



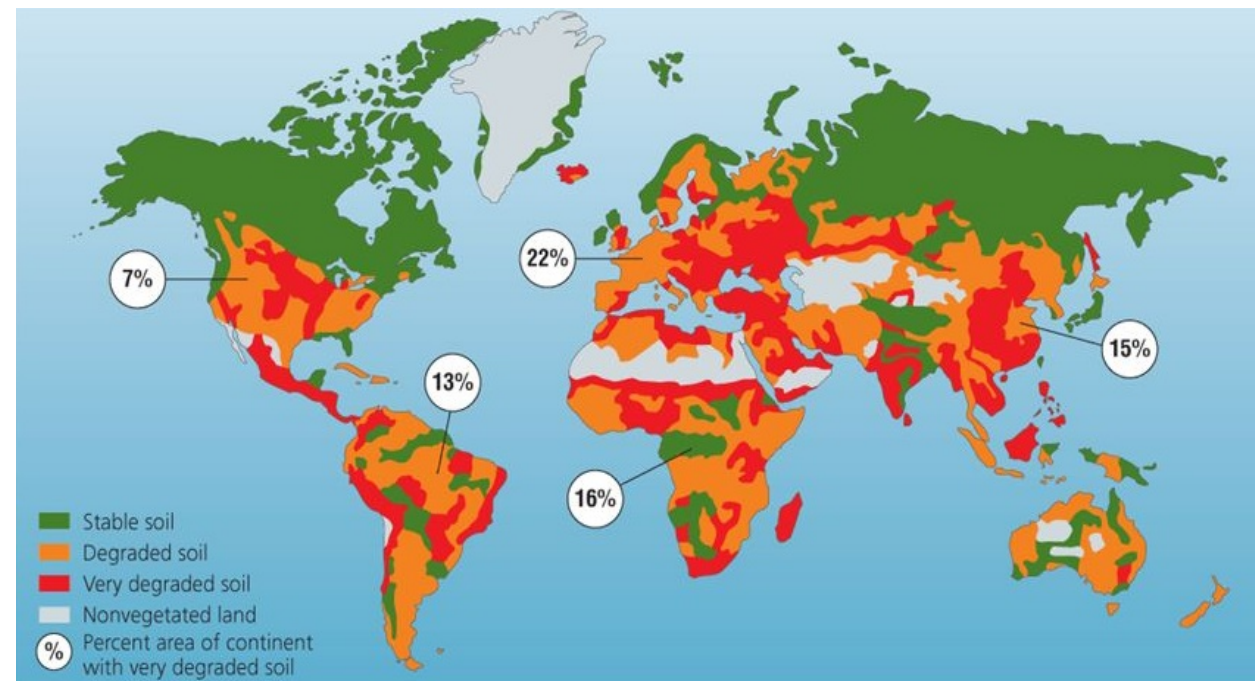
**NOVIHUM**  
GROW BETTER.  
WHEREVER YOU ARE.

Fourth Working Group "Platform for Coal and Carbon-Intensive Regions"



## A major challenge: feeding a growing population while losing arable land

- Soil: a key resource under tremendous pressure
- The issue: growing population while losing arable land
- Soil erosion and humus loss due to agricultural practices
- Soils are very complex; humus/organic matter very difficult to regenerate once lost



Millions of hectares of degraded or very degraded soils worldwide

## Building up humus in soils takes decades and is expensive



Manure / Compost



Crop rotation / Fallowing



Grazing

**NOVIHUM: the easier, faster and cleaner way to enrich soils with the best humus**

# NOVIHUM

- Humus like those at the heart of the best soils
- Positive short- and long-term effects:
  - Plant vitality, fruit quality, yield increase
  - Plant water-use efficiency
  - Early plant development
- Recommended application every 3 to 5 years
- No pathogens, salts, odors, microplastic or pollutants
- Suitable for use in diverse climates and crops
- Working on an organic-certifiable version





# NOVIHUM's production process (patented)

- Patented continuous humification technology: achieves in a few hours what takes decades under natural conditions
- Over 5 years of R&D to develop and optimize an economically viable process
- All raw materials used in NOVIHUM are widely available



