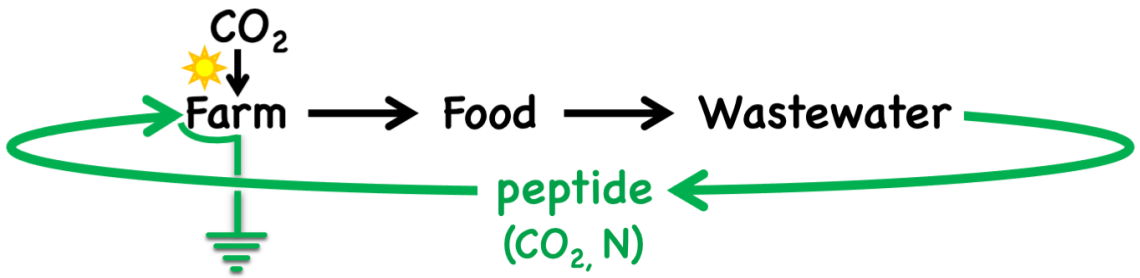
Self-Sequestering Carbon

Self-sequestered carbon freely permeates into and then binds soil and subsoil. It does not need to be buried, injected or stabilized.

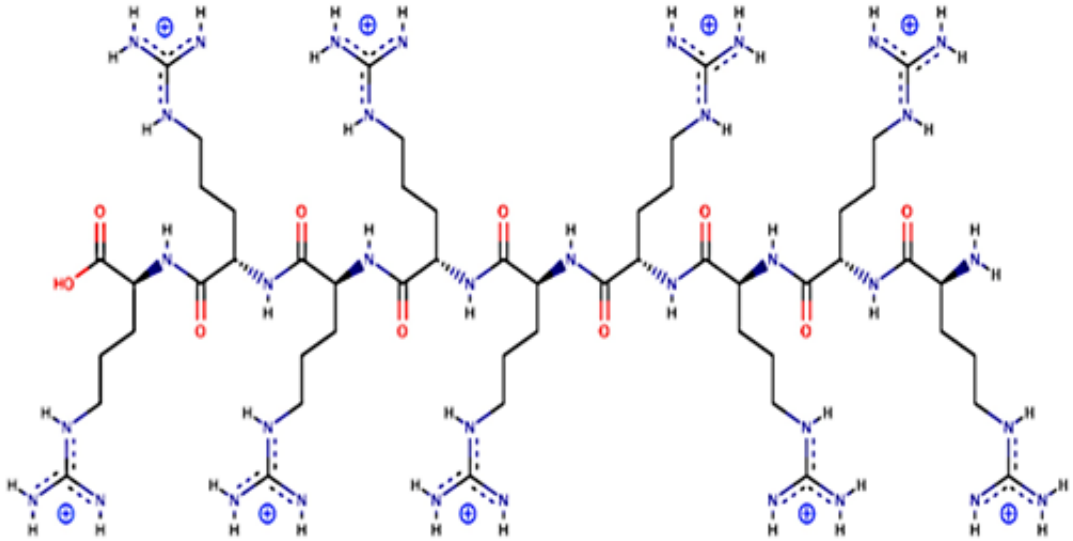


Matt Wecker
GeneBiologics

Steve Decker
NREL

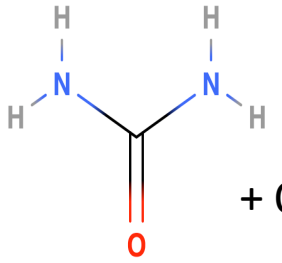
Polyarginine as a Self-sequestering C and N Fertilizer

Polyarginine has multiple, very strong positive charges to bind soil's negative charges.



- Water soluble
- 50% C and 35% N, "urea carrier"
- Binds very tightly to the mineral portion of soil
- Doubles for slow-release N
- Half-life in soil can be tuned by the peptide sequence

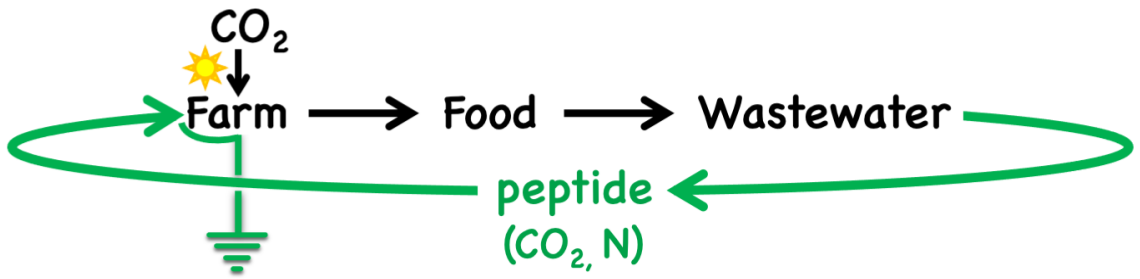
Peptidase, Argininase



+ Ornithine

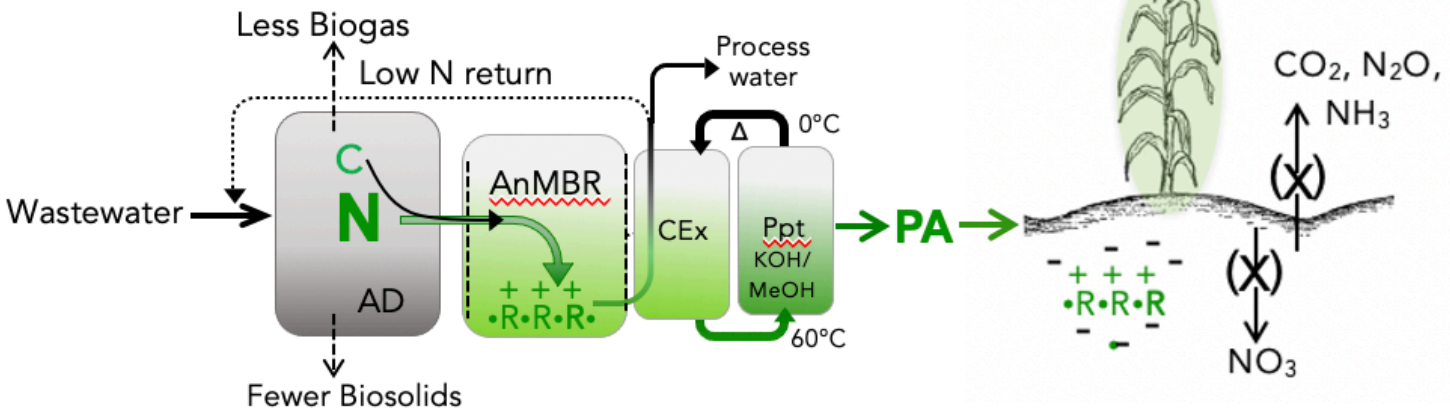
Urea

Circular C and N Economies, Lower GHG Emissions and Healthier Soils



Polyarginine made from wastewater creates a circular economy around C and N, drawing biogenic C to the soil reservoir. CO_2-eq emissions are dropped in 10 ways system-wide, avoiding up to 500 MMT CO_2-eq /y.

- Using the same strong positive charge, C and N is drawn from wastewater as a solid, lowering remediation costs, and paying for peptide production.
- The solid, dry, sterile product is a perfect drop-in fertilizer for return to farms



In Proof-of-concept stage