

EcoPlant[®]



ZM-GROW[™]

A Premium Level Foliar Fertilizer

| Recycled nutrient fertilizers

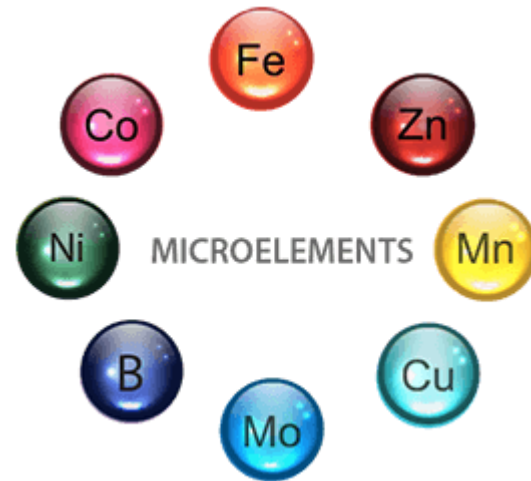
Edmundas Akstinas, Orij Group

Tartu, Estonia

2019-02-07

Conventional vs Organic

- NPK formulas
- Microelements
- Granulated
- Foliar



Balance	15-15-15
	16-16-16
	17-17-17
	18-18-18
	19-19-19
	20-20-20
High K	12-11-18
	12-12-17
	15-5-20
	15-5-25
	15-8-20
	15-9-20
Duck Shape	16-16-8
	20-20-15
High P	11-19-15
High N	21-17-3
	22-9-9
	24-6-10
	24-9-9
	25-5-5
	27-6-6
	28-8-8
	30-9-9
	30-10-10
V Shape	18-8-18
	18-9-18
	19-9-19

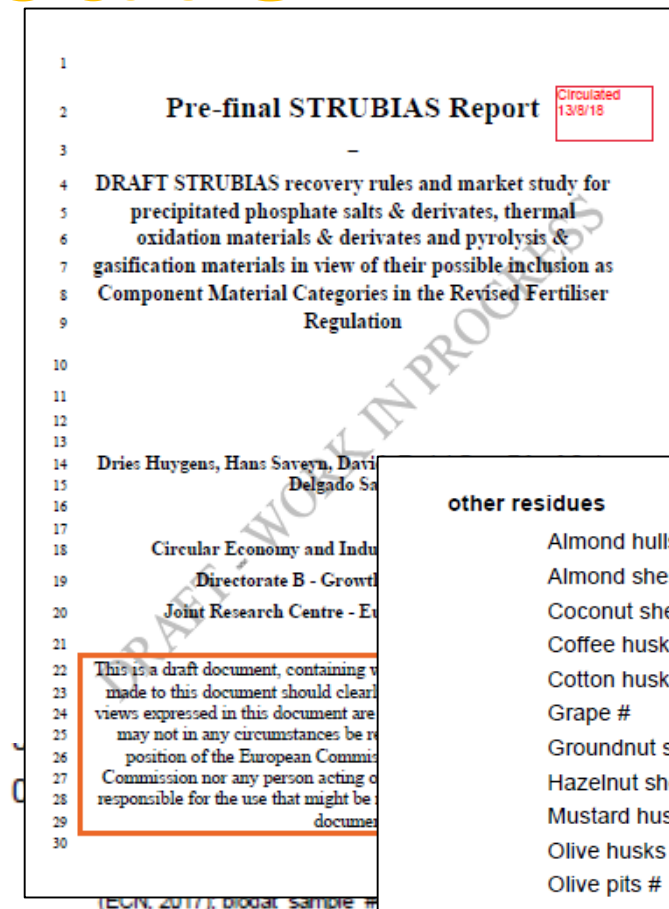
- Manure
- Compost
- Low nutrient NPKs (2-2-1 etc.)



