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HUMAN URINE AS A FERTILISER IN PLANT PRODUCTION

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Owing to better devices and use-restrictions of water toilets in coastal planning areas, separated toilets are becoming more common in Finland. These toilets enable the closed recirculation of nutrients in households, if human urine is stored and later used as fertiliser in home gardens or in plant production. Even though human urine contains many nutrients (table 1), it is led into grey water or absorbed into the ground through a septic tank or a sand filter, which is against of the spirit of sustainable development and the current Waste Disposal Act in Finland.

Table 1. The nutrient amounts in faeces per person per year and their division between urine and solid excrement.

Nutrients	Urine		Solid excrement		Faeces
	Kg/person/year	%	Kg/person/year	%	Kg/person/year
Fresh weight	329-438		26-51		365-511
Nitrogen (N)	4	89	0,5	11	4,5
Phosphorus (P)	0,4	67	0,2	33	0,6
Potassium (K)	0,9	69	0,4	31	1,3
Total NPK	5,3		1,1		6,4

This study is based on a literature review and calculations of nutrient amounts, and its aim was to survey the quality of urine as a fertiliser, compared to artificial fertilisers, and its usage as a fertiliser in agriculture. The results show that human urine can be recommended as a fertiliser for cereal production as well as for energy and fibre plants. Because modern-day lavatories are unable to adequately separate the fraction of faeces, solid excrement mixes with the sterile urine and, thereby, impairs the hygienic quality of urine and the possibility of using it in food production.

The most important nutrient in urine is nitrogen, which is in the form that plants can use. Before spreading it, the urine has to be stored in a tank for six months in order to ensure hygiene. Many farmers have injectors and trailing hoses with which to spread the urine into the soil. Its large volume compared to its nutrient content makes it difficult to use urine in plant production. The volumes are 40 to 200 times those of concentrated fertilisers.

People are prejudiced concerning the utilisation of human urine in agriculture. More research about the use of urine in agriculture is needed in order to dispel negative attitudes. Efficient recirculation of urine is essential from the environmental, as well as

agronomic, point of view. However, the high hygienic level of food products should also be maintained in the future. More attention should be paid to the development of devices so that separated toilets could be a serious alternative to water toilets.