Auroville's Environmental Monitoring Service

Auroville's 'municipal' laboratory for water, soil and food analysis is located in Aurobrindavan.

Igor at Auroville's Environmental Monitoring Service

"That's the gas chromatograph. We use it to detect trace amounts of chemical compounds in samples. That machine over there is the atomic absorption spectrophotometer which we use mainly to detect metals, including arsenic and mercury, in different substances. This is the UV-visible scanning spectrophotometer. These three machines are our star performers. Then, of course, we have the usual equipment in our microbiological and chemical testing rooms," says Igor, who runs Auroville's Environmental Monitoring Service (EMS).

"I like chemistry," he explains. "In my childhood I was experimenting with stuff from chemical instruction kits. Later I majored in chemical biology at the University of Odessa, and then worked in a Ukrainian research institute. But I had also been touched by The Mother and Sri Aurobindo. After *perestroika*, I got involved with publishing in Ukrainian the short biography of Sri Aurobindo by Peter Heehs and books of Mother and Sri Aurobindo. This brought me to Pondicherry. I visited three or four times, came to know about Auroville and finally decided to join."

That was in 1993. He met former Aurovilian Ardhendu who had the idea to start a 'municipal' laboratory. "Ardhendu was concerned about the quality of food and water. This was the work I had been involved with in the Ukraine, so I knew what to do. At the time some units like the Health Centre, Village Action, the Water Service and Palmyra were ready to support such an idea. With help of all these units we managed to start a laboratory." After brief stints in the Auroville Health Centre and the Centre for Scientific Research, the laboratory was finally welcomed in the Aurobrindavan complex. "We are located in a former residential area, which is really unsuitable," says Igor. "But the advantage is that we are on the main road from Pondicherry to Tindivanam, so our clients can easily find us."

The laboratory's development

The laboratory slowly developed. In 2002 it received a boost. The Asia Urbs programme [see *Auroville Today* # 159, April 2002] mentioned the necessity of a Municipal Laboratory for Auroville and funding was allocated. "We were able to buy some very good state-of-the-art instruments, including the three machines I just showed," says Igor. "And with these instruments, our work could finally start on a serious footing. At present six people, including two M.Sc. microbiologists, one M.Sc. chemist, field workers and a lab assistant work at EMS."

A chemical analysis in progress

For a small laboratory, EMS offers a staggeringly wide range of tests [see box]. "It is a survival strategy," explains Igor. "We are a 'self-supporting Auroville service' which means that we don't receive any funding from Auroville. We have to manage on our own. The best way to do this is to offer a wide range of tests for outside clients, and gradually increase our clientele. The income from the outside clients also enables us to provide free tests for public bodies in Auroville, such as the Matrimandir, the Solar Kitchen, Pour Tous, Pitanga, the kindergartens and some schools, while commercial restaurants, guest houses and commercial units are charged only a minimal fee for our work."

Water and ground water testing

A major element of that work involves water. "In the past we did many chemical and microbiological examinations of wastewater systems in Auroville in order to assess which treatment system functioned best and also to find if a system had developed a fault. Today, we mainly test potable water," says Igor. "Most important here are the micro-biological tests to determine the presence of bacteria which are indicator of water quality, such as total coliforms and E. coli. The microbiological parameters of water can change quite quickly, often due to things like not properly cleaning the storage tank, wrong placement of the tank lid or not closing the overflow pipe with mesh. Also spontaneous breaks occur in the distribution network due to earth movements or root intrusion. That's why regular testing is necessary." Tests are done in accordance with Indian Standard IS 10 500-1991.

EMS also tests the chemical components of groundwater. "We just finished a test of the groundwater pumped up by a new bore well at the Matrimandir," he says. Asked about the quality of Auroville's groundwater, Igor replies that it is good. "Our groundwater is clean. In many parts of India the groundwater is affected by high levels of fluoride or arsenic caused by the soil chemistry of that area, but Auroville is free of this." Groundwater, he says, is also unlikely to be contaminated by pesticides. "This type of contamination you only find in open water, such as in ponds or an open well." Contamination due to domestic pollution is practically non-existent. "We have encountered only one case, and that was in the past. A shallow well, which was operated by a hand pump, had been situated too close to a septic tank and there was faecal contamination. But this was a rare case."

The situation, however, is different on the beaches. "There we have found evidence of saltwater intrusion in the aquifer, probably due to over-pumping. The problem seems to continue and is getting worse. This will create problems in future," he says.

The absence of a central Auroville Health Authority

Does he make his findings public? "We have a problem here," admits Igor. "We call ourselves a 'Municipal Laboratory' but we lack a client body to report to. We would like to be able to do tests on the instruction of an 'authority' in Auroville whose task it would be to ensure the quality of water and foods, a kind of Auroville Health Authority, to whom we would supply our data for further action. But it doesn't exist."