The new fertilizer directive

- Already in the EU Council
- Bio-based ashes will be granted **EC** status
- Focus on circular economy principles
- Local, renewable, sustainable fertilizers
- Decrease dependability on imports

Wood bottom ash	1	1.0	15.0	24.0	0.9	0.3	2.1	0.5	1.3
Wood fly ash	1	29.0	4.6	2.7	1.0	2.9	0.6	0.2	0.2



other residues	
Almond hulls #	
Almond shells #	
Coconut shells #	
Coffee husks #	
Cotton husks #	
Grape #	
Groundnut shells #	
Hazelnut shells #	
Mustard husks #	
Olive husks #	
Olive pits #	
Olive residue #	
Palm fibres-husks #	
Palm kernels #	

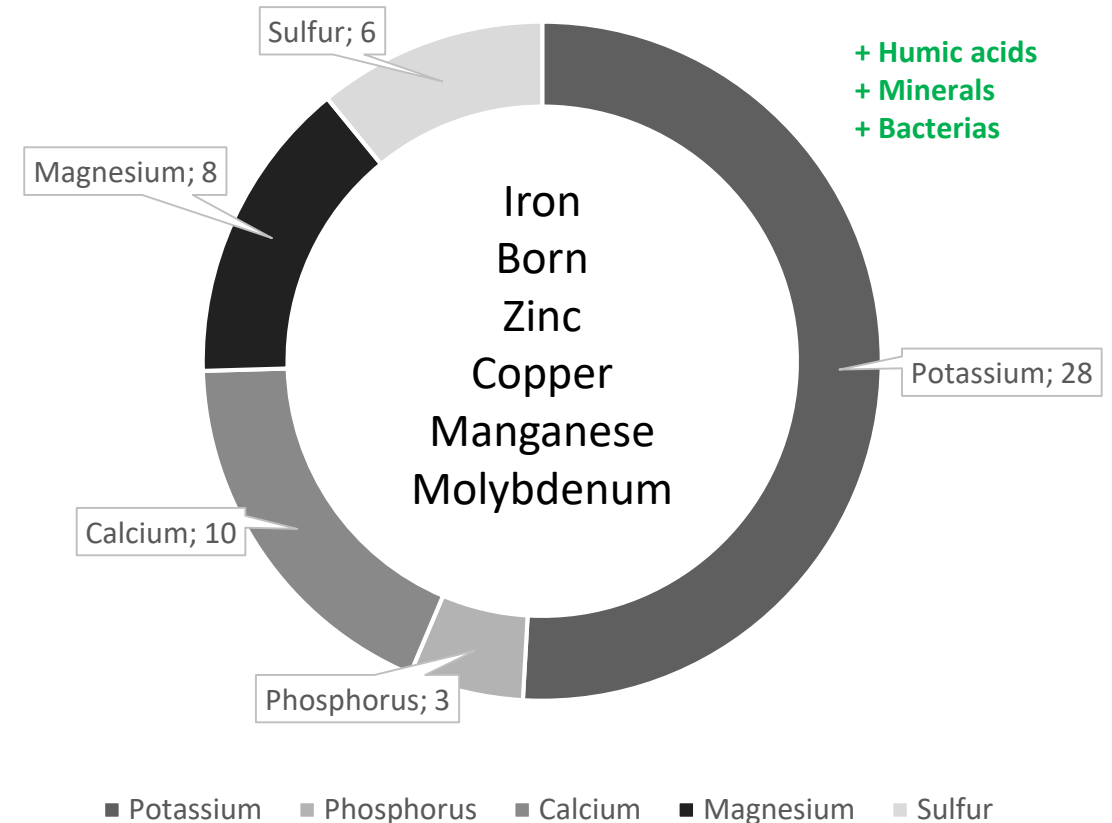
Who are we?

- In the business for over 20 years
- Factory based in Ukraine
- 10 ha territory, 3 railway loading tracks
- Over 70 employees
- Annual production over 25.000 tons
- Exports to EU, China, Taiwan



What is EcoPlant?

- Ash from sunflower husk
- Naturally alkaline with pH 10-12
- Chlorine free
- Reduces soil acidity
- Increases hummus
- Competitive element values



How it's done?

