waterpoints

Organoponics: the use of human urine in composting

Experiments and tests using fermented human urine in the production of legumes, medicinal and aromatic plants in containers, began 10 years ago in the Rural Research and Training Centre A.C. (CEDICAR), Mexico. This cultivation system has been called 'organoponics' or 'urineponics'. It is a cost-effective system, saving money and water, is capable of producing an average of 25 kg of legumes per year per m^2, and has been culturally accepted by most of the families and institutions where it has been tried.

The organoponic system developed in Mexico, mainly in urban areas, is extremely simple. First, containers are filled with leaves or grass trimmings up to 85 per cent of their capacity. Then they are inoculated with fermented urine and filled with an additional 15 per cent of topsoil. Finally, the seed is transplanted or sown.

Urine is fermented by placing one litre of urine in a container and adding a spoonful of black soil, compost or vermicompost. It is left to sit without cover for 28 days. The process is completed when the smell of ammonia becomes pervasive and the colour changes from light yellow to dark brown. As the urine ferments, significant populations of actinomycets emerge, which are micro-organisms especially apt to degrade lignin and cellulose. For this reason, it can be applied at a dose of 5 to 20 litres per m^3 of carbon rich material, to substitute and/or complement other manure.

The main advantage of this cultivation system, especially where land is scarce, is that after 10 months of growth, the initial substratum has decomposed, resulting in compost rich in organic matter.

The use of urine as fertilizer highlights the added benefits of dry toilets, as well as edible backyard and rooftop gardens. Families are also encouraged to donate their urine to the municipal system for treatment and use in peri-urban agriculture. Urine is innocuous, readily available and carries no health risks. Most of the pathogens that cause human diseases die quickly once urine leaves the body. If some persist, the lactic bacteria and the actinomycets destroy them during storage and during the fermenting process.

The technique allows the recycling of organic matter (used as substrata) and promotes the sorting of household wastes and the development of household, neighbourhood and municipal composting centres. It also saves water, promoting dry, urine-separating toilets, which alleviates the accidental discharges from toilets and septic tanks reaching water bodies, causing their eventual eutrophication. Although household gardens are not conceived as a business or a small undertaking, a 10 m^2 garden can bring a family savings of US$80–100 per month.

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Household storage a factor in diarrhoea incidence

Research from Peru suggests that even when the water is of a high quality, children will not be healthy unless water storage in the household is hygienic and there is adequate sanitation. The research aimed to assess the effects of water and sanitation on childhood health in a birth cohort of children. The children were monitored once a day for diarrhoea and once a month for anthropometry (height). It was found that at 24 months of age, children with the worst conditions for water source, water storage, and sanitation were 1 cm shorter and had 54% more diarrhoeal episodes than those with the best conditions.

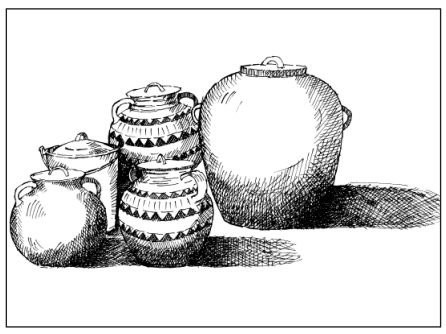

Figure 1 Smaller containers are associated with more incidents of diarrhoea

A perhaps surprising result was that if water was stored in the household, the type of container had an effect on the health of the children. The container size was classified as: large, medium, or small: large containers were generally cement cisterns covered with a lid, flat platform, or large plastic bag, small containers included pots, pans, barrels, and buckets, and were often found uncovered. Even households that had a water connection usually stored water, because water pressure was often low or water supply was intermittent.

Children from households with small storage containers had 28 per cent more diarrhoeal episodes than did children from households with large containers. Lack of adequate sewage disposal explained a height deficit of 0.9 cm at 24 months of age.

The authors conclude that nutritional status measured by infant growth is a useful endpoint for water and sanitation interventions and underscores the need to improve sanitation in developing countries. Improved and more reliable water sources, when accompanied by adequate storage and sanitation decrease diarrhoeal incidence and improve linear growth in children.

Source: Checkley, William, Robert H. Gilman, Robert E. Black, Leonardo D. Epstein, Lilia Cabrera, Charles R. Sterling, Lawrence H. Moulton (2004) 'Effect of water and sanitation on childhood health in a poor Peruvian peri-urban community' *The Lancet,* Vol. 363 10 January 2004.