

Fire in Ankleshwar Noble Market



On March 6, a plastic godown in Legal Market near Noble Market caught fire around evening. Firefighters of DPMC used water cannon on the fire and brought it under control.

Major fire at auto parts factory in Gurugram



A major fire broke out in an auto parts manufacturing unit in Gurugram's Binola village on Saturday morning.

Turkey coal mine explosion



At least 40 workers are dead in a coal mine explosion in Turkey.

CoE ACTIVITIES

Post Graduate Diploma in Process Safety

Safety Training for School Students

The Centre of Excellence (COE) at Shroff S. R. Rotary Institute of Chemical Technology (SRICT) Ankleshwar organized work place and Life Safety training program for the school students of CM Academy, Vidya Mandir, Chanakya School, Glorious International School, Shravan School and Sewa Rural studetns. In all total 2700 students had actively participated in this awareness training program.



LPG cylinder explosion in Rohtak



Seven family members were seriously injured when an LPG cylinder exploded in Haryana's Rohtak on Wednesday.

Kerch Bridge explosion



A massive blast shook the Kerch Bridge, Crimea, early Saturday, local time. Shocking images of burnt rails and collapsed roads have been circulating everywhere.

Fire broke out in an industrial trial unit in Umargam



SURAT: A fire broke out in an industrial unit in Umargan GIDC of valsad on Saturday.

Fire and Safety Training at Deepak Nitrite Ltd. Dahej

Employees of the Deepak Nitrite Ltd. Dahej received fire and safety training from CoE on March 25, 2023.

Total 53 employee had actively participated in this training program.



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Massive fire breaks out at chemical company in Vapi



Vapi: A massive fire breaks out at a chemical company in Gujarat's Vapi district on Tuesday.



Fire broke out at chemical company in Valsad



Valsad: A massive fire out at a chemical company in Gujarat Industrial Development corporation in Vapi area of valsad district.

CHOLINESTERASE INHIBITION

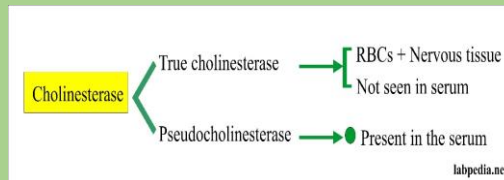


Mr. Jayesh Gol
OHS Head, UPL Anklshwar

➤ **WHAT IS CHOLINESTERASE?**

Cholinesterase (ko-li-nes-ter-ace) is one of many important enzymes needed for the proper functioning of the nervous systems of humans, other vertebrates, and insects. Certain chemical classes of pesticides, such as organophosphates (OPs) and carbamates (CMs) work against undesirable bugs by interfering with, or 'inhibiting' cholinesterase. While the effects of cholinesterase inhibiting products are intended for insect pests, these chemicals can also be poisonous, or toxic, to humans in some situations.

Human exposure to cholinesterase inhibiting chemicals can result from inhalation, ingestion, or eye or skin contact during the manufacture, mixing, or applications of these pesticides.



➤ **HOW DOES IT WORK?**

Electrical switching centers, called 'synapses' are found throughout the nervous systems of humans, other vertebrates, and insects. Muscles, glands, and nerve fibers called 'neurons' are stimulated or inhibited by the constant firing of signals across these synapses. Stimulating signals are usually carried by a chemical called 'acetylcholine' (a-see-till-ko-leen).

Stimulating signals are discontinued by a specific type of cholinesterase enzyme, acetylcholinesterase, which breaks down the acetylcholine

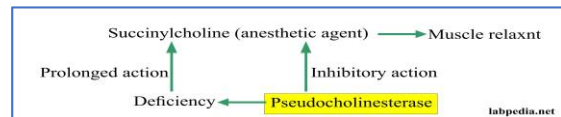
These important chemical reactions are usually going on all the time at a very fast rate, with acetylcholine causing stimulation and acetylcholinesterase ending the signal.

If cholinesterase- affecting insecticides are present in the synapses, however, this situation is thrown out of balance. The presence of cholinesterase inhibiting chemicals prevents the breakdown of acetylcholine. Acetylcholine can then build up, causing a "jam" in the nervous system. Thus, when a person receives to great an exposure to cholinesterase inhibiting compounds, the body is unable to break down the acetylcholine.

Let us look at a typical synapse in the body's nervous system, in which a muscle is being directed by a nerve to move. An electrical signal, or nerve impulse, is conducted by acetylcholine across the junction between the nerve and the muscle (the synapse) stimulating the muscle to move.