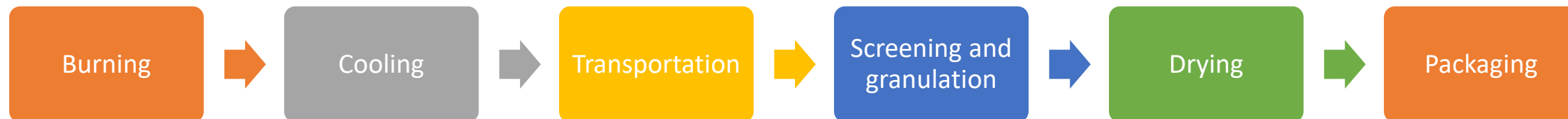


Table 2. Limits for Environmental Samples (EU)

Sample Matrix	Measured Typical Range	Max. Conc. for Contaminated Sites	Units
Soil	<1 - 100	100.000	ng I-TEQ/kg d.m.
Sediment	<1 - 200	80.000	ng I-TEQ/kg d.m.
Air (ambient)	<1 - 100s	14.800	fg I-TEQ/m ³

The limits allowed in various matrices are published by the WHO and other local authorities. Examples for European environmental levels and foodstuff limits (status Feb/2007) are given below (Tables 2. & 3.). The current EU Commission Maximum Levels for dioxins are contained in Commission Regulation 466/2001, amended by Council Regulation 2375/2001. This was implemented in July 2002 and became effective February 2003. These are general guidelines, actual limits and measured concentrations can vary from country to country.

<http://ec.europa.eu/environment/dioxin/download.htm>



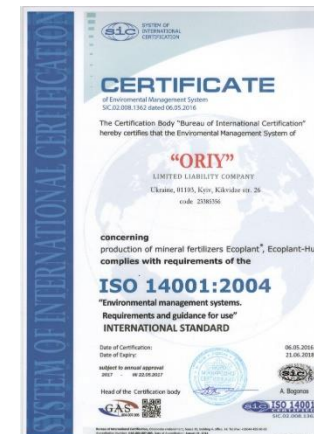
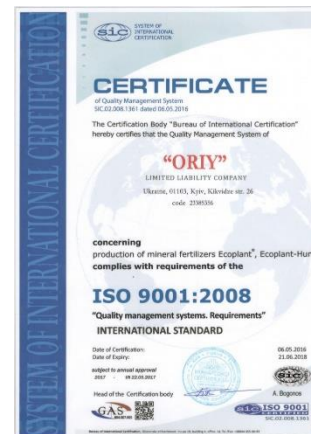
BioDetection Systems

Method	Parameter	Result
DR CALUX	PCDD/PCDF and dl-PCBs (total BEQ; semi)	1.3

For organic?



- Over 20 years in the business
- Experts in granulating organic matter
- ISO standards
- EU certification
- Closed cycle production



What is ZM-grow?

- Premium K,Zn,Mn,S foliar fertilizer
- Unique technology
- Spraying and seed treatment
- Closed cycle production
- Certified organic



