Phosphorus, Nitrogen, and Potassium recovery rates from food scraps processed in commercial systems

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Phosphorus, Nitrogen and Potassium are mined from primary sources in the lithosphere, atmosphere and biosphere for use in agriculture. Typically these nutrients are used once in the human food chain before being lost back to the environment. Recycling these nutrients from the human waste stream to grow new food makes the original mining event more useful to society and in theory reduces the total quantity of mining needed each year [1]. Food scraps are a waste that is already handled weekly by society, and therefore represents a readily recoverable source for nutrients by current technology.

We present data on the recovery rate and resulting chemical forms of Phosphorus, Nitrogen and Potassium recovered for reuse by these commercially viable systems: (1) Food scraps composted at a commercial facility using an Aerated Turned Pile system, (2) Food scraps digested in an Anaerobic Digester connected to a waste water treatment plant, and (3) Food scraps consumed by the larva of the Black Soldier Fly (*Hermetia illucens)*. We utilize a mass balance approach to account for the quantities of each nutrient input and the streams in which they are output. Additionally, we examine the chemical forms each element exists as within each output stream. This data can be used to assess the value and role of each system in the future of organic waste management.

[1] Cordell et al. (2009) *Glob Environ Chang* **19**, 292–305.