He gives the quality of the seawater as an example. "Just to satisfy our own curiosity we tested seawater along the coast from Pondicherry to Quiet, to Repos and further up north to Sri Ma. Depending on the direction of the current, we found high levels of contamination. If the flow was north, the sea carried a lot of faecal pollution. Sometimes the pollution was so heavy that it was almost raw sewage floating past. But if the current went south, there was hardly any pollution. This explains why people sometimes suffered from skin irritations after swimming in the sea."

Testing food items

An Auroville authority, says Igor, should not only monitor sea water and issue warnings and notices but also ensure the quality of Auroville foods. "They should provide us with samples of food items taken randomly from the shelves at Pour Tous or from restaurants for testing." He gives the example of aflatoxins. "Aflatoxins are the number one food poison, with carcinogenic propensities that will attack the liver. They are often found in raw peanuts. It is now standard practice for Naturellement [*an Auroville food producer, eds.*] to supply us with a sample of a batch of peanuts before purchasing it. We test it – this takes 2 hours – and give the results and then they decide. So we can guarantee that Naturellement's peanut butter is aflatoxin free. But we can't give this statement for other nut butters produced in Auroville. Similarly, we do not know about the quality of the jams and other foodstuffs made in Auroville."

The absence of funding by a central Auroville Health authority makes is difficult for EMS to test specific food products, such as milk, for adulteration and the presence of pesticide residues. "There are many different forms of pesticide residues such as organophosphate pesticides, organochlorine pesticides, carbamate and pyrethroid pesticides, each of which requires a different system of tests. We have the machines and ability to do all tests required, but we lack the finances," says Igor. He explains, "to do those tests we need a certain amount of chemicals, which only come in rather large qualities. So if we need 50 mg of a certain chemical, and they sell it in packets of 500 gram at Rs 3,000 and it has a shelf life of 1 year, and you do one test a year for which you charge Rs 100, it obviously does not make sense. A normal municipal laboratory would work with a substantial budget provided by the municipality. But we are self-supporting, and as we lack the money, we have decided not to do these tests."

Views on the future

How good is the EMS? Igor laughs. "What we do can only be done in Chennai – nowhere around here do similar facilities exist. Judging by the increasing number of outside clients, I would say that our reputation is pretty good." Amongst those clients are producers of spirulina from all over India and from France, to whom EMS offers a standard package of microbiological and chemical tests to assess compliance with Indian and International standards. Other products that are tested are soaps, essential oils and cosmetics. EMS also does soil and compost tests, and – surprisingly – tests the quality of tea. Igor explains. "There is a company in Calcutta which has six tea gardens. One day they discovered that the test results of their own laboratories had been tampered with. They employed us. Now we test about 150 samples of soil, compost and tea a year. They send it by courier service."

Research and certification

It is normal for laboratories also to do research. EMS is no exception. "We are doing research into specific coatings on drinking water filter candles to remove viruses. Normal candles remove solid particles and harmful bacteria such as E. coli, Salmonella and Streptococcus; but they don't remove viruses. This is a real challenge, and very complicated. The work is in mid-stage, and we are not sure of any results. Whatever we come up with is being tested by a laboratory in The Netherlands," says Igor.

Though well-known, EMS has so far avoided being 'officially certified.' "Very few clients ask us for it and there seems to be no immediate necessity," says Igor. "To be officially recognized, we would need a proper building, not one where the paint is peeling from the wall like here. We also decided against going for it, as it is quite cumbersome and expensive. But it may happen in future, if EMS grows into a larger organisation." Is he interested in expanding the laboratory? "Actually no," he laughs. "I joined Auroville for spiritual reasons, not to run a large laboratory with many employees and international connections! But let's see!"

In conversation with Carel

Testing facilities at EMS

- Potable water quality analysis (chemical constituency, presence of toxic substances, microbiological analysis)
- Efficiency of drinking water purification systems
- Waste water quality analysis
- Efficiency of waste water purification systems
- Ground water quality analysis
- Sea water quality analysis
- Irrigation water quality analysis
- Bathing water quality analysis
- Concentration of impurities in mixing water of concrete
- Sanitary parasitology
- Assessment of metals in water, sludge, food etc.
- Soil analysis (fertility, micronutrients)
- Compost analysis
- Manure and biosolids analysis
- Biofertilizer quality assessment
- Oils and fats analysis
- Soap analysis
- Cosmetics analysis (creams, lotions, shampoos, powders)
- Food analysis (energy contents, microbiological analysis, presence of vitamin B 12, presence of heavy metals such as lead and cadmium, mercury, iron, zinc and arsenic)
- Spirulina analysis (chemical and microbiological tests)

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