Zinc and Manganese

Stunted growth

Increased maturity time

Low product quality

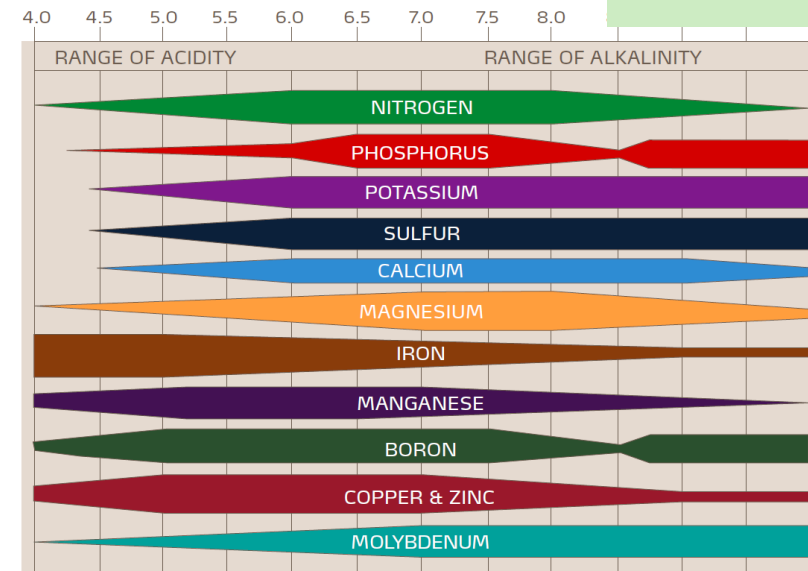
Nitrogen metabolism

Energy transfer

Protein synthesis

