

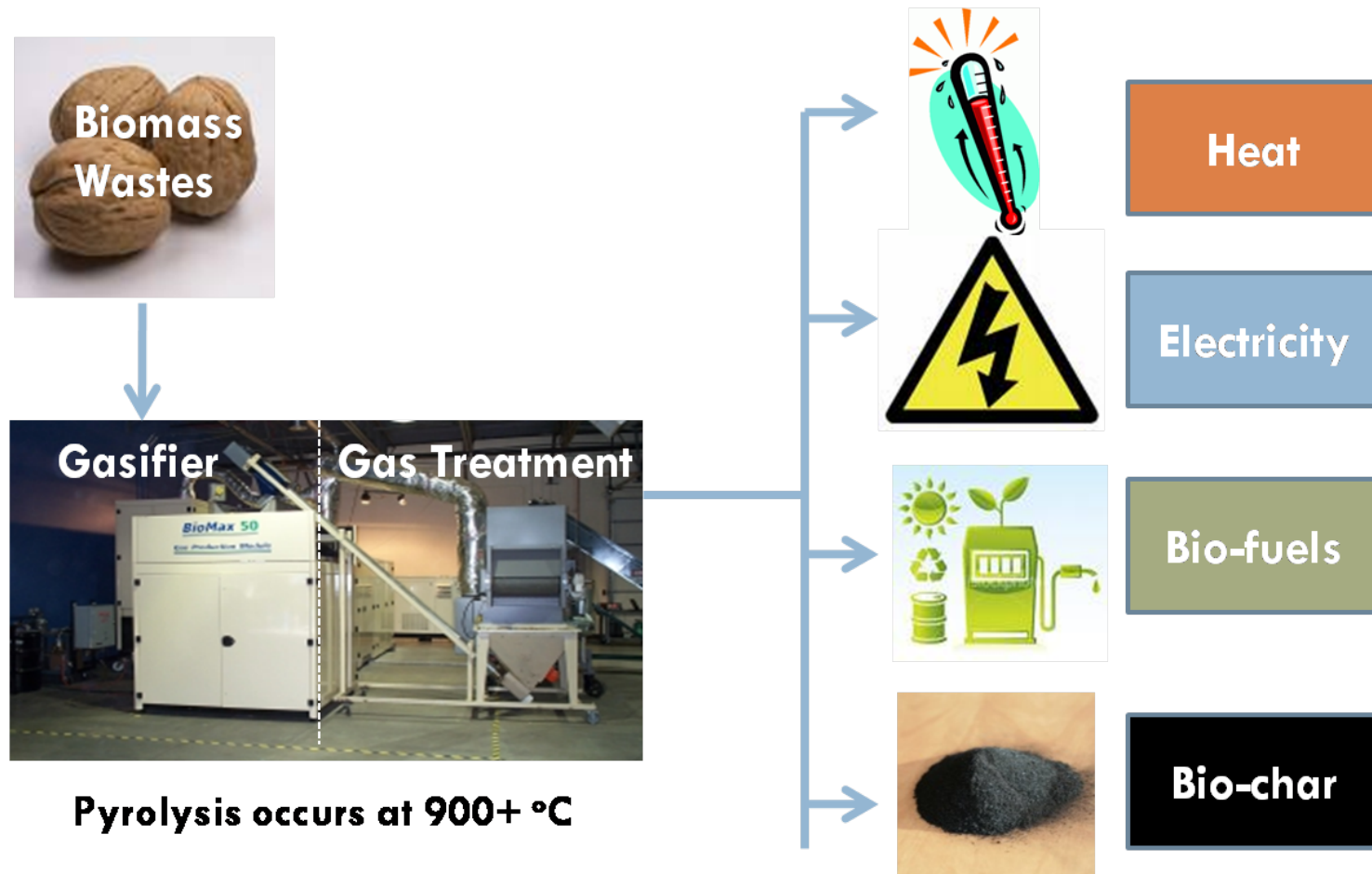
Enhancing soil quality and carbon sequestration through biochar soil amendments

