

Drowsiness,

Anorexia,

Gastralgias,

Hypersalivation feeling drunk,

Vertigo, hyperacusis

- Workers of contact.

Liver disorders,

Neurological and behavioral changes

Diagnosis

It depends primarily on the clinical history. Suspected poisoning, gastric aspirate samples and urine were sent to the toxicology lab.

2.4.3 TREATMENT AND DISPOSAL OF TOXIC

Basic and advanced life support

The time interval between exposure to IOF and the appearance of the first symptoms varies between 5 minutes and 12 to 24 hours, depending on the type, quantity and the gateway toxic. Clinical symptoms and signs of acute intoxication by IOF are classified as cholinergic, direct toxic effects, intermediate syndrome and neuropathy Delayed by IOF.

Symptoms include nausea, sweating, salivation, lacrimation, general weakness and bronchospasm in mild cases and bradycardia, tremor, diarrhea, chest pain, pulmonary edema, seizures and even coma in severe. It can result in death from heart or respiratory

failure. Treatment includes the administration of pralidoxime (1 gr. IV *) and atropine 1 mg sc ** every half hour to get control of symptoms. Pralidoxime accelerate the reconstitution of acetylcholinesterase and atropine muscarinic control symptoms while having no effect on nicotinic as weakness or respiratory depression.

(IV *: Intravenous - SC **: subcutaneously)

Treatment

There is no antidote. They are made of:

I. Toxic disposal measures:

a) Gastric lavage with bicarbonate water.

b) with activated carbon gastroclysis

c) Saline Laxative: sodium sulfate 30 g. in 200 ml of water.

d) meticulous skin contact Wash if poisoning is suspected.

2. Life Support:

a) Control by air, oxygen, ventilation.

b) Correction disorders pH, ions, glucose, etc.

3. Treatment of seizures: diazepam, at standard doses

2.4.4 Factors Modifying TOXICITY

We may find, in addition to expected or normal effects, (abnormally exaggerated or diminished) unexpected effects.

The same intensity of any toxic reaction depends on a number of circumstances:

The dose and therefore the concentration of toxic free and active receptor.

The toxic capacity to cross biological membranes to reach recipients without undergoing metabolic destruction or removal.

Conditions receiver sensitivity.

All these circumstances depend, in turn, of a series of factors that modify the toxicity of the product and may be categorized as:

Factors that depend on the environment (exogenous or physical)

Factors specific to the individual (endogenous or biological)

Factors related to the management of toxic conditions

2.5 ORIGIN AND HONEY PRODUCTION

In Mexico, the use of honey, dates back thousands of years ago, used for religious ceremonies in offerings or impoundments, but mainly in medical applications. And considering important part of the evolutionary process of man.

According to experts, for several hundred years two types of beekeeping in Mexico, that made with the European bee and the Yucatan Peninsula were developed and, on the other hand, other regions such as Puebla and Michoacan, based on the use of native bees.

Mexico has a production of high quality honey, prized for its properties, as well as its aroma, flavor and color, in various countries of the European Economic Community and the United States.

However, the introduction of the European bee (Apis mellifera) to various regions took place during the colonial period, although the European bee had many advantages, high resistance to disease and very docile, beekeepers chose to work with the native bee; melipona beecheii.

Between the years of 1950, the Mexican beekeeping was an important development through exports, accordingly took Mexico to a stage of modern commercial beekeeping placed Mexico among the first in the world.

Mexico held in 2007 the 6th place worldwide as a producer of honey. 55'459,000 Kg Mexico exported almost 47% of its production mainly to European countries.

Bees are always vulnerable to the effects of toxic compounds that exist in their environment. This includes a number such as, synthetic chemicals such as pesticides and fertilizers, as well as a variety of natural chemicals from plants, such as ethanol from the fermentation of organic materials and fruits. The bees are poisoned when exposed to ethanol fermented nectar, as well as very ripe fruit.

In the field of beekeeping it is about ensuring that the honey produced by bees exposed to these substances is "clean". But now a study by US experts denounces the excessive presence of pesticides in hives and therefore passage honey. A contamination with gamma radiation, could be mitigated, experts say.

