

## Nutrient use efficiency- *Controlled release fertilizers in potatoes*

Optimum efficiency of mineral fertilizers is essential for a sustainable agricultural production. With the increasing world demand for food and energy, this is set to become an ever-increasing priority. There is an absolute requirement to maximize efficiency, using both agronomic and plant breeding approaches.

Nutrient use efficiency may be defined as yield per unit fertilizer input, or in terms of recovery of fertilizer applied.

Nitrogen is the nutrient applied at highest rates in agriculture. According to the FAO database, total nitrogen consumption came up to 99.6 million MT in 2013. Globally, nitrogen use efficiency (NUE) for cereal production is estimated at merely 33-40%. The unaccounted 60-67% represents ~\$20 billion annual loss of N fertilizer, by soil de-nitrification, volatilization, surface runoff, and leaching (William & Johnson, 1999). These reasons made it the nutrient lost at highest rates in agriculture. The fraction that is lost from the cropping system is the source of much of the environmental pollution associated with fertilization.

Numerous studies demonstrate that Controlled Release Fertilizers provide significant reduction in nitrogen losses and considerably increased nutrients usage efficiencies, hence increased yields and quality.

### TRIAL: **Controlled Release Fertilizer in Seed potatoes, The Netherlands, 2015**

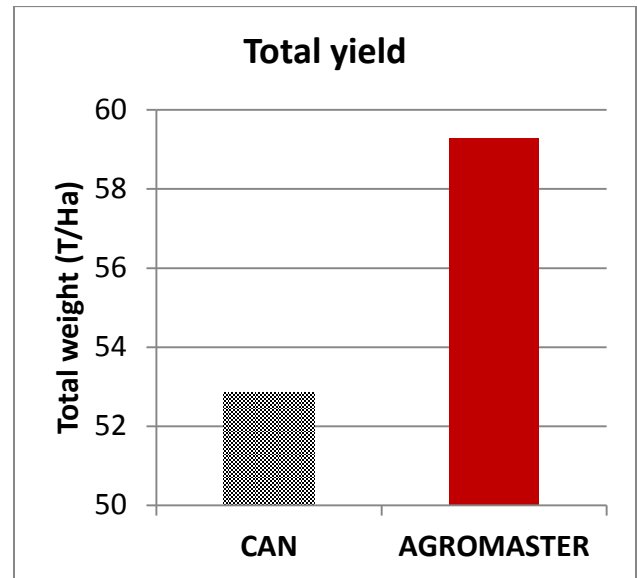
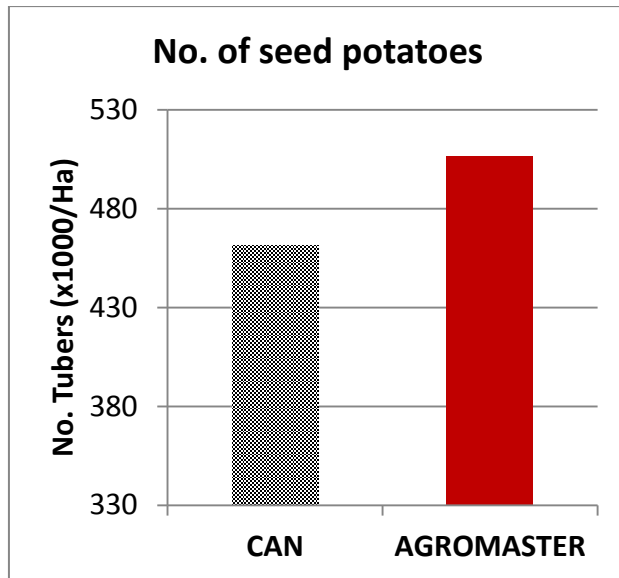
Country/Location:	Netherlands/ Proefcentrum Zwaagdijk, ~60 km North of Amsterdam	
Season:	Sowing: spring 2015	Harvest: summer 2015
Crop/Cultivar:	Potatoes (Spunta)	
Cultivation system:	Open field, soil type: loam	
Treatments:	CAN: N= 127 kg/ha. Agromaster ( 100% coated Urea 44-0-0): N =127 kg/ha. P & K applications were identical for both treatments	

#### Parameter evaluated:

<u>Term</u>	<u>Calculation</u>	<u>Explanation</u>
Partial factor productivity (PFP)	$PFP = Y/F$	Simplest expression of productivity under certain nutrient application
<i>Y = Yield of harvested portion of crop, when the said nutrient is applied</i>		
<i>F = Application rate of said nutrient</i>		

## RESULTS:

Figures 1 & 2: The effect of N treatments on:



## NUTRIENT USE EFFICIENCY:

N Treatment (kg/ha)	Fertilizer type	Tuber No. (number/ha)	<u>PPF</u> Tuber No. (No. of tubers /kg N)	Tuber yield (MT/ha)	<u>PPF</u> Tuber yield (Kg of tubers /kg N)
127	CAN 27%N	461200	3631.5	52.8	416
127	AGROMASTER (coated N)	506500	3988.2	59.3	467
Ratio AGROMASTER vs CAN			+9.8%		+12.3%

## CONCLUSION:

The Nutrient Use Efficiency parameter evaluated shows that the Coated N treatment produced 9.8% more tubers and 12.3% more yield per applied nutrient when compared to CAN.

Moreover, the Agromaster treatment produced a 14% improved return on investment vs the CAN treatment.

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