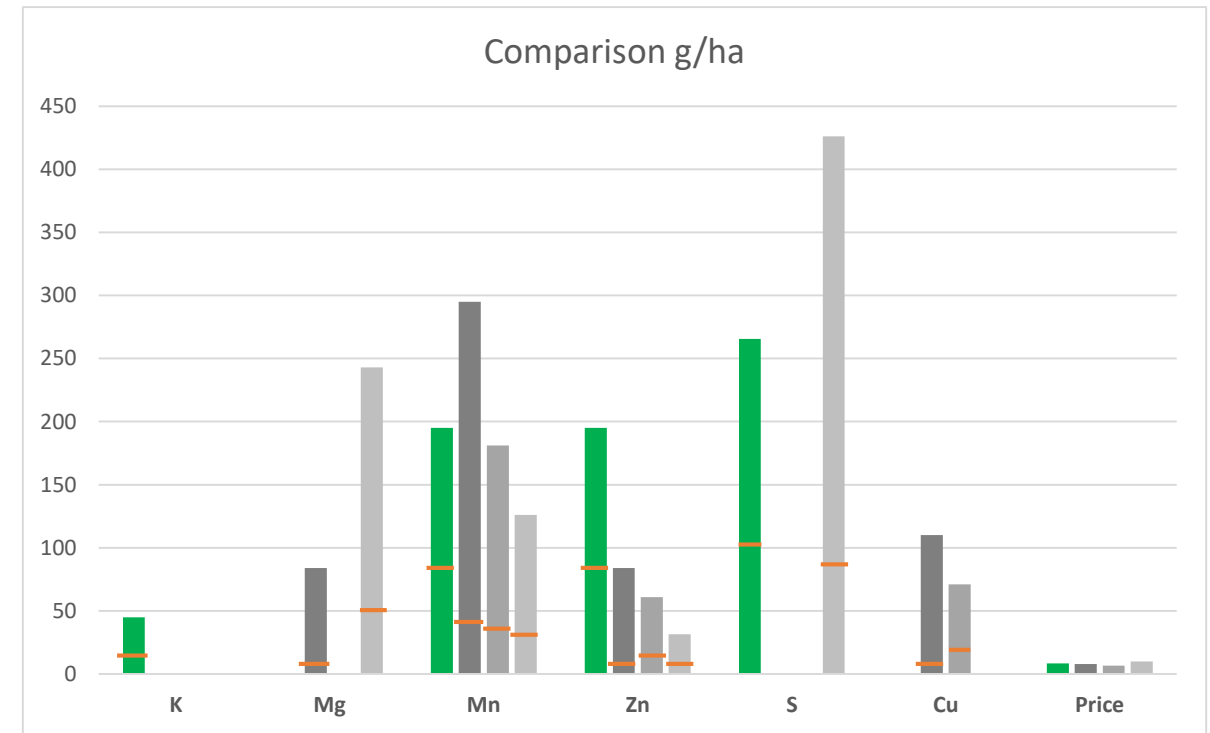
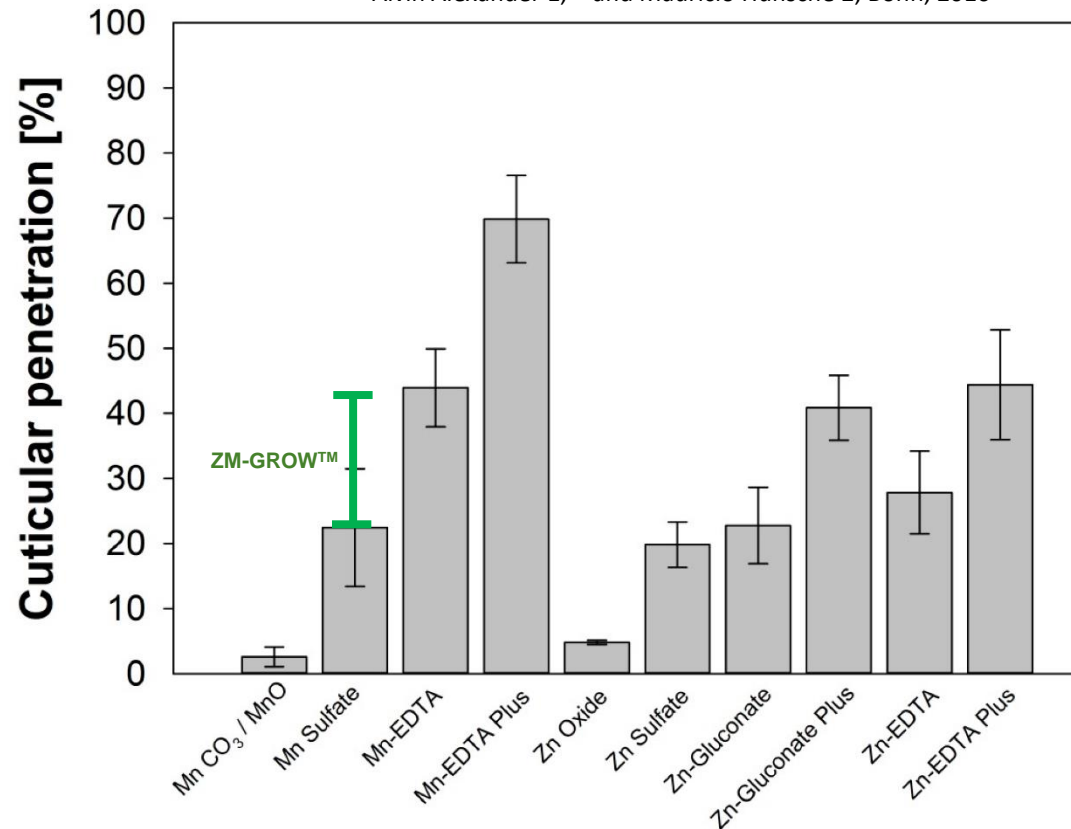
- Slow mobility
- Through full cycle
- Small amounts needed
- Toxic in excess
- Hard to detect

