

The New Zealand Institute for Plant & Food Research Limited

Plant & Food
RESEARCH

RANGAHAU AHUMĀRA KAI



Biomass for Biofuel with Closed-loop N Supply, Grown on Marginal Land

Research team:

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Research Aim



Mitigation of Agricultural Greenhouse Gases (GHG):

- Substitution of biofuels for fossil fuels used on the farm and by rural trucking.
- Substitution of recycled crop nutrients for fertilisers that are fossil fuel intensive.
- Produce the biomass for this use on 'marginal' land.

Benefits to rural communities:

- local, reliable fuel for farm and freight vehicles.
- new land use opportunities.

Advantages of anaerobic digestion



The AD conversion technology yields 3-4 times more vehicle fuel (km of travel per ha of biomass) than from using the biomass to make liquid fuels.

AD is an excellent process for returning nutrients to crop land; they are in a crop-available form in the digestate. This avoids using energy to produce N fertiliser.

Feedstocks for anaerobic digestion



Types of AD feedstocks include:

- livestock manure;
- wastes from food and other processors;
- crop residues; and
- Purpose grown crops.

Crops screened for CLN system



<u>Common name</u>	<u>Species</u>
Maize	<i>Zea mays</i>
Sorghum	<i>Sorghum bicolor</i>
Pearl millet	<i>Pennisetum glaucum</i>
Forage sunflower	<i>Helianthus annuus</i>
Jerusalem artichoke	<i>Helianthus tuberosus</i>
(Lucerne)	<i>Medicago sativa</i>

Maize 33M54 (long) and 38H20 (short season)



Sorghum 'Sugargraze'

and Jumbo



Sorghum 'Sugargraze'

and Jumbo



Jerusalem artichoke



The right 'marginal' land



Sites vulnerable to moderate water stress are defined as those with annual soil moisture deficit > 50mm