According to a study presented at the 23rd Meeting of Chemical Philadelphia on August 18, 2007, 97% of eating bee pollen having 1 to 17 types of pesticides and miticides, and 98% of the wax contains fluvinato and coumaphos, pesticides used in the hives to combat varroa mites.

Although there were already international standards for allowable levels of pesticides in foods such as milk, fruits and vegetables, honey had been relegated to the background, some experts say entomologists, a product has not been analyzed on a regular basis. This need invites experts to develop new methods of analysis to permit work with smaller than those needed for other food samples.

Gas and liquid chromatography together to facilitate safe pollen, bees and wax techniques used by its specificity, selectivity and sensitivity and the ability to detect small concentrations of drugs in the sample being analyzed. While the sanitary control of avian diseases usually done through chemical substances as antibiotics, with the consequent risk to contaminate hives, prophylactic gamma radiation is non-destructive technique suitable for disease control.

IMPORTANCE OF HONEY

2.5.1 GLOBAL

Global exports of honey are concentrated in 5 countries, which are most important to China, Argentina, Mexico, Germany and Canada.

In this regard, Argentina exports peaked 70.422 metric tons in 1997, and a minimum of 39.685 metric tons exported in 1990.

Mexico ranks third as a world exporter of honey, I having their highest export quantities during the years 1990 and 1991. From these years, it had a decline in exports, and in the last decade not again reached the record figure of 50.089 metric tonnes in 1991. Until the aforementioned year, Mexico was the second largest exporter of honey in the world, but from 1992 to date, the second place is Argentina.

Germany ranks as the importing country par excellence, this country is allocated a little over a quarter of volumes traded worldwide.

MAIN PRODUCING COUNTRIES OF HONEY

(Tons)

Table 2. Main honey producing countries 2000- 2003

PAIS	**2000**	**2001**	**2002**	**2003**
CHINA	251,839	254,358	267,830	273,300
ARGENTINA	93,000	80,000	85,000	85,000
EUA	99,945	84,335	77,890	82,144
TURQUIA	61,091	60,190	74,555	75,000
MEXICO	58,935	59,069	58,890	55,840
OTROS	685,743	722,405	713,694	739,730
TOTAL	**1,250,553**	**1,260,357**	**1,277,859**	**1,311,014**

Fuente: http://apps.fao.org/faostat

The PRC is the largest producer and exporter of honey in the world; however, its export capacity has varied over the last decade.

In 1994, exports reached 54.6% of its total production of honey.

Over the next three years, its export capacity decreased to achieve an increase in 1998 when its export capacity reached 37.3%. Argentina is the country that stands out for its export capacity, being the highest of all countries exporting honey, reaching levels up to 100% in the years 1997 and 1998.

The ability to export honey Mexico has ranged from 72% achieved in 1991 to 50.1% obtained in 1997. Throughout the 1990s to 1998, Mexico's export capacity always remained above 50%.

2.5.2 NATIONAL

Mexico currently lies within the top ranks of producing honey at international and national level, beekeeping is considered the second generation farming in the currency with a value of over 80 billion dollars in exports.

Beekeeping is performed throughout Mexico, but it is noteworthy that in the Yucatan, Campeche, Quintana Roo and Chiapas states increased production of this industry is concentrated.

EXP-VALOR/ AÑO	EXPORTACIONES (TONS)	VALOR (USD)
2005	17,928.22	30,049,250.90
2006	25,482.32	48,379,431.47
2007	30,933.97	56,462,758.57
2008	28,455.50	80,247,261.40
TOTAL	**102,800.01**	**215,138,702.34**

FUENTE: SIAP (http://www.siap.sagarpa.gob.mx/)
CON DATOS DE LA ADMINISTRACIÓN GENERAL DE ADUANAS A 2008

Figure 1. Production of honey in Mexico, according to previous years.

Thanks to the variety and abundance of flora in different climates existing in Mexico have been crucial for the consolidation of beekeeping and its high production is constant factors, this can be seen with the participation of all states in the inventories of honey .

