Endosulfan

Proposal by the European Union August 2007
http://www.pops.int/documents/meetings/poprc/docs/chem_review.htm
Supporting information by German Federal Environment Agency
http://www.pops.int/documents/meetings/poprc/docs/under_review/endosulfan/Draft%20Dossier_endosulfan.pdf

Composition	There are four relevant forms of endosulfan: alpha endosulfan, beta endosulfan, endosulfan sulphate, and technical endosulfan which is a 2:1 to 7:3 mixture of the alpha and beta isomers.
Uses	Insecticide for control of aphids, thrips, beetles, foliar feeding larvae, mites, borers, cutworms, bollworms, whiteflies, and leafhoppers. Used on cotton, tobacco, cantaloupe, tomatoes, squash, eggplant, sweet potato, broccoli, pears, pumpkins, corn, cereals, oilseeds, potatoes, tea, coffee, cacao, soybean, and other vegetables. Historically used to control termites and tsetse fly. Used in some countries in the past as a wood preservative.
Releases	The vast majority of endosulfan is used as active ingredient of plant protection products. That means it is deliberately spread over large soil or plant areas. Worldwide production estimated at 10,000 metric tonnes, however, current global production is likely to be significantly higher as use remains widespread. Recently the GAPS study, a global monitoring project on POPs, revealed that endosulfan "showed highest values of all the organochlorine pesticides (OCPs) investigated, in the range of tens to hundreds of pg/m_, with a geometric mean of 58". Endosulfan was also among those organochlorine chemicals which were present in highest concentrations worldwide in samples from tree bark lipids. Unlike for more volatile compounds no significant correlation with geographical latitude was found. The authors concluded that these compounds are not as effectively distilled and tend to remain near the original region of use.
Fate	In the environment, endosulfan is oxidized in plants and in soils to form primarily endosulfan sulfate and endosulfan-diol. Formation of endosulfan sulfate is mediated essentially by micro-organisms, while endosulfan-diol was found to be the major hydrolysis product. Endosulfan was measured repeatedly in Arctic seawater during the 1990s. Mean concentrations were similar to those of chlordane. Concentrations of endosulfan from Arctic air monitoring stations increased from early to mid-1993 and remained at that level through the end of 1997. Reported values for measured bio-concentration factors of endosulfan in various aqueous organisms cover a wide range from 100 in oysters to 11,000 in whole fish. Half-lives in acidic to neutral soils range from one to two months for _-endosulfan and from three to nine months for _-endosulfan under aerobic condition. The estimated half-lives for the combined toxic residues (endosulfan+ endosulfan sulfate)

	ranged from roughly 9 months to 6 years. Anaerobic conditions may considerably extend half-lives in soils.
Effects	The oxidised metabolite, endosulfan sulfate, shows an acute toxicity similar to that of the parent compound. In contrast, endosulfan-diol, which is another metabolite of endosulfan, is found substantially less toxic to fish by about three orders of magnitude. Recent literature has indicated the potential for endosulfan to cause some endocrine disruption in both terrestrial and aquatic species. Effects observed were impaired development in amphibians, reduced cortisol secretion in fish, impaired development of the genital tract in birds and hormone levels, testicular atrophy and reduced sperm production in mammals. Excessive and improper application and handling of endosulfan have been linked to congenital physical disorders, mental retardations and deaths in farm workers and villagers in developing countries in Africa, southern Asia and Latin America. Endosulfan was found among the most frequently reported intoxication incidents, adding unintentionally further evidence to its high toxicity for humans. In laboratory animals, endosulfan produces neurotoxicity effects, which are believed to result from over-stimulation of the central nervous system. It can also cause haematological effects and nephrotoxicity. The _-isomer was generally found more toxic than the _-isomer.
Exposure	Endosulfan was detected in adipose tissue and blood of polar bears from Svalbard. Endosulfan has also been detected in blubber of minke whale and in liver of northern fulmar. Endosulfan was detected in all lake trout examined from isolated Ontario (Canada) and New Brunswick lakes.
Status	Endosulfan has been included in the OSPAR List of Chemicals for Priority Action (update 2002). Endosulfan is on the list of priority substances agreed by the Third North Sea Conference (Annex 1A to the Hague Declaration). The second meeting of the Chemical Review Committee agreed to recommend to the Conference of the Parties that endosulfan should be listed in Annex III of the Rotterdam Convention and developed a rationale setting out how the criteria in Annex II had been met.
Alternatives	Will be discussed in Annex F evaluation if Endosulfan advances.