

# What is polonium, and how deadly is it?

by Jill Lawless and Maria Cheng, The Associated Press

Swiss scientists say they've found evidence that Palestinian leader Yasser Arafat may have been poisoned with polonium. The deadly radioactive element first hit the headlines when it was used to kill KGB agent-turned-Kremlin critic Alexander Litvinenko in London in 2006.

Arafat died under mysterious circumstances at a French military hospital in 2004. Scientists at Switzerland's Institute of Radiation Physics, who examined soil and bone samples from Arafat's grave, said their results "moderately support" the theory Arafat was poisoned with polonium. Other scientists say the results are suggestive but do not provide definitive proof that Arafat was poisoned.

Here are some facts about polonium.

## What is polonium?

Polonium-210 is one of the world's rarest elements, discovered in 1898 by scientists Marie and Pierre Curie and named in honor of her country of origin, Poland. It occurs naturally in very low concentrations in the Earth's crust and also is produced artificially in nuclear reactors. In small amounts, it has legitimate industrial uses, mainly in devices to eliminate static electricity. Polonium is not naturally found in the human body.

## How dangerous is it?

Very. If ingested, it is lethal in extremely small doses. A minuscule amount of the silver powder is sufficient to kill. British radiation experts say once polonium-210 enters the bloodstream, its deadly effects are nearly impossible to stop.

## How can it poison people?

People can be poisoned with polonium if they eat or drink food contaminated with it, breathe contaminated air or it enters the body through an open wound. Litvinenko apparently drank tea laced with polonium during a meeting at a London hotel.

## What are the symptoms of polonium poisoning?

A poisoning victim experiences multiple organ failure as alpha radiation particles bombard the liver, kidneys and bone marrow from within. Symptoms including nausea, hair loss and throat swelling.

## Where does it come from?

Polonium can be a byproduct of the chemical processing of uranium, but usually it's made artificially in a nuclear reactor or a particle accelerator. John Croft, a retired British radiation expert who worked on the Litvinenko case, said a dose large enough to kill would likely have to come from a government with either civilian or military nuclear capabilities. That category includes Russia — producer of the

polonium believed to have killed Litvinenko — and Arafat's foe, Israel. But it also includes the U.S and dozens of other nations.

### **Can the radiation be detected?**

Polonium's large alpha particles of radiation do not penetrate the skin and don't set off radiation detectors, so it is relatively easy to smuggle across international borders.

### **Who has died from it?**

In addition to Litvinenko's presumed death from polonium poisoning, some speculate that the Curies' daughter Irene, who died of leukemia, may have developed the disease after accidentally being exposed to polonium in the laboratory. Israeli author Michal Karpin has claimed the cancer deaths of several Israeli scientists were the result of a polonium leak at the Weizmann Institute of Science in 1957. Israeli officials have never acknowledged a connection.

### **Can scientists prove that Arafat was poisoned?**

Swiss scientists say Arafat had symptoms commonly linked to radiation poisoning, including nausea, vomiting, diarrhea and liver and kidney failure — but not two other classic symptoms, hair loss and a weaker immune system. In fact, there have been so few cases of known polonium poisoning that scientists don't know very much about its exact symptoms.

The scientists also noted their tests faced several limitations. They had to perform their analyses on very small specimens — such as a single hair shaft or traces of blood and urine. Those tests were also conducted eight years after Arafat's death, so there may have been problems with chemical degradation.

Derek Hill, a radiation expert at University College London, said if there was enough polonium left in the samples, it might be possible to trace where the element came from. That could provide more clues about whether Arafat was poisoned.

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