2.5.2.1 HONEY CONSUMPTION IN MEXICO

Honey consumption in Mexico has experienced significant increases in recent years, this is due to the widespread tendency to consume natural products or containing no chemicals in its production.

Honey consumption in Mexico has experienced significant increases in recent years, this is due to the widespread tendency to consume natural products or containing no chemicals in its production.

Honey consumption in Mexico is divided into three main categories: the first is the direct consumption, the second is through industrialized where honey as a sweetener, used products the main products occupy are sweetened milk, cereals, yogurt and typical

Mexican candies among others. And the third category is the use of honey for cosmetics and opotherapy.

In Mexico there are no records where reliable information can be obtained from the distribution of this product in the above categories. It is estimated that honey for direct consumption represents 52% of national supply, food industry, cosmetics industry and opotherapy together absorb 48%.

Because of the problems that exist by mixing honey with fructose, the federal government has implemented the establishment of standards for certifying the quality of honey and to achieve the Regulatory Council of the Mexican honey, AC was formed whose function is to certify purity of honey and ensure product quality, both domestically and for abroad. The council is implementing the use of a hologram, so that consumers have a greater assurance of product quality buying.

The national honey production in 2006 was 55, 970 tons with an estimated value at more than $ 134 million. More than 50 percent of production is concentrated in the states of Yucatan, Campeche, Jalisco, Veracruz and Guerrero.

Of total domestic production, nearly 50 percent is exported. During the first half of 2007, the amount exported natural honey amounted to 33.5 million dollars, 20 percent more than the same period last year.

Figure 2. beekeeping in the Mexican Republic in 2008.

PAIS	2000	2001	2002	2003
YUCATAN	160,868	131,279	153,948	171,208
JALISCO	96,450	128,859	104,563	137,263
CAMPECHE	107,534	120,180	116,033	129,807
VERACRUZ	96,716	94,752	102,000	124,633
GUERRERO	74,695	58,829	67,861	87,606
OTROS	459,762	472,837	518,511	558,308
TOTAL	**996,025**	**1,006,736**	**1,032,916**	**1,208,825**

Cuadro 3. producción de miel en los paises de México,

Fuente:*http://www.siap.sagarpa.gob.mx*

VALUE OF PRODUCTION OF HONEY IN MEXICO

(Thousands of pesos)

2.5.3 REGIONAL

The state of Veracruz has a honey production amounting to 5000 754 tons, it ranks third in production nationwide, exceeded only by Yucatan and Jalisco.

The importance of this sector, both national and state levels, is derived from the production obtained and is the result of an inventory in the country of nearly two million hives and Veracruz of approximately 175 thousand hives operated by thousand 226 beekeepers, organized in 37 Specialized Local Cattle Associations in Beekeeping

INDICATORS OF HONEY IN VERACRUZ 2002

MUNICIPIO	**PRODUCCION DE MIEL** (Toneladas)	**VALOR DE LA PRODUCCION** (Miles de pesos)
Papantla	589	10,609
Martínez de la Torre	482	8,687
Coatepec	462	8,316
Álamo Temapache	376	6,781
Tuxpan	302	5,441
Otros	5,257	94,591
Total	**7,468**	**134,425**

Table 4. Indicators of honey in the city of Veracruz. Source: Statistical Yearbook of Veracruz www.sefiplan.gob.mx 2003

2.6 CHARACTERISTICS OF HONEY

Honey is defined as a viscous substance produced by bees from the nectar of flowers I collected stored and matured in the honeycombs.

Honey has different classifications for the market is classified as follows:

Extracted honey

Liquid honey

Crystallized honey

Comb honey or sections

Individual sections of comb honey

Cut comb honey

Chunk honey

Also by its color it is classified as follows:

White water

Extra white

White

Extra light amber

Light amber

Amber

Dark amber

2.6.1 TYPES OF HONEY

The types and qualities of honey depends on several features such as: heartburn, colloids, hygroscopicity, crystallization, color, density, etc., which vary according to the properties of existing flowering, in regions where bee colonies are located Honey producers. However, in terms of marketing Honey it is primarily classified by its color, which determines its quality.

