Powder May Help Reduce Water Evaporation and Drought in Brazil

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A chemical powder may be the solution to the water evaporation problem in lakes and dams, one of the villains of the droughts in the arid and semi-arid regions of Brazil.

The product, developed by the Brazilian chemical engineer Marcos Gugliotti, from the company Lótus Química Ambiental, from São Paulo, is in its final testing phase. Up to now experiments were made in laboratories and in small water reservoirs to see the powder's efficiency.

The result was surprising: "In controlled environment conditions (laboratory) the product reduced 50% of the evaporation of water. In external tanks, the reduction varied between 16% and 44%," states Gugliotti. The final tests will be carried out in 2006.

The product developed by the engineer is composed by surfactants - a kind of fatty alcohol that reduces the surface tension of a solution - and a mixture of limestone.

When thrown in water, the powder forms a film that reduces the rugosity of the surface and, in consequence, the area exposed to the elements that speed up water evaporation.

"The area applied looks like a mirror, it gets smoother, the powder forms a kind of protecting barrier between the water and the atmosphere, but doesn't damage the gaseous exchanges. The environmental impact is also very low, almost imperceptive," explains Gugliotti.

Next month efficiency tests for the product will be made in real lakes. The experiment will be in the reflecting pools at the National Congress and the head offices of the Superior Court of Justice, in Brasília, capital city of Brazil. "It will be great if the evaporation reduction is in between 15% and 30%," states Gugliotti.

The test to verify the way in which the powder is spread over the surface was carried out, successfully, at the Broa dam, in São Carlos, city in the interior of the state of São Paulo.

"This test was fundamental, as, if the product didn't spread out it wouldn't be economically viable. It wouldn't cover large areas," says Gugliotti.

The result showed that one kilo of the solution is sufficient to cover one hectare of lake, dam or weir. The price of the kilo is still not set, but should cost about US$ 8.

There is no secret in the application of the product. The powder must be thrown in the water manually, with the help of a shovel.

"The ideal way is to throw the product on the edge of the lake, always in favour of the wind. If the surface is very big, it is a good idea to use a boat or even an agricultural aeroplane to spread out the powder," explains Gugliotti. The application frequency will vary according to the ecosystem.

"If it is clean water, once every three days. If it is polluted, once a day. The average is every 48 hours," he explains.

Whoever handles the products must wear gloves and a mask to avoid inhaling the solution. However, the engineer states that the product has low toxicity, does not represent risks to human health or the environment. The powder is also biodegradable.

Low toxicity is one of the advantages of the Brazilian product in relation to what exists in the market, especially the products developed by the Australians and used in some countries of the Middle East.

"They have hydrated lime in the composition. In spite of being able to use it in potable water, it is more toxic than the surfactants," explains the engineer.

From Far Away

According to Gugliotti, references to substances that reduce water evaporation are in scientific literature since 1925. The Australians were the first ones to test, practically, the efficiency of what was written in the books, in the 1950s. After the experience in Australia, the Unesco included the mechanism in the Arid Zone Program, which started in 1957.

Gugliotti has been researching the subject for some years, but the project only took shape last year, when he set up the company Lótus Química Ambiental, incubated at the Cietec (Incubator Center for Technological Companies) at the USP (Universidade de São Paulo). The powder's project, evaluated in US$ 125,000, has the support of the Research Support Foundation in the State of São Paulo (Fapesp).

Gugliotti is planning for next year tests in weirs in the Northeast region of the country. Over there, according to information from the Ministry of National Integration, about 75% of the water is lost to the air, by evaporation.

The remaining 25% are for human consumption. Conclusion: there is practically none left for agricultural activities. Only after the tests in 2006 will the product reach the market. However, Gugliotti has already placed the order for the powder's patent registration.

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