Normally, after the appropriate response is accomplished, cholinesterase 2 is released which breaks down the acetylcholine terminating the stimulation of the muscle. The enzyme acetylcholine accomplishes this by chemically breaking the compound into other compounds and removing them from the nerve junction. If acetylcholinesterase is unable to breakdown or remove acetylcholine, the muscle can continue to move uncontrollably.

Electrical impulses can fire away continuously unless the number of messages being sent through the synapse is limited by the action of cholinesterase. Repeated and unchecked firing of electrical signals can cause uncontrolled, rapid twitching of some muscles, paralyzed breathing, convulsions, and in extreme cases, death. This is summarized below.



Exposure to:

- carbamates
- organophosphates
- chlorinated derivatives of nicotine

May result in:

- build-up of acetylcholine
- cholinesterase inhibition
- constant firing of electrical messages
- potential symptoms of: twitching, trembling, paralyzed breathing, convulsions, and in extreme cases, death.

➤ WHICH PESTICIDES CAN INHIBIT CHOLINESTERASE?

Any pesticide that can bind, or inhibit, cholinesterase, making it unable to breakdown acetylcholine, is called a "cholinesterase inhibitor," or "anticholinesterase agent." The two main classes of cholinesterase inhibiting pesticides are the organophosphates (OPs) and the carbamates (CMs). Some newer chemicals, such as the chlorinated derivatives of nicotine can also affect the cholinesterase enzyme.

Organophosphate insecticides include some of the most toxic pesticides. They can enter the human body through skin absorption, inhalation and ingestion. They can affect cholinesterase activity in both red blood cells and in blood plasma, and can act directly, or in combination with other enzymes, on cholinesterase in the body. The following list includes some of the most commonly used OPs:

Acephate, Aspon, azinphos-methyl, carbofuran, carbophenothion, chlordane, chlorfenvinphos, chlorpyrifos, coumaphos, crotoxyphos, crufomate, demeton, diazinon, dichlorvos, dicrotophos, dimethoate, dioxathion, disulfoton, EPN, ethion, ethoprop, famphur, fenamiphos, fenitrothion, fensulfothion, fenthion, fonofos, isofenfos, malathion

Methamidophos, methidathion, methyl parathion, mevinphos, monocrotophos, naled, oxydemeton-methyl, parathion, phorate, phosalone, phosmet, phosphamidon, temephos, TEPP, Terbufos, tetrachlorvinphos, trichlorfon, etc.

Carbamates, like organophosphates, vary widely in toxicity and work by inhibiting plasma cholinesterase. Some examples of carbamates are listed below:

Aldicarb, bendiocarb, bufencarb, carbaryl, carbofuran, formetanate, methiocarb, methomyl, oxamyl, pinmicarb, propoxur, etc.

➤ WHAT HAPPENS AS A RESULT OF OVEREXPOSURE TO CHOLINESTERASE INHIBITING PESTICIDES?

Overexposure to organophosphate and carbamate insecticides can result in cholinesterase inhibition. These pesticides combine with acetylcholinesterase at nerve endings in the brain and nervous system, and with other types of cholinesterase found in the blood. This allows acetylcholine to build up, while protective levels of the cholinesterase enzyme decrease. The more cholinesterase levels decrease, the more likely symptoms of poisoning from cholinesterase inhibiting pesticides are to show.

Signs and symptoms of cholinesterase inhibition from exposure to CMs or OPs include the following:

- In mild cases (within 4 - 24 hours of contact): tiredness, weakness, dizziness, nausea and blurred vision;
- In moderate cases (within 4 - 24 hours of contact): headache, sweating, tearing, drooling, vomiting, tunnel vision, and twitching;
- In severe cases (after continued daily absorption): abdominal cramps, urinating, diarrhea, muscular tremors, staggering gait, pinpoint pupils, hypotension (abnormally low blood pressure), slow heartbeat, breathing difficulty, and possibly death, if not promptly treated by a physician.

Unfortunately, some of the above symptoms can be confused with influenza (flu), heat prostration, alcohol intoxication, exhaustion, hypoglycemia (low blood sugar), asthma, gastroenteritis, pneumonia, and brain hemorrhage. This can cause problems if the symptoms overlooked.

cholinesterase levels are either ignored or misdiagnosed as something more or less harmful than they really are.