As for taste and odor, clear honeys are very soft, not sharp and are used for the table. Dark honeys have pungent flavor and are widely used in industry or to mix with very clear honeys for flavor and odor, its price is lower in the domestic market and export.

2.6.2 PROPERTIES AND USES OF HONEY

Honey has numerous both therapeutic and nutritional properties. Some of the most representative, is characterized because has easily assimilated carbohydrates short chains.

Aids digestion and assimilation of other foods in the case of children facilitates the assimilation of calcium and magnesium. Has more sweetening power than sugar, it improves food preservation. It is mildly laxative (regulates bowel function).

It is used to treat pharyngitis, laryngitis, rhinitis, flu, minor depression, ulcers, gastritis, burns, among others. It is used to treat people suffering from asthenia or fatigue states and in the detoxification of alcoholics. It stimulates the formation of red blood cells due to the presence of folic acid. It stimulates the formation of antibodies due to ascorbic acid, magnesium, copper and zinc.

2.6.3 PRODUCTS FROM BEEKEEPING

Besides honey, other derivatives in Mexico occur hive, returning the Basic Beekeeping Manual prepared by the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food through the National Program for the Control of African Bee are removed the following concepts:

CERA: A product through bees wax glands produce between his 13th and 18th day of age. They use it to build the combs on which the queen deposited eggs and bees store honey and pollen. Also they take to seal the cells with larvae until birth. As the mature honey, raw material for producing wax is honey, and bees need to consume 6 to 7 kg of honey to produce 1 kg. Of wax. Used to make candles, oils and other products.

ROYAL JELLY: It consists of a substance that young bees secrete between the 4th and 12th day of age to feed the larvae during their first three days and queen throughout her life. The necessary raw materials for their manufacture are pollen, honey and water, which when consumed by bees become royal jelly by the action of the pharyngeal glands hiccups.

Royal jelly helps the longevity of Queen is longer than that of the workers, for the life of these is only 45 days from birth.

It is also considered as a dietary supplement because it contains vitamins, carbohydrates and amino acids that stimulate cell metabolism.

PROPOLIS: It is a resin that bees collect from the trunk of some trees. Propolis is a very important product for the hive, because through it the heat is kept secure and perfect hygiene.

Bees use it to isolate foreign bodies and animals that may decompose, cover cracks to keep the internal temperature of the hive, combs varnish and prevent infection of the baby.

Propolis is also a raw material for the cosmetics industry and for the production of high-quality coatings. In natural products they are used for making drugs against diseases of the respiratory tract, in the field of medicine and healing extracts of propolis, bactericide and fungicide used.

POISON: The venom (bee venom) of bees is a protein-based compound that workers injected to stick its sting; today is used directly or lyophilized form in alternative medicine.

2.7 producing bees

Hymenoptera origin. Bees are small arthropods that have a segmented body into three parts: prosoma, mesosoma and metasoma; in each of the segments, different structures of the body are articulated with specific functions.

Bees require protein and energy to survive, which are obtained from the nectar and pollen of plants; long man advantage this circumstance to extract reserves of honey and pollen from the hives, for use as a food source and specific sweeteners, which through research has demonstrated the diversity of benefits, which provide products Bees, for human consumption and as an alternate way to increase crop production through pollination.

2.7.1 Apis mellifera

European bee, also known as the domestic bee or honey bears the scientific name Apis mellifera. It is the bee species most widely distributed in the world. Native to Europe, Africa and parts of Asia, was introduced in America and Oceania. It was classified by Carolus Linnaeus in 1758. Since then numerous taxonomists described subspecies or geographic varieties which currently exceed 30 races.

Apis mellifera

Scientific classification

Kingdom:

Phylum: Arthropoda

Class: Insecta

Order: Hymenoptera

Suborder: Apocrita

Superfamily: Apoidea

Family: Apidae

Subfamily: Apinae

Tribe: Apini

Genre: Apis

Species: A. mellifera

2.7.2 melipona beecheii

Stingless bee Melipona melipona beecheii known as bee production has a very interesting niche with great potential diversification for the tropics.

