KREOTEC

KREOTEC Case Study
GHG Emissions & Yield
Barley Spain 2020

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21% REDUCTION IN GHG EMISSIONS PER TONNE OF GRAIN WITH KREOTEC APPLICATION

27% INCREASE IN YIELD IN KREOTEC TREATMENT COMPARED TO CONTROL

Barley Registration Trials – Spain
Results reported 13 November 2020

Objective of trial:

To evaluate the effects of KREOTEC on the yield of cereal crops (winter barley) through a replicated field trial.

Location: northeast of Spain, municipality of Torroella de Fluvia (Girona)

Treatments:

1. Control
2. KREOTEC applied at 200g/ha at 4-6 leaf stage

Relevant agronomy:

The soil was ploughed before sowing, with fertiliser applied at sowing. A standard rate of fertiliser (6-8-8 NPK) was applied at the rate of 1000 kg/ha across the whole trial.

This equates to:

- 60kg N/ha
- 80kg P/ha
- 80kg K/ha

Crop protection: 7/4/20 – Prosaro applied (2 actives)

No irrigation was used.

Sowing date: 11 December 2019

Harvest date: 15 June 2020

Relevant soil properties:

- Mineral N: 47kg N/ha
- Soil pH: 8.0 (1:2.5 water)
- Organic Matter: 2.41% (W&B test)
- Texture: sandy loam (47.6% sand, 22.9% silt, 29.5% clay)
- Drainage: adequate

Yield:

1. Control – 1,363 kg/ha
2. KREOTEC – 1,739 kg/ha

Greenhouse gas estimation:

The Cool Farm Tool (https://coolfarmtool.org/) was used to estimate GHG emissions (web portal, accessed 10 Dec 2020), using the parameters listed above.

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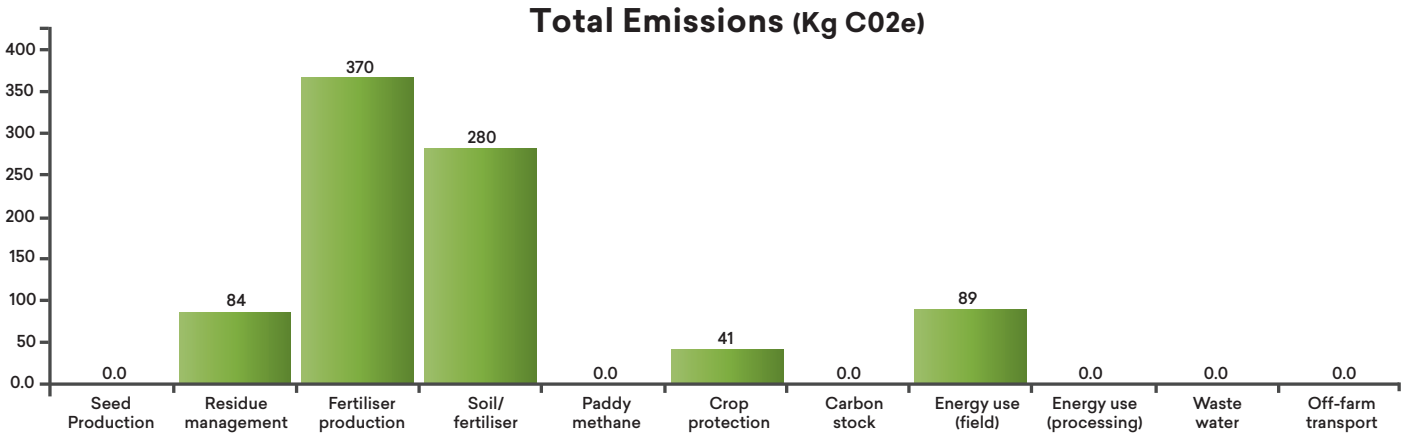
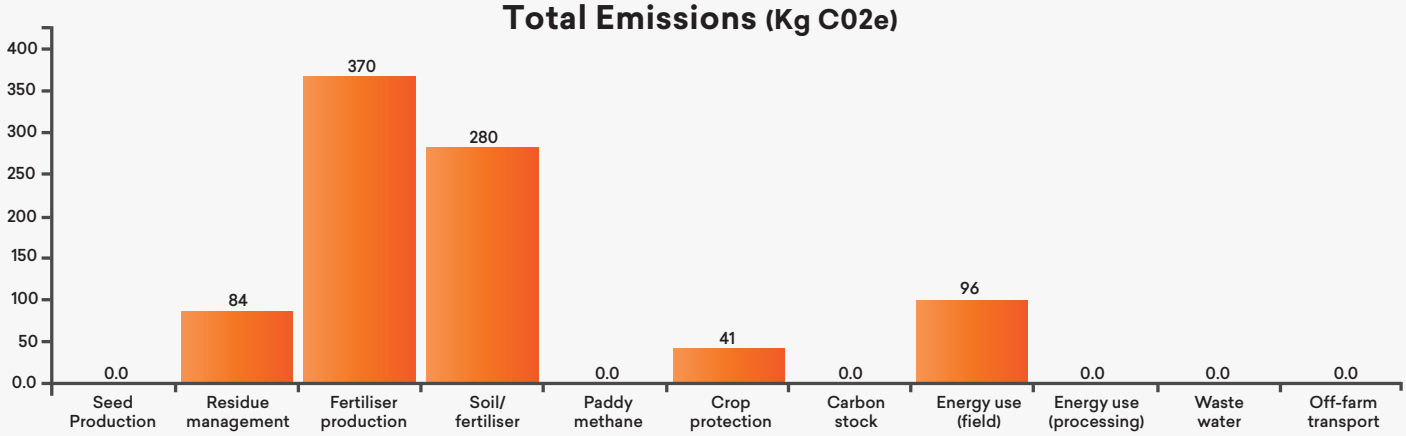
CONTROL GHC EMISSIONS AND YIELD

