



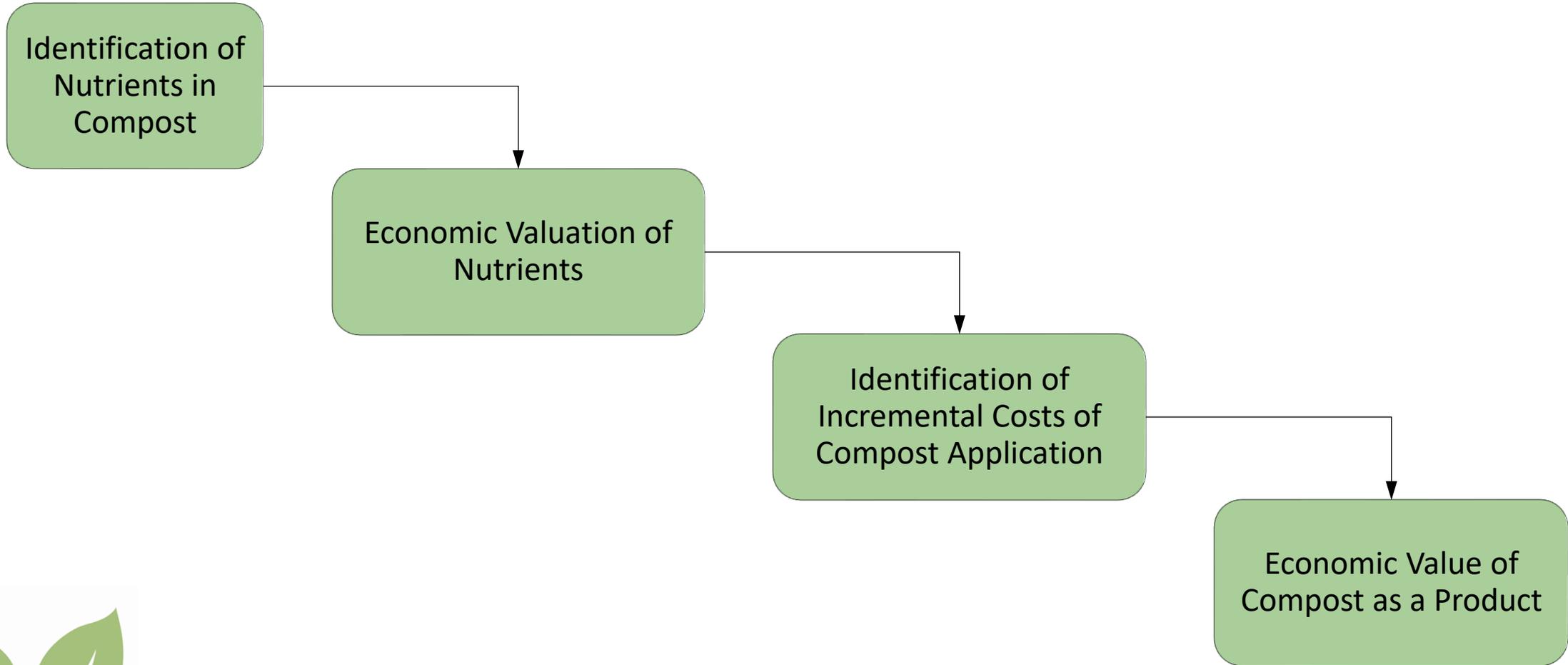
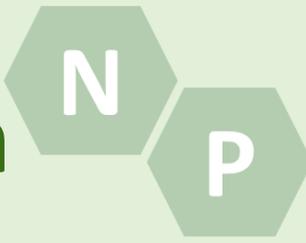
**Nutrients recycling and  
pollution handling**



# **Economic Valuation of Wastewater Sludge Compost as a Product**

**Alberts Auziņš – 24.02.2026**

# General Methodology of the Economic Valuation



# Nutrients in Compost (on a product basis)



## Primary Macronutrients:

- Nitrogen (N) – 1.12–2.16%
- Phosphorus (P) – 1.27–2.59% as  $P_2O_5$
- Potassium (K) –  $\approx 0.07\%$  as  $K_2O$
- Sulphur (S) – 0.63–0.79%