The meliponas and were exploited by the Indians before the arrival of the conquistadors, which obtained honey and wax.

In Mexico the meliponas are located in coastal areas, from Yucatan to the center of Tamaulipas, and from Chiapas to the south of Sonora. Where there regularly inhabit mountain, ie wooded areas and ahuacales, mangroves and scrub, but also visit the plants grown in gardens. Bees pollinate sting without many plants, among which is vanilla.

Melipona beecheii

Scientific classification

Kingdom:

Phylum: Arthropoda

Class: Insecta

Order: Hymenoptera

Suborder: Apocrita

Superfamily: apoidea

Family: apidae

Gender: melipona

Species: M. beecheii

The meliponas store honey in their hives in much larger cells and fewer than those of the common bee. The bee melipona is a medium sized smaller than the common bee, with a body length of between 9.7 and 10.7 mm, gray in the chest and metosomales tergites black with yellow stripes, tergites with abundant pubescence, short, orange or yellow; the legs are brown and black.

Stingless bees nest cavities both available (holes in trees or walls, abandoned nests of other insects or assets), and exposed sites.

The entrance to the nest is very characteristic of each species can be from a straight tube to a hole where only be a bee.

The extraordinary thing about this genre is that queens are born continuously at a rate of one for every 3-7 workers, depending on the species. Each colony has a single queen laying but usually tolerate the presence of a number of virgin queens. In a colony of Melipona beecheii with a population estimated at 4,000 workers, they have counted up to 50 virgin queens living in harmony with the Queen Mother.

2.8 PEST AND DISEASE

Pests and diseases cause significant economic losses in Beekeeping anywhere in the world. The nest of bees is highly attractive to their enemies because of abundant food storage (honey, pollen, wax, eggs, larvae, pupae and adults). These are preferred by hundreds of different species from the smallest such as viruses and bacteria to large mammals.

Similar to other countries, in Mexico many bee colonies die each year due to the introduction and pests and diseases. The most important diseases affecting bees in Mexico include: American foulbrood (Paenibacillus larvae) and breeding of lime (Ascosphaera APIs). The most important pest of bees in Mexico is the mite Varroa destructor. In addition, potentially beekeeping in Mexico is threatened by the introduction of the small hive beetle (Aethina tumida). The beetle is present in USA where it has caused significant economic damage.

Bees are prey to many insects and birds. They have also become victims of the insecticides used to protect crops from destructive insects.

2.8.1 POLLUTION OF HONEY IN OTHER COUNTRIES

It is noteworthy that also bees can be contaminated by natural situations and out of reach of beekeepers, but take appropriate action, as is already considered one of the most important honey bees global threats, the Varroa mite, with an impact in all countries where it is established, this pathogen has caused losses of 30-50% of the colonies, first in Britain and then to other countries, where it has become an endemic problem in the loss of bees scale affects pollination of commercial crops and wild plants.

Mites have begun to develop resistance to chemical pesticides, which has led to the British experts, in collaboration with the Department of Environment, Food and Rural country (DEFRA) to develop other technology, this biological time, to control the parasite without having to resort to the chemical.

So far, research has begun with the analysis of 50 types of fungi that "afflict" other insects and aims to verify whether this effectiveness can be applied against the Varroa mite. All this without having a devastating impact on bees. 50 fungi, experts have come up with four other have shown some effectiveness, although the complexity of the internal system of hives makes this difficult.

Following this study a new challenge for the experts to develop new methods of analysis of HPLC and GC opens. While the sanitary control of avian diseases usually done through antibiotics, with the danger of contaminating the hives, the gamma radiation is a prophylactic non-destructive technique suitable for disease control. If infected hives are not cured against the mite, in one year, bees die. The V. destructor is considered one of the major global threats to honey bees.

In Argentina, most producers have implemented in recent years artisanal treatments that do not have the approval of the National Health Service and Food Quality (SENASA). This led to a lack of knowledge about the health conditions of the hives, no records exist about the effectiveness that have applied products.