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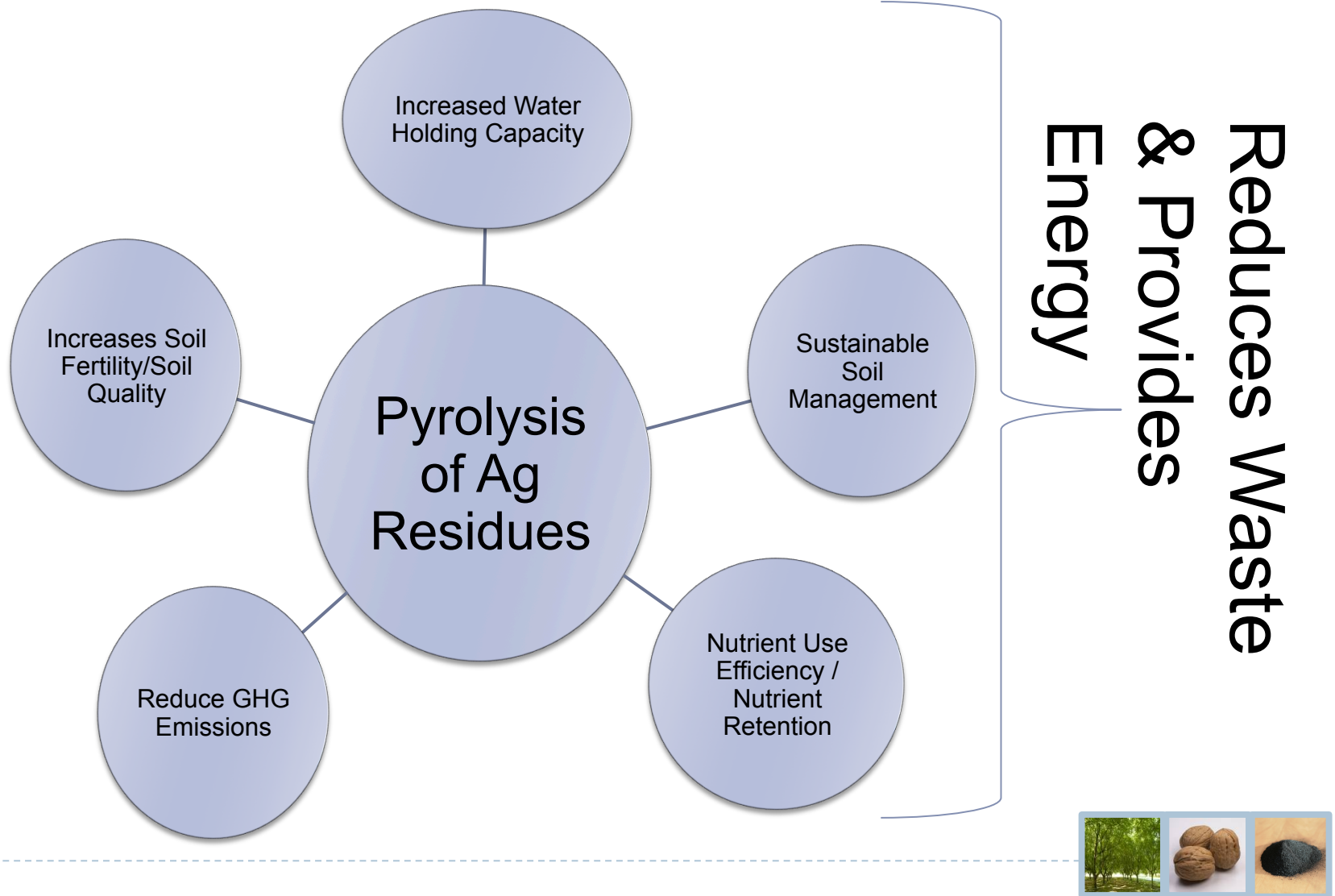
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What is biochar?



Why add biochar to soils?



Our Research

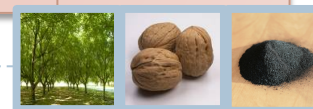
- ▶ We are currently evaluating whether the addition of a high temperature (pyrolyzed at 950°C) walnut shell derived biochar has the ability to improve soil quality and soil biodiversity while simultaneously reducing greenhouse gas emissions (e.g. N_2O , CO_2) and improve crop