## Organic Matter:

- Carbon (C)

## Secondary Macronutrients:

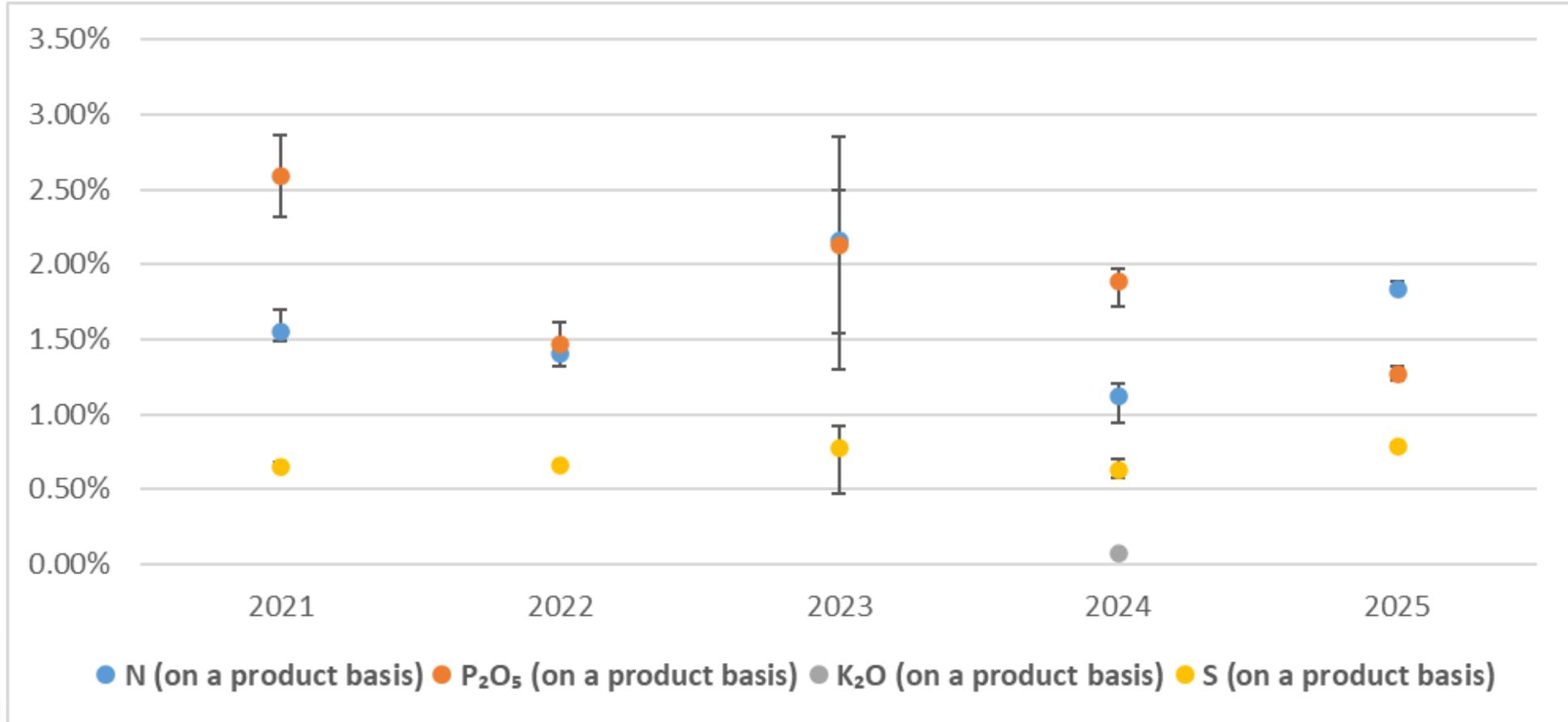
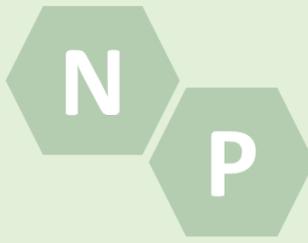
- Calcium (Ca) – 1.23–1.53%
- Magnesium (Mg) – 0.19–0.24%

