# CONTRIBUTION OF FIREWORKS TO ENVIRONMENTAL POLLUTION

**BY-**

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ABSTRACT:-

This article analyzed the contribution of fireworks to environment pollution.Fireworks can unleash a shower of toxins into soil and water, and scientists are only beginning to figure out what that means for human health.It also analyze different types of fireworks containing different types of harmful substances for air,soil,water and humans.Fireworks contains Perchlorates , particulates and metallic compounds.

KEYWORDS-
Fireworks, Perchlorates and particulates, Metallic compounds, Strontium (red), Aluminum (white), Copper (blue), Barium (green), Rubidium (purple), Cadmium (various),

INTRODUCTION;-

Fireworks are low explosive pyrotechnic devices used for entertainment and aesthetic purposes. Mostly the firework devices are used to display their effects in firework events. Especially in marriage or any special occasion like New Year celebration, fireworks are used for entertainment purpose. You can also see fireworks competition regularly held at number of places. These fireworks have bad impact on environment and human health.

Fireworks can unleash a shower of toxins into soil and water, and scientists are only beginning to figure out what that means for human health.Depending on the effect sought, fireworks produce smoke and dust that contain various heavy metals, sulfur-coal compounds and other noxious chemicals. Barium, for instance, is used to produce brilliant green colors in fireworks displays, despite being poisonous and radioactive. Copper compounds are used to produce blue colors, even though they contain dioxin, which has been linked to cancer. Cadmium, lithium, antimony,

rubidium, strontium, lead and potassium nitrate are also commonly used to produce different effects, even though they can cause a host of respiratory and other health problems.

The rockets' red glare during a fireworks show can fill onlookers with celebration and awe. Unfortunately, it can also fill them with particulates and aluminum.

Fireworks get their flamboyance from a variety of chemicals, many of which are toxic to humans. From the gunpowder that fuels their flight to the metallic compounds that color their explosions, fireworks often contain carcinogenic or hormone-disrupting substances that can seep into soil and water, not to mention the lung-clogging smoke they release and plastic debris they scatter.

But fireworks shows are woven into the fabric of the INDIA — they were popular in the society — and it's not like they happen every day. Is an occasional peppering of perchlorates really a big deal compared with all the industrial pollution Indian waterways have been dealt over the years?

Maybe not, but it's still not entirely clear how fireworks affect environmental or human health. While they haven't been linked to any widespread outbreaks of disease, it's not always easy to pin down why someone developed hypothyroidism, anemia or cancer.

What we do know is that, although they're fleeting and infrequent, fireworks shows spray out a toxic concoction that rains down quietly into lakes, rivers and bays throughout the country. Many of the chemicals in fireworks are also persistent in the environment, meaning they stubbornly sit there instead of breaking down. That's how mercury from coal emissions winds up in fish, and it's how DDT thinned bald eagles' eggshells in the '70s. There's scant evidence that fireworks are having similar effects, but the possibility has been enough to raise concern in many communities.

Here's a look at what's in fireworks, how they might affect people,

**Perchlorates and particulates**

For fireworks and other pyrotechnics to blow up, they need to blow up *something* — usually a blend of charcoal and sulfur fuel. They also need an ingredient that can inject oxygen to speed up the explosion, historically relying on potassium nitrate. These three chemicals are mixed together into a sooty substance known as gunpowder.

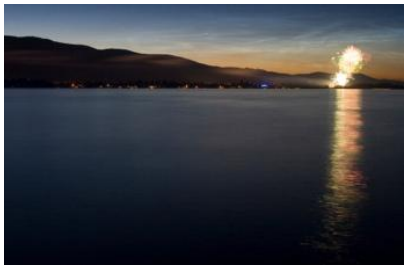
When a spark hits gunpowder, the potassium nitrate feeds oxygen to the fire, helping it quickly burn the charcoal-sulfur fuel. This produces volumes of hot, rapidly expanding solids

and gases that can be used to fire a bullet, explode an artillery shell or launch a Roman candle.

The original blends of black powder can be a bit too unstable and messy for some uses, though, so the potassium nitrate is often replaced by perchlorates, a family of chemicals all featuring a central chlorine atom bonded by four oxygen atoms. Two types in particular — potassium perchlorate and ammonium perchlorate — have become the go-to oxidizers of the pyrotechnics industry.

Perchlorates may have introduced a new problem, though: In high enough doses, they limit the human thyroid gland's ability to take iodine from the bloodstream, potentially resulting in hypothyroidism. The thyroid needs iodine to make hormones that control a variety of body functions, and people running too low on these hormones can develop a wide range of disorders. Children, infants and especially fetuses suffer the worst from hypothyroidism, since thyroid hormones are crucial for normal growth. Perchlorates have also been shown to cause thyroid cancer in rats and mice, but scientists believe humans are less vulnerable to this effect.

