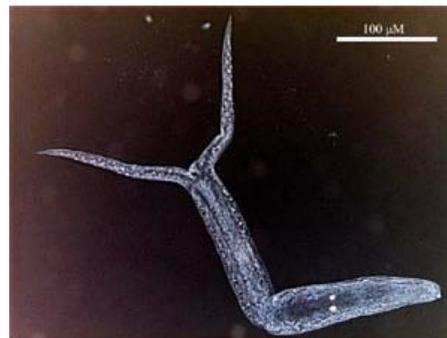


Essential Oil and Food Additive Combined to Fight Parasite Affecting Millions

Researchers from the **Johns Hopkins Bloomberg School of Public Health** developed an environmentally friendly and potentially affordable way to fight schistosomiasis, a disease caused by parasitic worms in water. The scientists found that spraying parasite-infested water surfaces with a combination of a red cedarwood oil distillate (from *Juniperus virginiana* trees) and the food additive, Tween 80, rapidly inactivates and kills infective *Schistosoma mansoni* larvae. Previous research had shown that frequent application of topical creams was one way to control exposure to the parasite that causes schistosome disease, but the procedure was difficult to sustain. Although not found in the United States, schistosomiasis impacts 200 million people worldwide. It is the number-one cause of bladder cancer in the developing world and a leading worldwide cause of liver failure due to cirrhosis (scarring of the liver). The authors' findings are published in the November 2005 issue of the *American Journal of Tropical Medicine and Hygiene*.



Avian schistosome

The study, which was authored by Jean Marie Naples, MD, PhD, and [Clive J. Shiff](#), PhD, with the Bloomberg School of Public Health's [Department of Molecular Microbiology and Immunology](#), and [Rolf U. Halden](#), PhD, PE, with the School's [Department of Environmental Health Sciences](#) and [Center for Water and Health](#), is a new approach to decreasing the spread of schistosomiasis and may help in the control of this insidious parasitic disease. Besides red cedarwood, there are many similar natural oils that can be extracted from *Juniperus* trees in all parts of the world that may also be effective, according to the Hopkins researchers.

It has been shown that bird schistosome parasites were responsible for recent outbreaks of swimmer's itch at beaches in Canada and the United States. Bird schistosome parasites are in the same family as human schistosome parasites. The red cedarwood oil distillate (mixed oil fraction) created by the Hopkins scientists may also protect against swimmer's itch.

The authors explained that cercariae- the infective larvae form of the parasite-gather at or near the surface of water in order to improve their chances of finding a vertebrate

host. In their research, the Hopkins scientists combined one part cedar oil distillate with five parts of Tween 80, which is an agent that reduces the surface tension of water. The oil-Tween 80 combination resulted in a surface-active formulation that will economically treat large bodies of water, irrespective of depth and volume.

The researchers found that applying the mixture to the water's surface blocked the ability of cercariae to penetrate skin. When mice were exposed to schistosome-infested water treated with the formulation, there was a 99.2 percent reduction in worm burden in these mice, as compared to mice exposed to untreated parasite-infested water.

Cedarwood oil is approved as a flavor additive for food and liquids and as a fragrance agent by the [Food and Drug Administration](#) and by the [U.S. Environmental Protection Agency](#) in soaps, detergents and cosmetics. Tween 80, a food additive, is biodegradable. The cedar oil distillate also stands up well to harsh environmental conditions. Samples exposed in Ghana to direct heat and sunlight for six weeks, remained effective for inactivation of *Schistosoma mansoni* larva.

The researchers have planned additional field trials in still and moving bodies of water to study effects on human and bird schistosome cercariae.

The Johns Hopkins Bloomberg School of Public Health is seeking a patent for the surface-active formulation which has potential commercial applications in the U.S. and other developed countries for the prevention of swimmer's itch. Inquiries may be directed to Deborah Alper at dalper@jhsph.edu, 443-287-0402 or www.jhsph.edu/TechTransfer.

"Reduction of Infectivity of Schistosome Cercariae by Application of Cercariacidal Oil to Water," was supported by a technology transfer grant from the Johns Hopkins Bloomberg School of Public Health and a [National Institutes of Health training grant](#).

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