Studies Laboratory of Entomology (CRICYT) on the effectiveness and use of the active ingredients as cimiazol, fluvalinate, flumethrin, bromopropylate. Some of the results obtained showed that flumethrin and fluvalinate, showed good efficacy, higher than those for the other two products. Another finding was the demonstration that the indiscriminate use of fluvalinate by the (commercial or artisanal) beekeepers are responsible for the decrease in effectiveness and presence in honey.

3. OBJECTIVES

3.1 GENERAL PURPOSE

Identify and determine organochlorine and organophosphate pesticide residues in honey from different sources.

3.2 SPECIFIC GOALS

Refine by qualitative methods presence of chlorinated pesticides and organophosphorus Honey Body of the municipalities of Esperanza, Puebla and Amatlan de los Reyes, Ver.

4. Hypothesis

According to the circumstances in which farmland and other activities in this sector are, we can imagine the large amount of pesticides that are introduced and applied excessively, which consequently affected mainly large ecosystems and food.

Regarding our study area we can predict, it is exposed to these factors, which is why we think about finding toxic residues of organochlorine and organophosphorus pesticides in the sampled honey.

Figure 7. Extractions trays with 5 samples in refrigeration.

6. RESULTS AND DISCUSSION

6.1 Qualitative analysis for chlorinated organic

Mexico has large producers and exporters of honey, but also with high levels of existing pollutants in our environment, due to the excessive use of pesticides, insecticides, herbicides, etc. our ecosystem has been severely damaged, even excluding large emissions of CO2, and others. Research on these damages do not stop, however, and although currently there are initiatives and projects of agriculture free of pesticides and / or organic insecticides, however slowly damages the health of planet deteriorate persist.

Although currently already they have international standards for permissible limits of pesticides in foods such as milk, fruits and vegetables, honey had been in the background. Now, more analysis is required and discarding these chemicals contaminated food, providing better quality and at the same time consumer confidence.

The qualitative analysis in the laboratory of Toxicology FACBA in the honey samples that were obtained from Amatlán de los Reyes, Ver. Likewise Esperanza, Puebla.

In both cases these samples are indirectly exposed honey crops are applied where large amounts of chemical fertilizers and fumigants.

The results according to all samples shown in the following table.

MUESTRAS		**Extracciones con n-Hexano**				**Extracciones con Benceno**		
	Plaguicidas	**Toxafeno**	**DDT**	**DDD Metoxicloro**	**Endrin o Clordano**	**DDD/DDT**	**Heptacloro**	**Heptacloro presencia OCs**
Muestra 1	*Repetición 1*	**Positivo**	**Negro/caramelizado**	**Negativo/caramelizado**	**Negativo**	**Positivo**	**Negativo**	**Negativo**
	Repetición 2	**Positivo**	**Positivo**	**Negativo/caramelizado**	**Negativo**	**Negativo**	**Negativo**	**Negativo**
	Repetición 3	**Negativo**	**Positivo**	**Positivo**	**Negativo**	**Positivo**	**Negativo**	**Negativo**
Muestra 2	*Repetición 1*	**Positivo**	**Positivo**	**Positivo**	**Negativo**	**Positivo**	**Negativo**	**Negativo**
	Repetición 2	**Positivo**	**Positivo**	**Positivo**	**Negativo**	**Negativo**	**Negativo**	**Negativo**
	Repetición 3	**Negativo**	**Negro/caramelizado**	**Positivo**	**Negativo**	**Positivo**	**Negativo**	**Negativo**
Muestra 3	*Repetición 1*	**Positivo**	**Positivo**	**Negativo/caramelizado**	**Negativo**	**Negativo**	**Negativo**	**Negativo**
	Repetición 2	**Positivo**	**Positivo**	**Positivo**	**Negativo**	**Positivo**	**Negativo**	**Negativo**
	Repetición 3	**Positivo**	**Positivo**	**Positivo**	**Negativo**	**Positivo**	**Negativo**	**Negativo**
Muestra 4	*Repetición 1*	**Positivo**	**Positivo**	**Positivo**	**Negativo**	**Positivo**	**Negativo**	**Negativo**
	Repetición 2	**Positivo**	**Positivo**	**Positivo**	**Negativo**	**Positivo**	**Negativo**	**Negativo**
	Repetición 3	**Positivo**	**Positivo**	**Positivo**	**Negativo**	**Positivo**	**Negativo**	**Negativo**
Muestra 5	*Repetición 1*	**Positivo**	**Positivo**	**Negativo ***	**Negativo**	**Positivo**	**Negativo**	**Negativo**

