

ANTIBIOTIC POLLUTION CAN DISRUPT AQUATIC FOOD CHAINS

Indian scientists have found that diatoms, primary food-producers in aquatic foodchains, undergo significant variation after being treated with commonly used antibiotics.

The new findings on diatoms follow a 2011 study by Swedish scientists from the University of Gothenburg, Chalmers University of Technology, and Ume University, who reported antibiotic contamination in river sediment samples collected near an Indian waste water treatment plant processing effluent from more than 90 bulk drug manufacturers.

Recently, scientists Priya M. D Costa and Arga Chandrashekar Anil of the National Institute of Oceanography at Dona Paula, Goa, studied the effects of streptomycin, penicillin and chloramphenicol on diatom communities and published their findings in *Current Science* (April 2012).

These antibiotic concentrations were chosen to mimic conditions in highly polluted environments. For example, untreated sewage water and aquaculture pond sediments where antibiotics can enter the sediments directly without undergoing any purification process, the *Current Science* study says.

It suggests that while chloramphenicol directly affects a diatom community, streptomycin has the potential of damaging it. Penicillin, on the other hand, can affect diatoms only when mediated through a bacterial colony.

High antibiotic combinations reduced diatoms by 99.100 per cent and favoured emergence of yeast, probably due to high concentrations and synergistic effects, the study says.

Changes in diatom communities in individual antibiotic treatments were either direct (chloramphenicol and potentially streptomycin) or bacteria-mediated (penicillin). According to the study, streptomycin and chloramphenicol have the potential to affect diatoms directly by inhibiting their protein synthesis.

In the chloramphenicol treatments, diatoms were reduced to 819 per cent of control values while in streptomycin treatments, diatoms did not show a dose dependent response at higher concentrations of the antibiotic.

The study found that antibiotics inhibit competitors at high concentrations and function as signalling molecules that influence metabolism at low concentrations.

These findings seem to be significant since diatoms, apart from being the basis of aquatic food-chains, are a popular tool for monitoring past and present environmental conditions and are commonly used in studies of water quality, Samiullah Bhat, assistant professor at the Kashmir Universitys department of environment, told *SciDev.Net*.

The study suggests that investigations on the fate of antibiotics in antibiotic-polluted and natural environments must consider effects across trophic levels (position of an organism in a food chain) and particularly, diatoms, the base of aquatic food webs.

Source: <http://www.scidev.net/global/biodiversity/news/antibiotic-pollution-can-disrupt-aquatic-food-chains.html>