## Micronutrients:

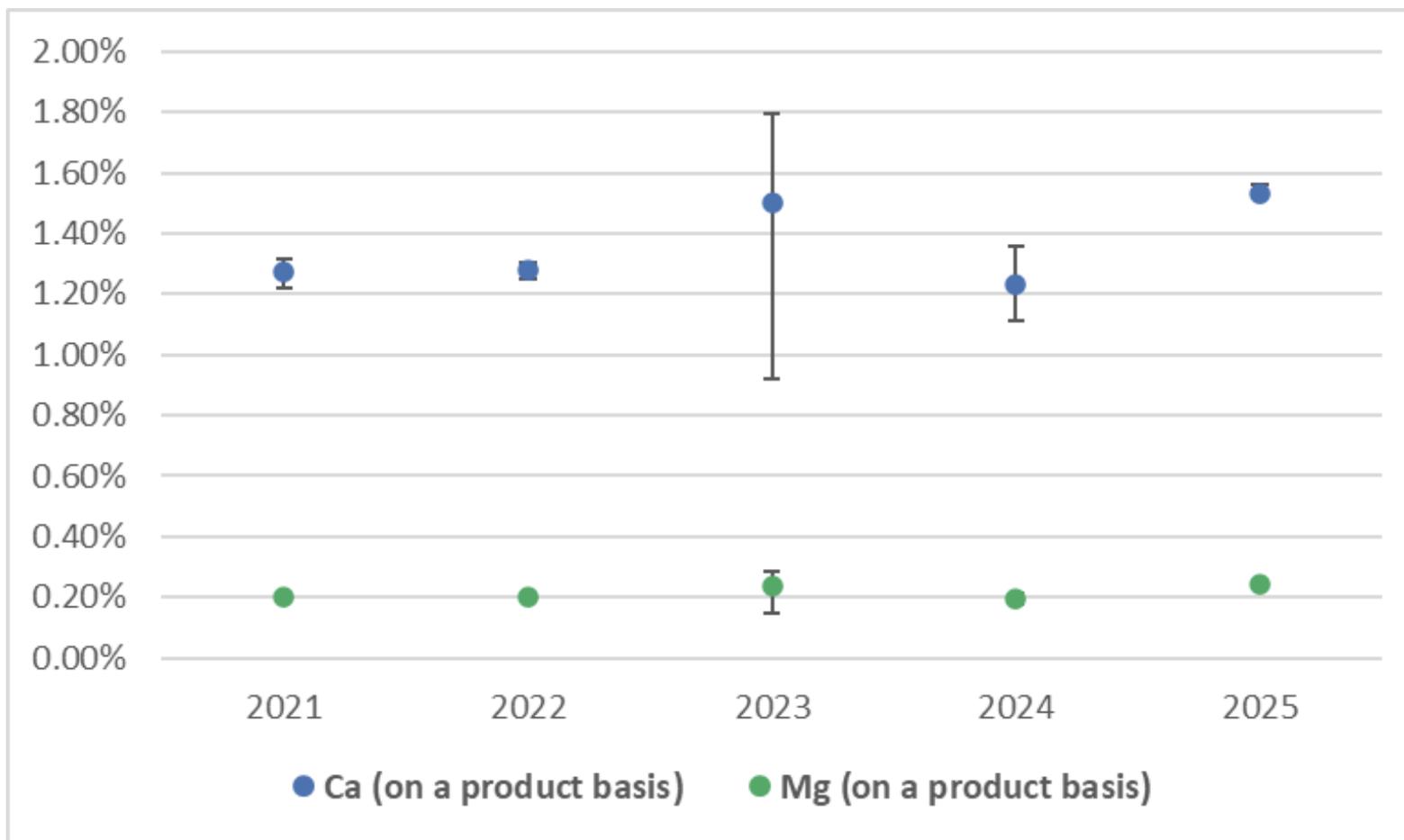
- Zinc (Zn) – 0.026–0.034%
- Copper (Cu) – 0.005–0.008%
- Other: iron (Fe), manganese (Mn), boron (B), molybdenum (Mo), etc.