	Repetición 2	**Positivo**	**Positivo**	**Negativo ***	**Negativo**	**Positivo**	**Negativo**	**Negativo**
	Repetición 3	**Positivo**	**Positivo**	**Negativo ***	**Negativo**	**Positivo**	**Negativo**	**Negativo**

Table 6. Table of Results

Qualitative determination of pesticide residues in honey from Amatlan de los Reyes y Esperanza, Puebla.

Sample 1: Esperanza, Puebla.

Sample 2: Amatlan de los Reyes, Ver.

Sample 3: Puebla, Puebla.

Sample 4: Amatlan de los Reyes, Ver.

Sample 5: Miel Carlota (commercial).

The pollution caused by the various forestry and agricultural activities comes great environmental and food problem as in this case for honey producers, because for them is a devalued quality and produced economic losses. The risks of excessive use of certain pesticides, fertilizers and other chemicals applied to crops have been not only on climate change, damage and death of species, river pollution and health problems, but mainly in the food industry.

The results shown in Table 00, we observe the presence of DDT mostly remember that the sample which was not detected, probably could have but a low concentration of this chemical or other alteration.

Whether it was with the extraction of benzene or n-hexane the results are worrying thrown to indicate the presence of this chemical banned nearly 40 years ago by the Environmental Protection Agency's (EPA) and as restricted in many countries.

Table 7. Results and impact of organochlorine pesticides DDT with extractions of Benzene and n-hexane.

		EXTRACCIÓN CON N-HEXANO	**EXTRACCIÓN CON BENCENO**
Plaguicidas		**DDT**	**DDD / DDT**
Muestra 1	Repetición 1	**Negro/caramelizado**	**Positivo**
	Repetición 2	**Positivo**	**Negativo**
	Repetición 3	**Positivo**	**Positivo**
Muestra 2	Repetición 1	**Positivo**	**Positivo**
	Repetición 2	**Positivo**	**Negativo**
	Repetición 3	**Negro/caramelizado**	**Positivo**
Muestra 3	Repetición 1	**Positivo**	**Negativo**
	Repetición 2	**Positivo**	**Positivo**

	Repetición 3	**Positivo**	**Positivo**
Muestra 4	Repetición 1	**Positivo**	**Positivo**
	Repetición 2	**Positivo**	**Positivo**
	Repetición 3	**Positivo**	**Positivo**
Muestra 5	Repetición 1	**Positivo**	**Positivo**
	Repetición 2	**Positivo**	**Positivo**
	Repetición 3	**Positivo**	**Positivo**
Positivos Detectados:		**13/15**	**12/15**

Another pesticide found was DDD / methoxychlor a manufactured chemical that does not occur naturally in the environment.

It is widely used as an insecticide against flies, mosquitoes, cockroaches, mites and larvae of many insects, commonly used in agricultural crops and livestock, gardens and pets.

That is why the incidence of this insecticide not only honey but other food products such as milk, vegetables and fruits exposed directly or indirectly toxic, methoxychlor is broken down slowly in air, soil, water and other microscopic organisms can It takes several months.

