



**Pesticide
Action
Network**
Europe

Endosulfan

Fact Sheet

Persistent organic pollutant

Endosulfan is a 'persistent organic pollutant' (POP) as defined under the Stockholm Convention: it is persistent in the environment, bioaccumulative, demonstrates long range environmental transport, and causes adverse effects to human health and the environment. Endosulfan is listed as a POP in the Convention on Long-range Transboundary Air Pollution (LRTAP), and is recognised as a Persistent Toxic Substance by the United Nations Environment Programme.

Yesterday's pesticide

First registered for use in 1954, endosulfan is a broad spectrum organochlorine insecticide. Following international recognition of their long term negative impacts on the global environment, organochlorines, including DDT, chlordane and HCH, have been largely eliminated from use in global agriculture. Endosulfan remains the major exception and is still widely applied to crops – particularly in the developing world.

Widespread contamination

Due to its potential to evaporate and travel long distances in the atmosphere, endosulfan has become one of world's most widespread pollutants. Endosulfan is now found extensively in global water resources, soils, air, rainfall, snow and ice deposits and oceans, including in remote ecosystems such as the Arctic, Antarctic, Great Lakes, Canadian Rockies, Costa Rican rainforests, Alps, and Himalayas.

In human breast milk

Endosulfan is a widespread contaminant of human breast milk and has been found in samples from women in Egypt, Madagascar, South Africa, El Salvador, Kazakhstan, India, Indonesia, Pakistan, Spain, Colombia, Nicaragua, Sub-Saharan Africa, Denmark and Finland, and in umbilical cord blood samples in Denmark, Finland, Spain, USA, Japan. A survey of women in Denmark and Finland found endosulfan in all samples of breast milk (total = 280) and in all placental samples (total = 130). Neither country has ever recorded heavy use of endosulfan.

Threats to wildlife

According to the European Union "endosulfan is very toxic to nearly all kinds of organisms".¹ Levels in the environment are frequently high enough to impact on wildlife. According to the US EPA, "Monitoring data and incident reports confirm that endosulfan is moving through aquatic and terrestrial food chains and that its use has resulted in adverse effects on the environment adjacent to and distant from its registered use sites".² Endosulfan is detected in the tissues of animals worldwide, including polar bears, antelope, crocodiles, Minke whales, and African vultures.

Arctic contamination

Arctic concentrations of other organochlorine pesticides, such as DDT, chlordane, and HCH, are now falling. Yet levels of endosulfan remain high. A 2005 study showed a 3-fold increase in the concentration of endosulfan in the blubber of Beluga whales. Arctic fish species show a similar trend. According to the US EPA: "Based on

the detection of endosulfan in areas distant from use sites, such as the Arctic, and its potential to persist and bioaccumulate, the [US EPA] Agency has concerns for dietary exposure of indigenous peoples to endosulfan.”³

Unsafe to users

According to the US EPA, endosulfan presents “short- and intermediate-term risks for mixers, loaders, and applicators for the majority of uses, even with maximum Personal Protective Equipment and engineering controls”.⁴ Mandatory safety equipment in the US includes chemical resistant footwear, chemical resistant gloves, chemical resistant head gear and a respirator. A survey of endosulfan sprayers working in Spain found 100% (total = 220) had traces of the insecticide in their blood.

Widespread poisonings

Endosulfan is one of the most frequently reported causes of unintentional poisoning,⁵ particularly in Asia, Latin America, and West Africa. Most cases occur as a result of occupational exposure. Poisoning incidents, including fatalities, are documented in Benin, Colombia, Costa Rica, Guatemala, India, Indonesia, Malaysia, Philippines, Mali, New Zealand, Senegal, South Africa, Sri Lanka, Togo, Turkey and USA.

Impacts on health

Acute endosulfan poisoning can cause convulsions, psychiatric disturbances, epilepsy, paralysis, brain oedema, impaired memory and death. Long term exposure is linked to immunosuppression, neurological disorders, congenital birth defects, chromosomal abnormalities, mental retardation, impaired learning and memory loss.

Food contamination

Endosulfan is an abundant food contaminant globally and is present in a wide range of fruits and vegetables, as well as dairy products (milk, butter, cheese) and meat (beef, lamb, pork). In Africa, Asia and South America, endosulfan is present in drinking water resources, while in USA, China, Australia and West Africa, endosulfan has been detected in fish and seafood.

Towards a global ban

Endosulfan is banned or withdrawn in 55 countries worldwide; mostly in Europe, West Asia and the Far East. In February 2008, Benin became the first major West African country to announce a ban, following recommendations from local pest management experts.

Safer alternatives are available

Successful replacement of endosulfan has been achieved in all countries where endosulfan is now banned including France, Spain, Greece and Portugal – all major users prior to the EU ban in 2006. Farmers in some non-EU countries have also converted away from endosulfan, including in cotton, soy and coffee production. A 2008 study in Sri Lanka showed that yields of all crops, including rice and tea, have been maintained since a national ban in 1998.

The information above is drawn from 'Information for the consideration of Endosulfan, Provision of information to the Stockholm Convention Secretariat for use by the POPs Review Committee (POPRC), Pesticide Action Network (PAN) International, 30 June 2008'.

Key references are indicated below:

¹ GFEA-U. 2007. Endosulfan. Draft Dossier prepared in support of a proposal of endosulfan to be considered as a candidate for inclusion in the CLRTAP protocol on persistent organic pollutants. German Federal Environment Agency – Umweltbundesamt Berlin, February

² US EPA. 2007. Addendum to the Ecological Risk Assessment for Endosulfan. Memorandum to Special Review and Reregistration Branch. October 31. EPA-HQ-OPP-2002-0262-0063

³ US EPA. 2007. Note to reader. Endosulfan Readers Guide. November 16. EPA-HQ-OPP-2002-0262-0057

⁴ US EPA. 2007. Note to reader. Endosulfan Readers Guide. November 16. EPA-HQ-OPP-2002-0262-0057

⁵ GFEA-U. 2007. Endosulfan. Draft Dossier prepared in support of a proposal of endosulfan to be considered as a candidate for inclusion in the CLRTAP protocol on persistent organic pollutants. German Federal Environment Agency – Umweltbundesamt Berlin, February