

Nitrogen balance of various single-home wastewater treatment systems

	Traiselect System by Créaqua ⁽⁶⁾		Biodisc system by Scholtz & P.	Submerged fixed film biomass growth system by Zuk-O-Pur		Activated sludge system by Boralite	
	Louvain-la-Neuve	Glabais	Kirschberg	Chastre	Rixensart	Ottignies	Beersel
Inflow [l/day.p]	76 ⁽¹⁾	76 ⁽¹⁾	180 ⁽²⁾	119 ⁽³⁾	119 ⁽³⁾	119 ⁽³⁾	119 ⁽³⁾
Nitrogen N_{tot} [mg/l]	0,92	5,39	34,62	60,40	48,00	66,80	45,64
Nitrogen released [kg/yr.p]	0,025	0,150	2,275	2,623	2,085	2,900	1,982
Nitrogen released [%] ⁽⁴⁾	0,45 ⁽⁵⁾	2,7 ⁽⁵⁾	40,6	46,8	37,2	51,8	35,4

⁽¹⁾ Greywater only

⁽²⁾ Statistical value for Germany

⁽³⁾ [Statistical value for the Walloon Region \(Belgium\)](#)

⁽⁴⁾ It is assumed that [the nitrogen content of black water](#) is 5,6 kg N / year.person at each system's inlet.

⁽⁵⁾ No black water involved

⁽⁶⁾ At the time of this study, the Traiselect System was marketed by Créaqua

Réf. : PATIGNY F., *Étude des performances épuratoires et environnementales de quelques unités d'assainissement individuel.* (or Study of the environmental performance and purification efficiency of single-home wastewater treatment systems)

Thesis, *Faculté des Sciences Agronomiques de Gembloux, Université de Liège* (Belgium), Director Prof. Culot, (2001).



Patigny's Calculation Method *{explanations by Joseph Országh}*

Inflow [l/day.p] = quantity of water to be treated, expressed as litres per day, per person

N_{tot} [mg/l] = total concentration of nitrogen released with treated wastewater discharge, expressed as milligrams of nitrogen N per litre

Nitrogen released [kg/yr.p] = annual quantity of nitrogen released by the installation, expressed as kg of nitrogen N per year, per person.

Examples :

1. TRAISELECT installation in Louvain-la-Neuve :

- The quantity of nitrogen that comes with an inflow of 76 litres/day.person is calculated as follows: 76 litres x 0.92 mg/l = 69.92 mg of nitrogen daily per person, representing 69.92 mg x 365 days = 25521 mg. In other words, **0.026 kg of nitrogen** is released with the treated wastewater, per year, per person.

Very little nitrogen is released due to the fact that the system treats greywater containing no nitrogen-rich black water. Nitrogen from human dejecta does not enter the system because toilet waste is composted separately in the garden. In this way, the nitrogen contained in dejecta gets bound within non-leachable organic compounds (humus).

2. Boralite installation in Ottignies :

- The wastewater inflow per person is estimated based on Walloon daily water consumption statistics : 119 litres per day per person. The total concentration of nitrogen released being 66.8 mg/l, the nitrogen outflow is calculated as follows: 119 litres x 66.8 mg/l x 365 days = 2901458 mg. In other words, **2.901 kg of nitrogen** is released with the treated wastewater, per year, per person.

This is over 115 times the nitrogen quantity outflowing from the TRAISELECT system under the preceding example.

Considering that one person's annual dejecta contains about 5.6 kg of nitrogen (disregarding the nitrogen in greywater), 2.9 kg of nitrogen represent 51.8% of 5.6 kg. Thus, the purification efficiency of this system for nitrogen is 51.8%.