Soil Quality Changes and Lettuce Yield

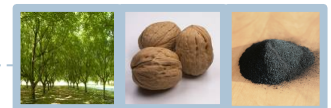
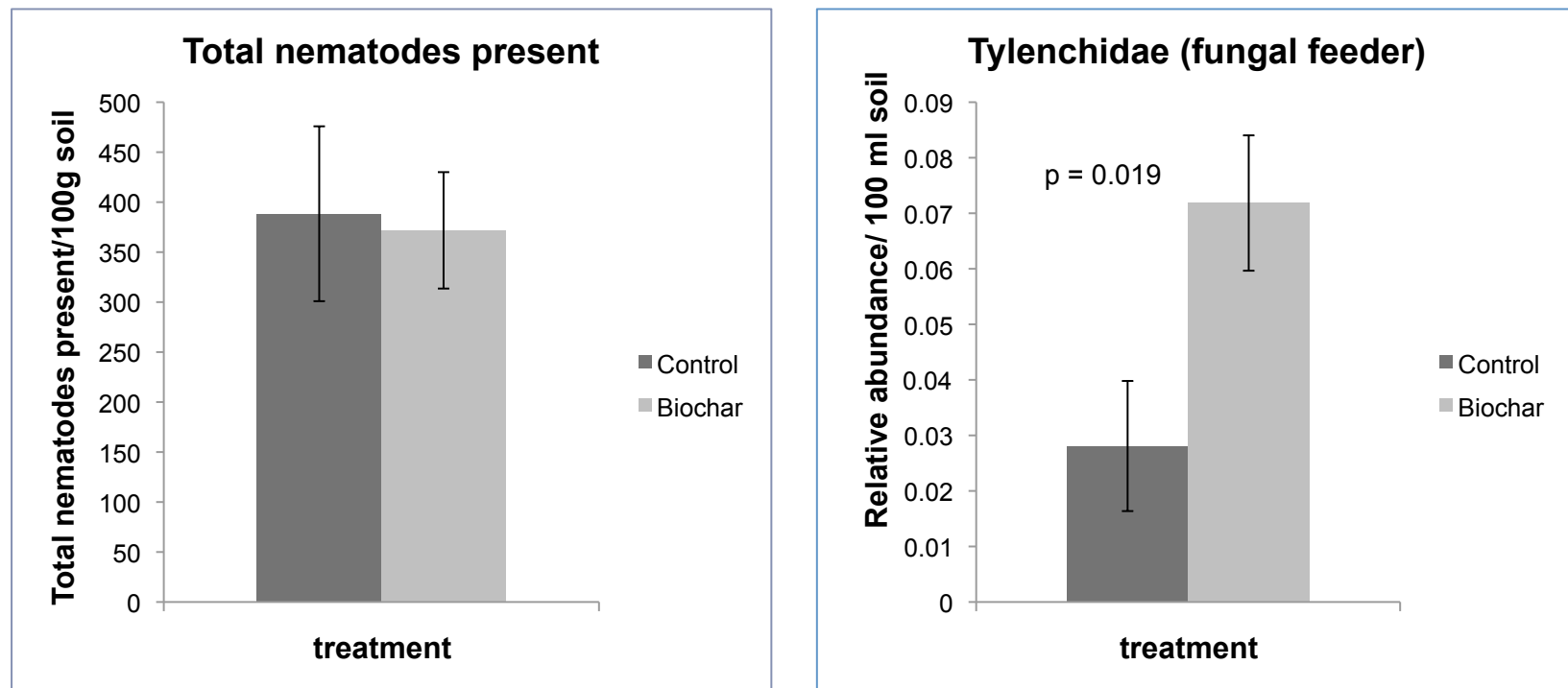
Table 1: Initial and final soil quality properties following the amendment of high temperature walnut shell biochar to soils growing lettuce after one year following amendment.

Treatment	Soil C (%)	Soil N (%)	C:N Ratio	PO ₄ -P (ppm)	K (ppm)	Lettuce Yield (g fresh wt)
Initial soils	1.6	0.1	13.3	133	970	-
Final Biochar soils	1.80	0.19	9.53	105	541	1080
Final Control soils	1.57	0.19	8.32	95	411	1101



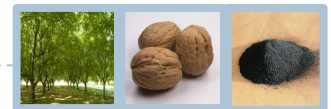
Biological Changes

Figure 1: Total number of nematodes present and relative abundance of a fungal feeding nematode in soils amended with and without biochar.



Conclusions/Future Work

- ▶ **Biochar additions to soil have the ability to retain nutrients and enhance C sequestration when they may otherwise be depleted in similar systems without the addition of biochar.**
- ▶ **Biochar has the ability to change the biodiversity of an agro-ecosystem without negatively impacting crop yield.**
- ▶ **More research is needed to understand the impact of original biomass material (feedstock) and pyrolysis conditions (i.e. high or low temperature production) upon soil physical, chemical and biological properties.**





THANK YOU

Questions?