The types and severity of cholinesterase inhibition symptoms depend on:

- the toxicity of the pesticide.
- the amount of pesticide involved in the exposure.
- the route of exposure.
- the duration of exposure.

Fire broke out at chemical company in vadodara



A massive fire broke out at a chemical factory near padra village in Vadodara, Gujarat on 5th March, 2023. At least four firefighters were rushed to the spot to douse of flames.

Major blaze in east Delhi market

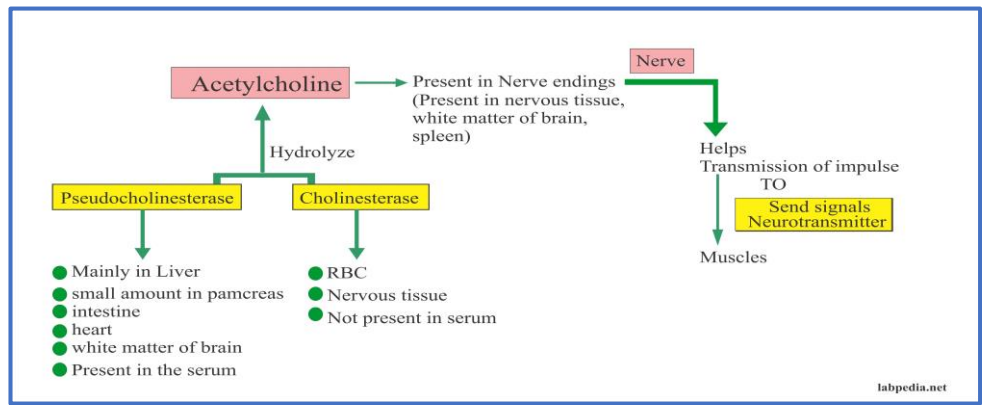


A major fire broke out at Gandhi Nagar Market in east delhi here on Wednesday evening, officials said.

Fire breaks out at Tesla Gigafactory Berlin



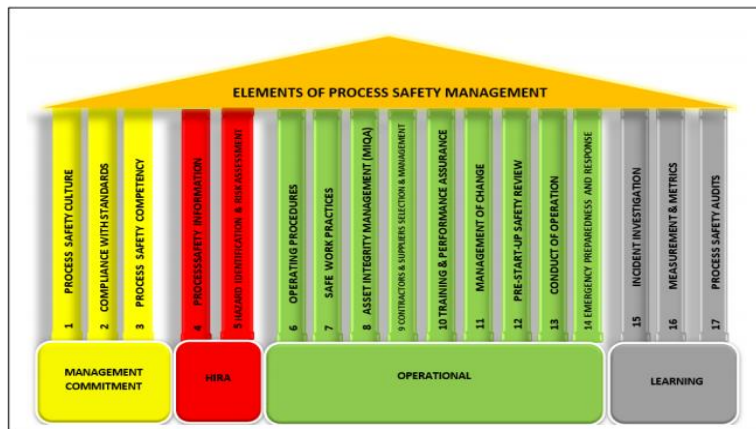
A major fire broke out at the Tesla Gigafactory Berlin after a significant pile of cardboard and wood caught fire in the factory's recycling facility.



➤ WHY MONITOR CHOLINESTERASE?

Anyone exposed to cholinesterase-affected pesticides can develop lowered cholinesterase levels. The purpose of regular checking of cholinesterase levels is to alert the exposed person to any change in the level of this essential enzyme before it can cause serious illness. Ideally, a pre-exposure baseline cholinesterase value should be established for any individual before they come in regular contact with organophosphates and carbamates. Fortunately, the breakdown of cholinesterase can be reversed and cholinesterase levels will return to normal if pesticide exposure is stopped.

ELEMENTS OF PROCESS SAFETY MANAGEMENT



In the 1st Issue of SAFEXCELLENCE, SRICT CoE has selected above mentioned 17 process safety elements and based on these elements and published literature, an attempt is made to analyze the disasters taken place during the month for the probable cause/s. SAFEXCELLENCE team points out the missing process safety element/s in the events that happened.

Accidents	Missing PSM elements																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Narmada Plastic, Bharuch	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Meghmani Organics Ltd. Panoli	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Turkey Coal Mine Explosion	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Major Fire at Auto part Factory	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Explosion at Maha Power Plant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Tesla Giga Factory Berlin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Dr. Ravindra Kanawade
Asso. Professor, UPL University

For More
information About
Total Safety
Solution Model,
Contact Us



(Scan QR Code)

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