EMISSIONS PER HECTARE	EMISSIONS PER KILOGRAM	YIELD
860.27	**0.63**	**1,363**
kg C02e	kg C02e	kg/ha



KREOTEC GHC EMISSIONS AND YIELD

EMISSIONS PER HECTARE	EMISSIONS PER KILOGRAM	YIELD
867.23	**0.50**	**1,739**
kg C02e	kg C02e	kg/ha



21% REDUCTION IN GHG EMISSIONS PER TONNE OF GRAIN WITH KREOTEC APPLICATION

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Control GHC emissions detailed data (all values in kg)

Sources	$C0_2$	N_20	CH_4	Total $C0_2$ eq	Per ha	Per kg
Seed production	0	0	0	0	0	0
Residue management	0	0.28	0	84.02	84.02	0.06
Fertiliser production*	365.68	0	0	365.68	365.68	0.27
Soil/fertiliser	0	0.94	0	280.38	280.38	0.21
Paddy methane	0	0	0	0	0	0
Crop protection	41	0	0	41	41	0.03
Carbon stock changes	0	0	0	0	0	0
Energy use (field)	89.19	0	0	89.19	89.19	0.07
Energy use (processing)	0	0	0	0	0	0
Waste water	0	0	0	0	0	0
Off-farm transport	0	0	0	0	0	0

**Calculated with validated default values for fertiliser production.*

KREOTEC GHC emissions detailed data (all values in kg)

Sources	$C0_2$	N_20	CH_4	Total $C0_2$ eq	Per ha	Per kg
Seed production	0	0	0	0	0	0
Residue management	0	0.28	0	84.02	84.02	0.05
Fertiliser production*	365.68	0	0	365.68	365.68	0.21
Soil/fertiliser	0	0.94	0	280.38	280.38	0.16
Paddy methane	0	0	0	0	0	0
Crop protection	41	0	0	41	41	0.02
Carbon stock changes	0	0	0	0	0	0
Energy use (field)	96.15	0	0	96.15	96.15	0.06
Energy use (processing)	0	0	0	0	0	0
Waste water	0	0	0	0	0	0
Off-farm transport	0	0	0	0	0	0

**Calculated with validated default values for fertiliser production.*

Photo 1. General view of the trial at the end of January.

Photo 2. General view of the test on the day of the application

Assumptions used in the calculation:

1. No land use, management or cover crop change in the last 20 years
2. All residue management is standard (default residue is 1.78t/ha)
3. Residue distributed, incorporated or mulched
4. Land size is 1ha
5. Soil type: coarse (sandy)
6. Soil moisture average: moist
7. Fertiliser manufactured in Europe (2014 benchmark)
8. Prosaro was applied post-emergent as a fungicide (with two active ingredients/doses)
9. No transport included

Diesel usage – based on best bet machinery selection from CFT

- Pre-sowing ploughing – disc harrows - 4.59 L/ha
- Sowing – grain drill, - 0.34 L/ha
- Fertiliser spreading – 7.6 L/ha
- Fungicide (biocide spraying) – 1.40L/ha
- Kreotec only – ('biocide spraying) – 1.40 L/ha
- Harvesting – combine – 19.36 L/ha

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10 Dec 2020

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