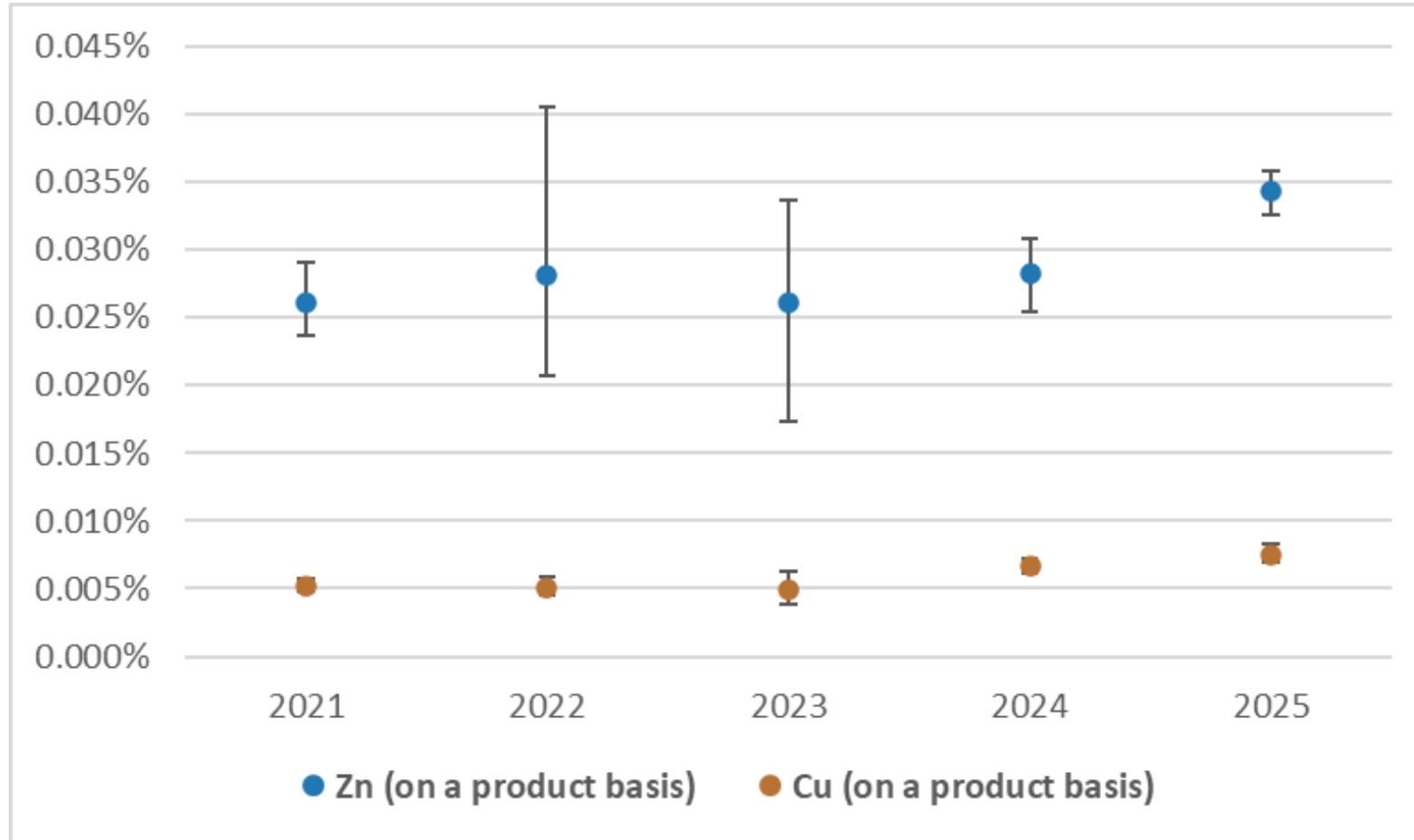
# Primary Macronutrients in Compost



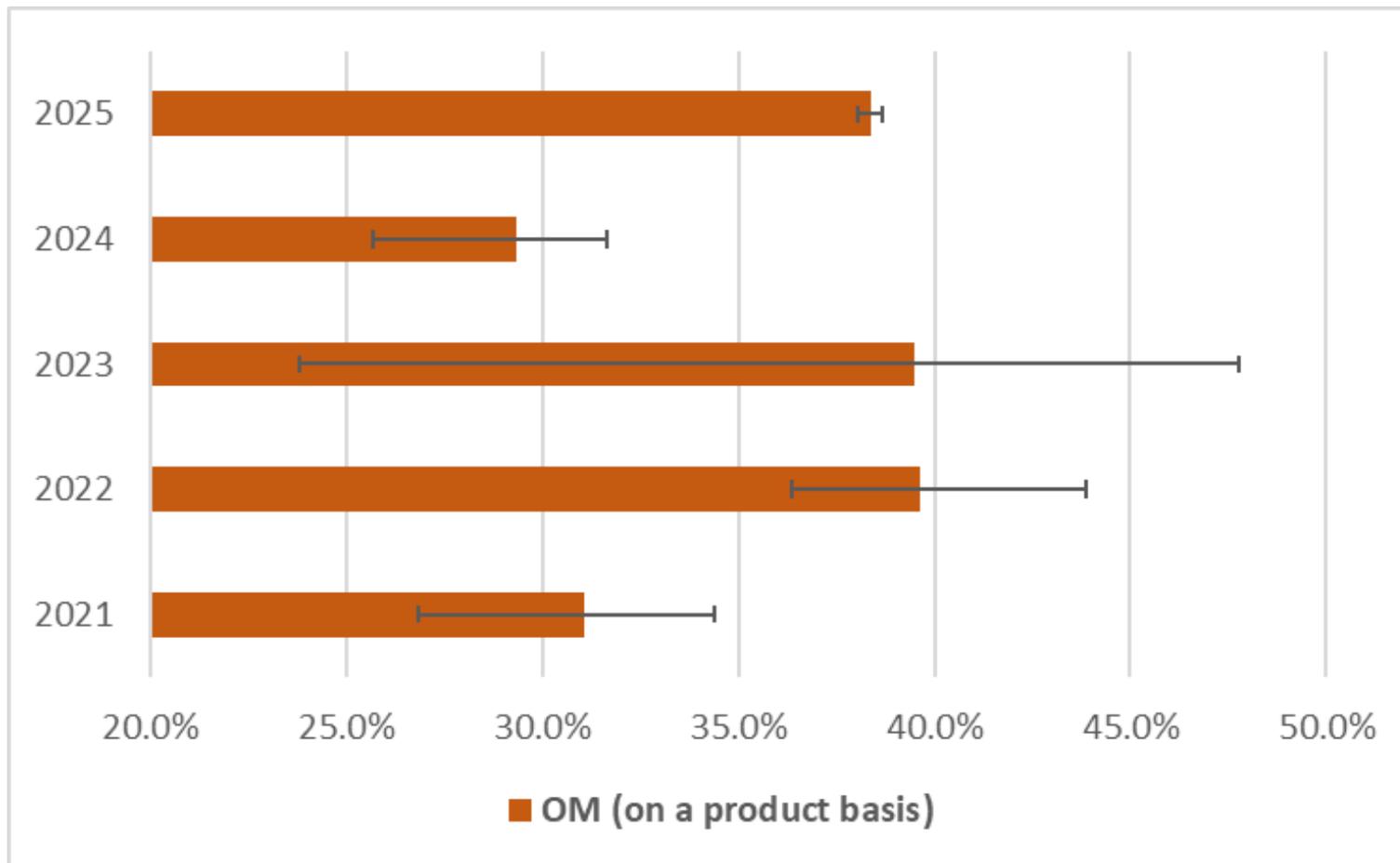
# Secondary Macronutrients in Compost



# Micronutrients in Compost



# Organic Matter in Compost



# Economic Valuation of Nutrients

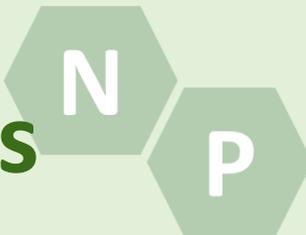


## Reference products:

- Ammonium nitrate (N34) → N value estimate
- Ammonium sulphate (N21+24S) → S value estimate
- Compound fertilizer NPK 15-15-15 + 11S } → P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O value estimates
- Compound fertilizer NPK 8-20-30 + 2S }
- Ground limestone → Ca value estimate
- Dolomitic limestone → Mg value estimate
- YaraVita ZINTRAC → Zn value estimate
- YaraVita COPTRAC → Cu value estimate