The Influence of Soil pH on Nutrient Availability



Why ZM-grow? Uptake

Alvin Alexander 1,* and Mauricio Hunsche 2, Bonn, 2016



Why ZM-grow? Mixing



- Calcium sulphate/phosphate
- Phosphorus

[illegible]



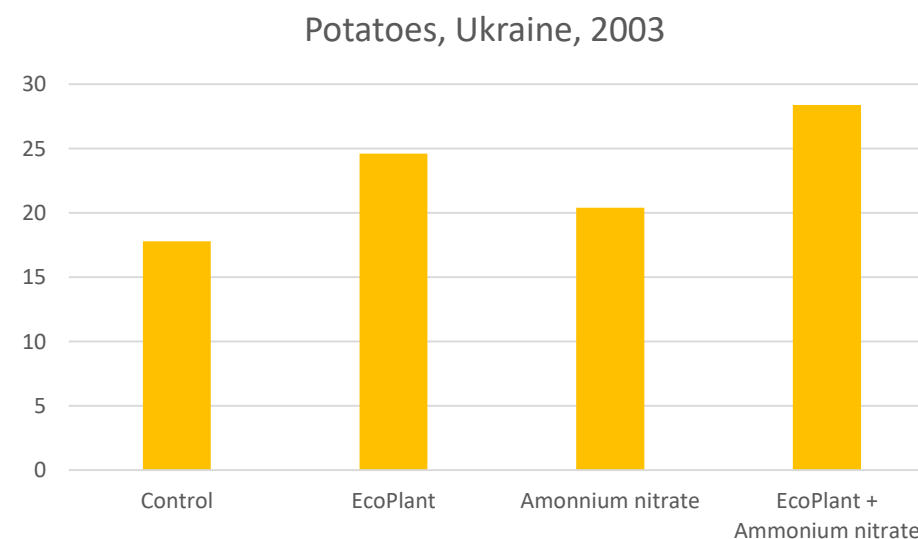
Field trials overview

ZM-GROW™

EcoPlant® 

EcoPlant: Potatoes

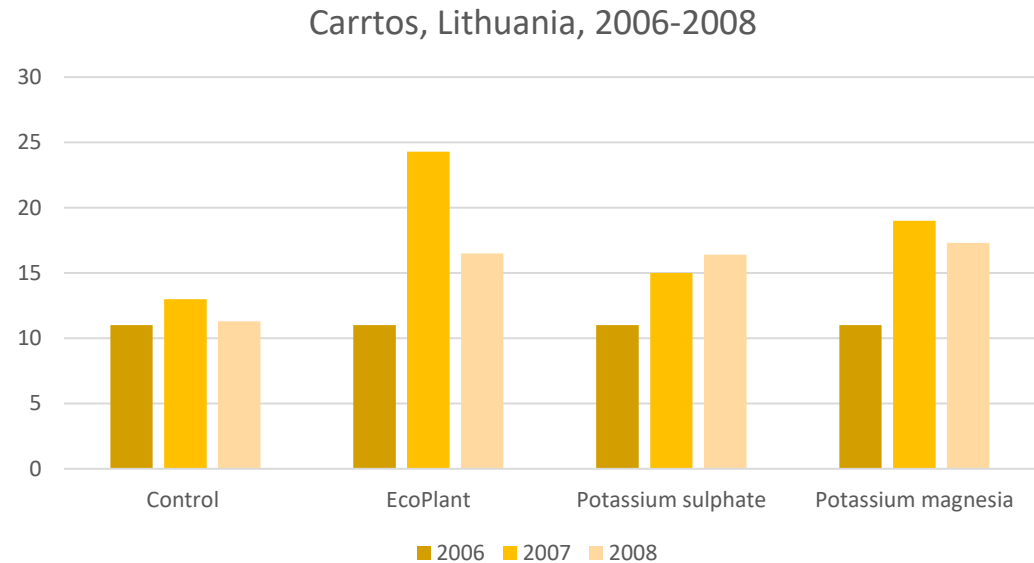
- **Product:** EcoPlant
- **Plant type:** Potatoes
- **Country:** Ukraine
- **Year:** 2003
- **Soil type:** chernozem, sod-podzolic
- **Partners:** Ukrainian national agro academy
- **Results:** Increased yield from control by 28%, EcoPlant + ammonium nitrate resulted in increased yield by 37%



EcoPlant: Carrots



- **Product:** EcoPlant
- **Plant type:** Carrots
- **Country:** Lithuania
- **Year:** 2006-2008
- **Soil type:** sandy loam, light loam
- **Partners:** LAMMC
- **Results:** In 2006 no notable yield was obtain due to the period of high drought. In 2007 EcoPlant performed best with yield increase of 46.5%. In 2008 EcoPlant resulted in yield increase of 32%.



EcoPlant: Grain (I)

- **Product:** EcoPlant
- **Plant type:** Winter wheat
- **Country:** Lithuania
- **Year:** 2010-2013
- **Soil type:** sandy loam
- **Partners:** Private farmers
- **Results:** The first year carrots were planted on two fields with fertilization EcoPlant vs. NPK. The second year cabbage was planted, same fertilization. The third year winter wheat was planted in both fields with no fertilization. On the left we see wheat after two years of EcoPlant. The field on the right had to be re-seeded.



