



AGNYTE



Comparison of relative changes in greenhouse gas emissions with the addition of Agynte

Canola Demonstration – Sth NSW, Australia

Objective of trial:

To evaluate the effects of Agynte on the growth, yield and quality of Canola, comparing a standard fertiliser program with and without applying Agynte and a standard fertiliser program with a 37% reduction in applied Nitrogen with applied Agynte.

Location:

Rand, Sth NSW, Australia

Treatments:

1. 100% applied N
2. 100% applied N + Agynte
3. 63% applied N + Agynte

Relevant agronomy:

The canola crop was planted using No-till practices following a wheat crop (stubble retained).

Relevant Soil Analysis Results

Organic matter (W&B) (%):	1.4
pH (CaCl ₂):	4.8
Electrical Conductivity (1:5 water)	0.08
Content P - Colwell (mg/kg)	38
Avail K (mg/kg)	270
Content S (KCl40) (mg/kg)	9
Calcium (Amm-acet cmol+/kg)	5.7
Magnesium (Amm-acet cmol+/kg)	2.5
Potassium (Amm-acet cmol+/kg)	0.69
Sodium % of Cations (ESP)	2.9
CEC (cmol+/kg)	9.3

Applied Fertiliser

Pre-Sowing	2.5t/ha of lime broadcast 1t/ha Gypsum (0-0-0-18.5)
Sowing	80kg/ha MAP (10-21.9-0-1.5) 50kg/ha Urea (46-0-0-0)
Top Dress 1 (all treatments)	100kg/ha Urea (46-0-0-0)
Top Dress 2 (100%N treatments)	100kg/ha Urea (46-0-0-0)

This equates to:

	100% N treatments	63% N Treatments
Nitrogen	123kg/ha	77kg/ha
Phosphorus	17.5kg/ha	17.5kg/ha
Potassium	0kg/ha	0kg/ha
Sulphur	185kg/ha	185kg/ha

Crop protection

3 herbicide applications

No irrigation was used.

Sowing date

20 April 2022

Harvest date

4 December 2022

Yield Results

100% Applied N	4.20t/ha
100% Applied N + Agnyte	4.32 t/ha
63% Applied N + Agnyte	4.21t/ha

Greenhouse gas estimation:

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

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 (based on crop yield)
3. Residue distributed, incorporated or mulched
4. Land size is 1ha
5. Soil type: fine (clay)
6. Soil moisture average: dry
7. Fertiliser manufactured in SE Asia (2014 benchmark)
8. As all treatments received the same pesticides these were not included
9. No transport included

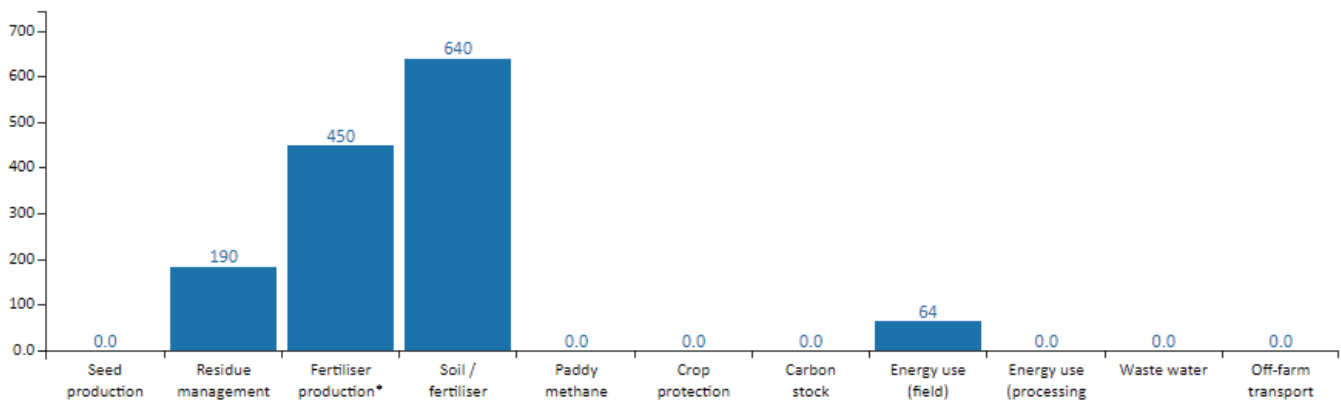
Diesel usage assumptions

- Sowing – 5lt/ha
- Spraying -1lt/ha
- Fertiliser spreading – 1lt/ha
- Windrowing – 4lt/ha
- Harvesting – combine – 8lt/ha

100% N ONLY

TOTAL EMISSIONS 1.34k kg CO ₂ e	EMISSIONS PER HECTARE 1.34k kg CO ₂ e	EMISSIONS PER TONNE 318.99 kg/ha
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Total Emissions (kg CO₂e)



Detailed data (all values in kg)

[Hide data](#)