# Economic Valuation of Nutrients: Value Estimates



EUR/t

Nutrients	In 2024 prices	In 2025 prices
N	1 059	1 081
P <sub>2</sub> O <sub>5</sub>	1 090	1 221
K <sub>2</sub> O	875	910
S	240	301
Ca	42.06*	42.06
Mg	20.94*	20.94
Zn	12 143*	12 143
Mn	25 600*	25 600

\* in 2025 prices



# Nutrient Uptake Coefficient



Nutrients	Mineral fertilisers	Solid cattle, pig manure (1 + 2 year)	WW sludge compost (1 + 2 year)
N	100%	35%	30%
P <sub>2</sub> O <sub>5</sub>	100%	50%	50%
K <sub>2</sub> O	100%	70%	75%
S	100%	35%*	30%*
Ca	100%	100%	100%
Mg	100%	100%	100%
Zn	100%	100%	100%
Mn	100%	100%	100%

\* assumed the same as N;

■ arbitrary assumption



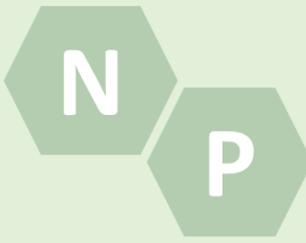
# Incremental Costs of Compost Application



	EUR/t
Compost spreading	4.10
Soil sample collection Assumes labour and transport costs €16.11/ha and compost application rate of 16 t/ha	1.01
Laboratory testing of soil samples Assumes laboratory costs €20.86/ha and compost application rate of 16 t/ha	1.30
<b>Total</b>	<b>6.41</b>



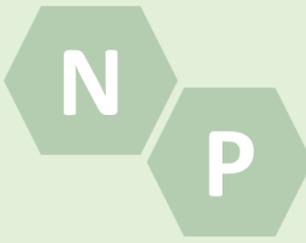
# Economic Value of Compost (2024 prices, EUR/t)



	2024 compost parameters		2025 compost parameters	
	Not adjusted for nutrient uptake	Adjusted for nutrient uptake	Not adjusted for nutrient uptake	Adjusted for nutrient uptake
Economic Value of Nutrients in 1 t of Compost:				
N	11.89	3.57	19.43	5.83
P <sub>2</sub> O <sub>5</sub>	20.60	10.30	13.81	6.90
K <sub>2</sub> O	0.62	0.47	0.62	0.47
S	1.52	0.46	1.89	0.57
Ca	0.52	0.52	0.65	0.65
Mg	0.04	0.04	0.05	0.05
Zn	3.43	3.43	4.18	4.18
Cu	1.72	1.72	1.92	1.92
Total	40.34	20.50	42.55	20.56
Incremental Costs of Compost Application	6.41	6.41	6.41	6.41
<b>Estimated Economic Value of Compost</b>	<b>33.93</b>	<b>14.09</b>	<b>36.14</b>	<b>14.15</b>



# Economic Value of Compost (2025 prices, EUR/t)



	2024 compost parameters		2025 compost parameters	
	Not adjusted for nutrient uptake	Adjusted for nutrient uptake	Not adjusted for nutrient uptake	Adjusted for nutrient uptake
Economic Value of Nutrients in 1 t of Compost:				
N	12.14	3.64	19.84	5.95
P <sub>2</sub> O <sub>5</sub>	23.06	11.53	15.46	7.73
K <sub>2</sub> O	0.65	0.48	0.65	0.48
S	1.91	0.57	2.37	0.71
Ca	0.52	0.52	0.65	0.65
Mg	0.04	0.04	0.05	0.05
Zn	3.43	3.43	4.18	4.18
Cu	1.72	1.72	1.92	1.92
Total	43.47	21.94	45.11	21.67
Incremental Costs of Compost Application	6.41	6.41	6.41	6.41
<b>Estimated Economic Value of Compost</b>	<b>37.05</b>	<b>15.53</b>	<b>38.70</b>	<b>15.26</b>





# Thank you for your attention

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