Low doses of perchlorates don't seem to hurt healthy adults — volunteers who took 35 milligrams for 14 days or 3 milligrams for six months showed no thyroid-related problems, and studies of workers exposed to similar amounts for years also failed to uncover any major side effects. Plus, perchlorate advocates often point out that it should theoretically all be incinerated in the sky before any can fall down to contaminate the ground.



But a 2007 study of an Oklahoma lake following fireworks displays overhead found that perchlorate levels spiked more than 1,000 times above the baseline level for 14 hours after a show. While the maximum concentration detected was 44.2 micrograms — less than 1 milligram — per liter, the study was still the most concrete evidence yet that fireworks release perchlorates into waterways.

The smoke from fireworks' burned charcoal and sulfur fuel also contains particulate matter that can get lodged in people's lungs, an immediate danger for those with asthma or chemical sensitivities. Prolonged exposure to similar airborne particles from diesel exhaust has also been shown to cause lung cancer. Air-quality monitors reportedly spike for about three hours after a fireworks show.

One positive of both perchlorates and particulates is that they most likely don't pose a long-term threat. Particulates fade away after a few hours, and perchlorates dissipate days or weeks after

being released. Unfortunately, the same can't be said about some other chemicals that help light up the sky.

**Metallic compounds**

In addition to gunpowder, fireworks are packed with heavy metals and other toxins that produce their sparkling shower of colors. Like perchlorates, the exact effect of fireworks' heavy-metal fallout is still mainly a mystery, but scientists do know that the metals themselves can wreak havoc in the human body.

• **Strontium (red):** This soft, silvery-yellow metal turns red when it burns, is extremely reactive with both air and water, and can be radioactive. Some strontium compounds dissolve in water, and others move deep into soil and groundwater; radioactive strontium has a half-life of 29 years. While low levels of stable and radioactive strontium haven't been shown to affect human health, they both can be dangerous at high doses. Radioactive strontium can damage bone marrow, cause anemia and prevent blood from clotting correctly, and lab studies have shown it can lead to birth defects in animals. Stable strontium is mainly a threat to children because it can impair their bone growth.

• **Aluminum (white):** Since aluminum is the most abundant metal in Earth's crust — and one of humanity's most widely used — avoiding exposure is almost impossible. Virtually all food, water, air and soil contain some amount of aluminum — the average adult eats about 7 to 9 milligrams of the silvery-white metal every day in food. It's generally safe at these levels, but it can affect the brain and lungs at higher concentrations. People and animals exposed to large amounts of aluminum have performed poorly on mental and physical tests, and some studies suggest aluminum exposure may lead to Alzheimer's disease, although that connection has yet to be proven.

• **Copper (blue):** Fireworks' blue hues are produced by copper compounds. These aren't very toxic on their own, but the copper jump-starts the formation of dioxins when perchlorates in the fireworks burn. Dioxins are vicious chemicals that don't occur naturally and aren't intentionally produced anywhere; they only exist as unwelcome byproducts of certain chemical reactions, one of which happens in blue fireworks. The most noted health effect of dioxin exposure is chloracne,

a severe skin disease with acne-like lesions mostly on the face and upper body. Dioxin doesn't stop there, though — the World Health Organization has identified it as a human carcinogen, and it's also been shown to disrupt hormone production and glucose metabolism.

• **Barium (green):** Fish and other aquatic organisms can accumulate barium, which means it can move up the food chain. The silvery-white metal naturally bonds with other elements to form a variety of compounds that all have different effects — none are known to be carcinogenic, but they can cause gastrointestinal problems and muscular weakness when exposure exceeds EPA drinking water standards. Symptoms may include vomiting, diarrhea, breathing trouble, changes in blood pressure, numbness around the face, general muscle weakness and cramps. High levels of barium exposure can lead to changes in heart rhythm, paralysis or death.

• **Rubidium (purple):** This soft, silvery metal is one of the most abundant elements on Earth. It burns purple, melts to a liquid at 104 degrees Fahrenheit and is highly reactive with water, capable of igniting fires even far below the freezing point. It hasn't been reported to cause any major environmental damage, but it can cause skin irritation since it's so reactive with moisture, and it's moderately toxic when ingested, reportedly able to replace calcium in bones (PDF).

• **Cadmium (various):** Used to produce a wide range of fireworks colors, this mineral is also a known human carcinogen. Breathing high levels of cadmium can seriously damage the lungs, and consuming it can fluster the stomach, often resulting in vomiting and diarrhea. Long-term exposure can lead to kidney disease, lung damage and fragile bones. Plants, fish and other animals take up cadmium from the environment, meaning that any released into waterways from a fireworks show can be passed up the food chain.

So, fireworks have so many adverse affects on environment and are responsible for many types of pollution. It is our duty to preserve our environment so should avoid use of fireworks as possible. There are so many other means of entertainment which not cause pollution so government also take measures to stop use of fireworks and encouraging people to use other means of entertainment.