Table 8. Results and impact of organochlorine pesticides DDD / methoxychlor with extractions of n-Hexano

Muestras		**EXTRACCIÓN CON N-HEXANO**
		DDD / Metoxicloro
Muestra 1	Repetición 1	**Negativo / caramelizado**
	Repetición 2	**Negativo / caramelizado**
	Repetición 3	**Positivo**

Muestra 2	Repetición 1	**Positivo**
	Repetición 2	**Positivo**
	Repetición 3	**Positivo**
Muestra 3	Repetición 1	**Negativo / caramelizado**
	Repetición 2	**Positivo**
	Repetición 3	**Positivo**
Muestra 4	Repetición 1	**Positivo**
	Repetición 2	**Positivo**
	Repetición 3	**Positivo**
Muestra 5	Repetición 1	**Negativo***
	Repetición 2	**Negativo***
	Repetición 3	**Negativo***
Positivos Detectados:		**9/15**

Positive: change reaction and bright red at 3 sec.

*** Negative: change reaction and red burned at 8 sec.**

Toxaphene is a mixture of hundreds of different chlorinated compounds, widely used in a while but all uses were banned in 1990, it is used to control insects on cotton and other. In the United States was where he initially was banned, but currently amounts of toxaphene found in rivers, lakes and in fatty tissues of animals such as fish and mammals.

Large global organizations such as the Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC) and the EPA have determined that toxaphene is probably carcinogenic to humans.

Table 9. Results and impact of organochlorine pesticides endrin or toxaphene and chlordane with n-Hexane extractions

Muestras		**Extracciones con n-Hexano**	
		Toxafeno	**Endrin o Clordano**
Muestra 1	Repetición 1	**Positivo**	**Negativo**
	Repetición 2	**Positivo**	**Negativo**
	Repetición 3	**Negativo**	**Negativo**
Muestra 2	Repetición 1	**Positivo**	**Negativo**
	Repetición 2	**Positivo**	**Negativo**
	Repetición 3	**Negativo**	**Negativo**
Muestra 3	Repetición 1	**Positivo**	**Negativo**
	Repetición 2	**Positivo**	**Negativo**
	Repetición 3	**Positivo**	**Negativo**
Muestra 4	Repetición 1	**Positivo**	**Negativo**
	Repetición 2	**Positivo**	**Negativo**
	Repetición 3	**Positivo**	**Negativo**
Muestra 5	Repetición 1	**Positivo**	**Negativo**
	Repetición 2	**Positivo**	**Negativo**
	Repetición 3	**Positivo**	**Negativo**
Positivos detectados:		**13/15**	**0/15**

Tests endrin and chlordane, very harmful and severe substance health significantly affecting injuries to the central nervous system have symptoms such as headache, nausea and vomiting, either ingested or be exposed to very great cause amounts convulsions and death were also conducted in minutes or hours.

Although it was banned and restricted its use from 80, many scientific papers even suggest the persistence of residues that left years before their applications.

Undoubtedly, the aim of this work is to ensure the possible contaminants that may exist in our samples, but got negative results both with and Endrin Chlordane respectively.

Finally the qualitative determination of heptachlor and heptachlor in the presence of OCs was done. Heptachlor was banned under the Rotterdam Convention (2004) in all its formulations to be highly harmful to health and the environment.

Table 10. Results and impact of organochlorine pesticide heptachlor and heptachlor in the presence of OCs with extractions of Benzene.

Muestras		Extracciones con Benceno	
		Heptacloro	**Heptacloro en presencia de Ocs**
Muestra1	Repetición 1	**Negativo**	**Negativo**
	Repetición 2	**Negativo**	**Negativo**
	Repetición 3	**Negativo**	**Negativo**
Muestra 2	Repetición 1	**Negativo**	**Negativo**
	Repetición 2	**Negativo**	**Negativo**
	Repetición 3	**Negativo**	**Negativo**
Muestra 3	Repetición 1	**Negativo**	**Negativo**
	Repetición 2	**Negativo**	**Negativo**
	Repetición 3	**Negativo**	**Negativo**
Muestra 4	Repetición 1	**Negativo**	**Negativo**
	Repetición 2	**Negativo**	**Negativo**
	Repetición 3	**Negativo**	**Negativo**

Muestra 5	Repetición 1	**Negativo**	**Negativo**
	Repetición 2	**Negativo**	**Negativo**
	Repetición 3	**Negativo**	**Negativo**
Positivos Detectados:		**0/15**	**0/15**

The results were negative

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