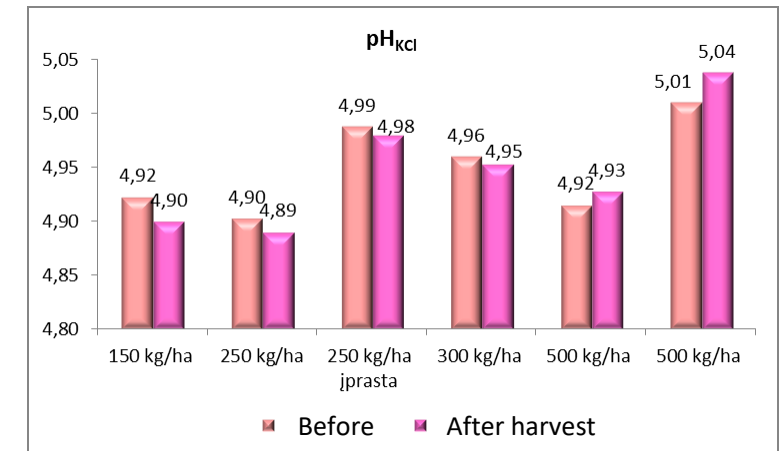
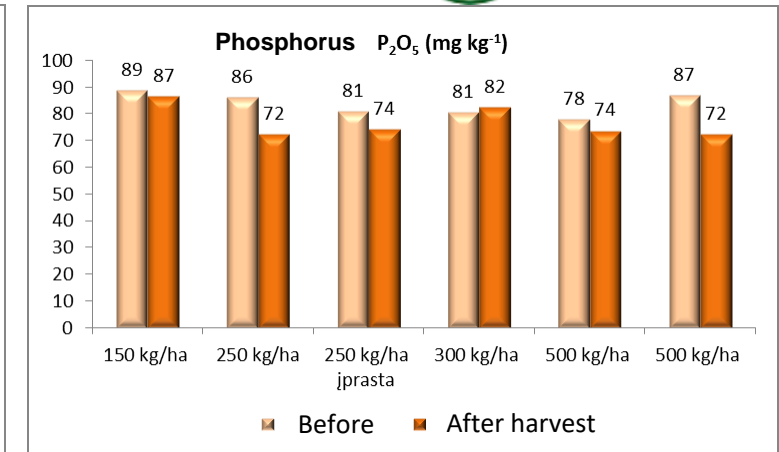
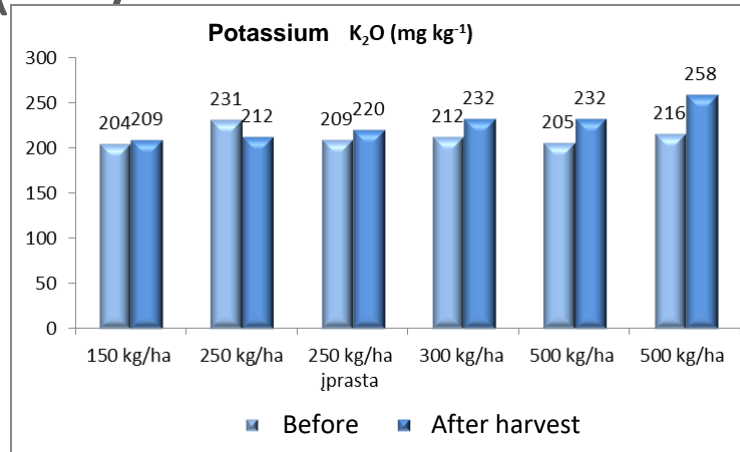
EcoPlant: Grain (II)

- **Product:** EcoPlant humi
- **Plant type:** Oats
- **Country:** Estonia
- **Year:** 2018
- **Soil type:** sandy
- **Partners:** Estonian University of Life Sciences
- **Results:** EcoPlant humi achieved the quickest yield in the first stage of growth. While the final yield did not show relative difference, EcoPlant achieved the best result in crop quality and specifications.