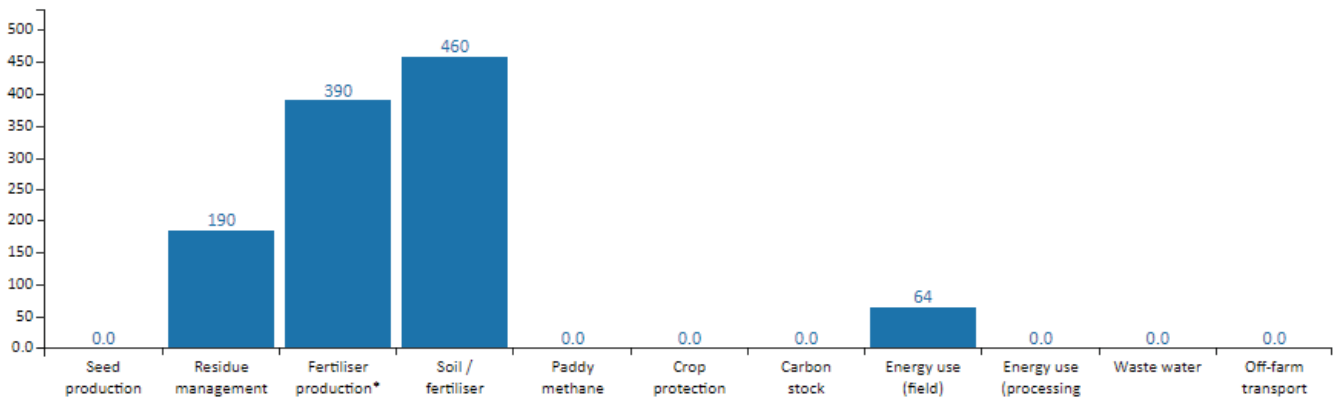
Sources	CO ₂	N ₂ O	CH ₄	Total CO ₂ eq	Per ha	Per tonne
Seed production	0	0	0	0	0	0
Residue management	0	0.68	0	185.02	185.02	44.05
Fertiliser production*	450.07	0	0	450.07	450.07	107.16
Soil / fertiliser	183.94	1.67	0	640.34	640.34	152.46
Paddy methane	0	0	0	0	0	0
Crop protection	0	0	0	0	0	0
Carbon stock changes	0	0	0	0	0	0
Energy use (field)	64.32	0	0	64.32	64.32	15.31
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.

63% N + AGNYTE

TOTAL EMISSIONS 1.10k kg CO2e	EMISSIONS PER HECTARE 1.10k kg CO2e	EMISSIONS PER TONNE 261.25 kg/ha
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Total Emissions (kg CO2e)



Detailed data (all values in kg)

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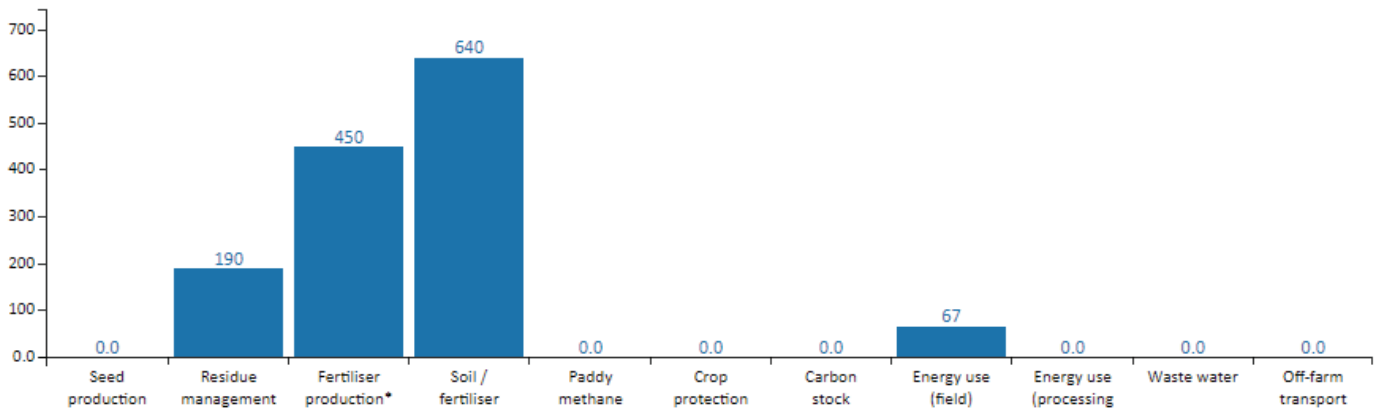
Sources	CO ₂	N ₂ O	CH ₄	Total CO ₂ eq	Per ha	Per tonne
Seed production	0	0	0	0	0	0
Residue management	0	0.68	0	185.27	185.27	44.01
Fertiliser production*	390.71	0	0	390.71	390.71	92.81
Soil / fertiliser	110.61	1.28	0	459.58	459.58	109.16
Paddy methane	0	0	0	0	0	0
Crop protection	0	0	0	0	0	0
Carbon stock changes	0	0	0	0	0	0
Energy use (field)	64.32	0	0	64.32	64.32	15.28
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.

100% N + AGNYTE

TOTAL EMISSIONS 1.35k kg CO ₂ e	EMISSIONS PER HECTARE 1.35k kg CO ₂ e	EMISSIONS PER TONNE 311.60 kg/ha
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Total Emissions (kg CO₂e)



Detailed data (all values in kg)

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Sources	CO ₂	N ₂ O	CH ₄	Total CO ₂ eq	Per ha	Per tonne
Seed production	0	0	0	0	0	0
Residue management	0	0.69	0	188.72	188.72	43.69
Fertiliser production*	450.07	0	0	450.07	450.07	104.18
Soil / fertiliser	183.94	1.67	0	640.34	640.34	148.23
Paddy methane	0	0	0	0	0	0
Crop protection	0	0	0	0	0	0
Carbon stock changes	0	0	0	0	0	0
Energy use (field)	67	0	0	67	67	15.51
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.



Conclusions:

Replacing 37% of nitrogen with Agnyte resulted in no yield difference, but reduced emissions by 58kg CO₂e/tonne of canola produced or 240 CO₂e kg/ha.

Adding Agnyte to the 100% N treatment increased yield by 0.12t/ha, but reduced emissions by 7kgCO₂e/tonne of canola produced with little or no impact on the emissions per hectare.