A urine based 'potion' can act as a CO2 absorbent (w/ Video)

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The ocean, the ground, rocks and trees act as carbon drains but are far from places where greenhouses gases are concentrated, especially CO_2. A Spanish researcher has proposed human, agricultural and livestock waste, such as urine, as a way to absorb this gas.

Absorbing the large quantities of carbon dioxide and other greenhouse gases present in cities would require millions of tonnes of some naturally occurring substance. A study published in the Journal of Hazardous Materials suggests urine as a reactive. As a resource available across all human societies, it is produced in large quantities and is close to the pollution hubs of large cities.

"For every molecule of urea in urine, one mole (a chemical unit used to measure the quantity of a substance) of ammonium bicarbonate is produced along with one mole of ammonia, which could be used to absorb one mole of atmospheric CO_2," as explained to SINC by the author of the study, Manuel Jiménez Aguilar of the Institute of Agricultural and Fisheries Research and Training of the Regional Government of Andalusia.

After absorbing the CO_2 another unit of ammonium bicarbonate is produced, which is used in China as a nitrogen fertilizer for 30 years. Jiménez Aguilar points out that "if applied to basic-calcium rich soils this would produce calcium carbonate thus encouraging gas-fixation in the ground.

To avoid the urine from decomposing, the researcher suggests the possibility of including a small proportion of olive waste water (a black, foul-smelling liquid obtained from spinning the ground olive paste). This acts as a preservative. The researcher confirms that "the urine-CO_2-olive waste water could be considered an NPK fertilizer (ammonia-nitrate-phosphorous-potassium)."

The result is that the urine mixed with a small percentage of olive waste water can absorb various grams of CO_2 per litre in a stable manner and over more than six months. According to Jiménez Aguilar, "CO_2 emissions could be reduced by 1%."

The fluid created can be inserted into domestic and industrial chimneys (reconverted into containers to accumulate the urine-olive waste water mixture) so that the greenhouse gas passes through the liquid, increasing the pressure exerted on the CO_2 and thus increasing its absorption capacity.

As the scientist makes clear "these containers or chimneys should have a urine filling and emptying system and a control system to detect when the mixture has become saturated with gas." When taken out of the chimney, the urine is stored in another container or can be channelled for its distribution and use as an agricultural fertilizer.

Making the most of urine

By applying this methodology as a greenhouse gas absorbent, the way in which industrialised countries use waste water and solid waste would never be the same again. The author hints that the whole water and waste treatment system would be reviewed to adapt newly built areas to a waste recycling and waste management system.

"In developing countries this nutrient recovery system could be

implemented thanks to its environmental advantages," says the expert.

Furthermore, urine recycling in every home would allow for nutrients to be recovered, leading to a lesser need for artificial fertilizers. Jiménez emphasises that "if urine and faeces are recycled there and then, as much as 20 litres of water per person per day could be saved and this would reduce waste water treatment costs."

The study suggests that urine should be recycled for it to be used as fertilizer liquid and that faeces should be treated with solid organic waste to produce compost or solid fertilizers. The researcher also states in another study that is pending publication that the urine-olive waste water mixture can also be used to reduce the CO_2 and NOx emissions of vehicles.

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