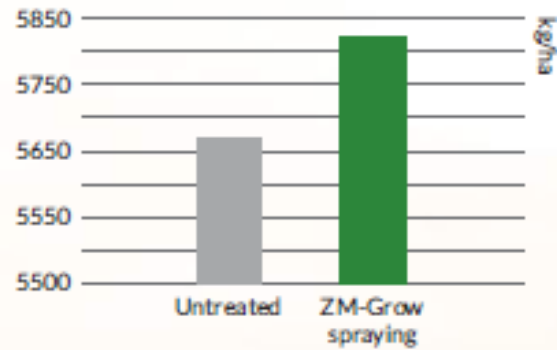
EcoPlant: Grain (III)

- **Product:** EcoPlant humi
- **Plant type:** Wheat
- **Country:** Lithuania
- **Year:** 2017
- **Soil type:** light and medium loam
- **Partners:** LAMMC
- **Results:** Element intake before / after harvest was researched. With the wheat yield of 5t/ha, Potassium, Phosphorous, Calcium was replenished to the soil. Bigger dosages allow pH regulation.

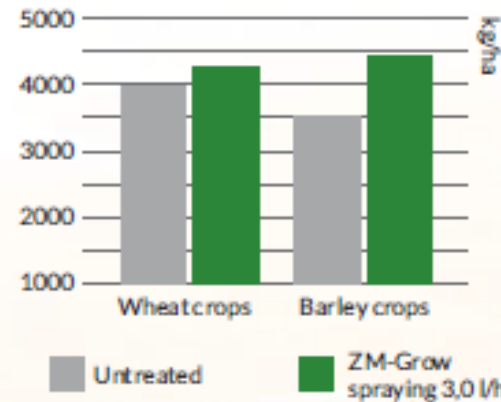


ZM-grow: 2015-2018

Oats, Ruukki 2015



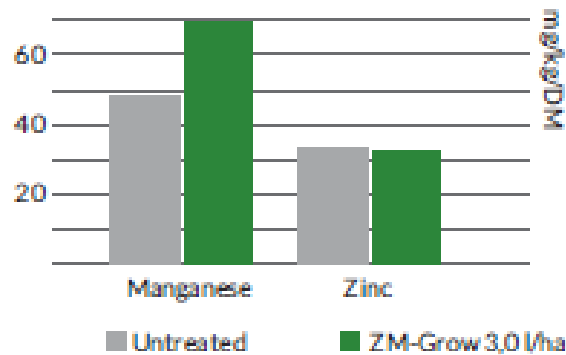
Wheat and barley, Västarkvarn 2017



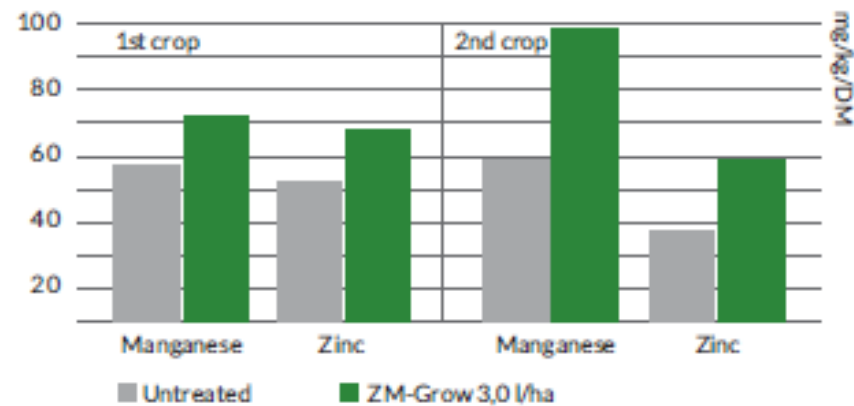
Seed treatment, Västarkvarn 2018



Manganese and zinc content in corn, Ylistaro 2018



Manganese and zinc content in grass, Maalahti 2017



Let's talk more

Edmundas Akstinas

Commerce director | ORIJ GROUP

edmundas@ecoplant.ua

+370 655 20557