Demonstration facility in Dortmund  
1 000 tons production capacity

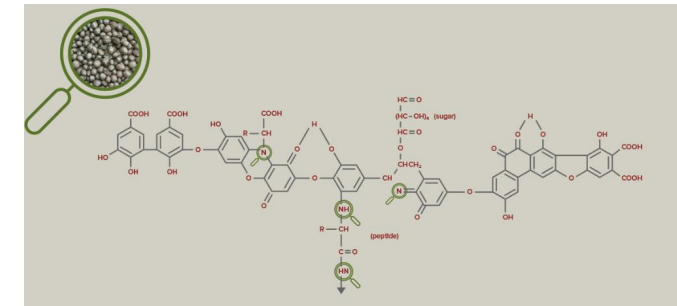


ca. 1 kg lignite  
(brown coal)

Humification  
technology  
(few hours)



ammonia,  
oxygen



1 kg NOVIHUM

# Only standard equipment is needed for applying NOVIHUM and achieving proven results

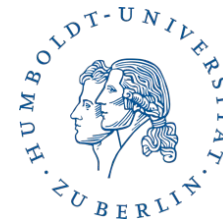
Broadcast or in-furrow: typical range of 0.8 – 1.5 tons per hectare



Incorporation top 10 to 25 cm

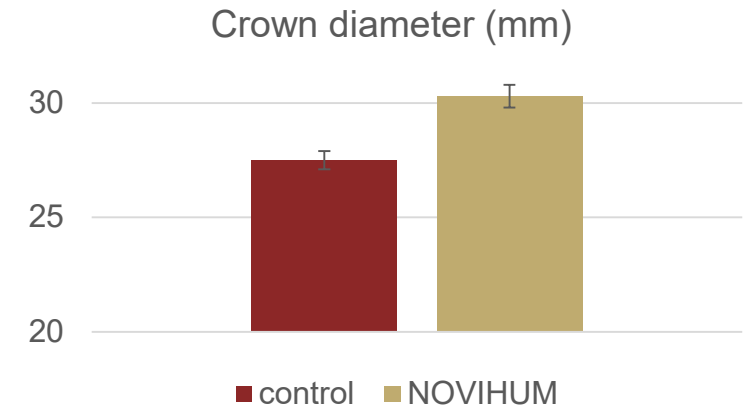
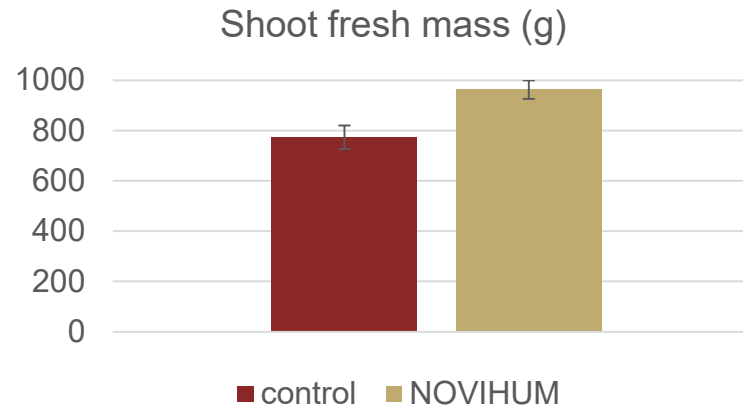


Proven effects in over 400 hundred single trials with commercial customers and renowned academic institutions



## Case study: lettuce (Yuma Valley, Arizona)

- Year: 2017
- Plant: Romaine lettuce
- Sandy soil, trial in 1-acre area
- Application rate of 1 t/ha
- Result: significant increases in shoot mass, root mass, and crown diameter
- 2018: grower scaled up from 1-acre (1 ton NOVIHUM) to 50-acres (20 tons)
- 2019: pre-order of 40 tons NOVIHUM already in place





# About NOVIHUM Technologies

## Company

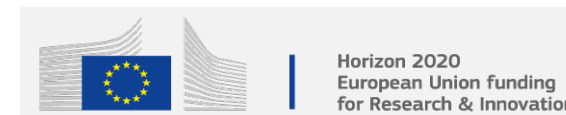
- Founded in 2012, ca. 30 employees
- Location: Dortmund (manufacturing), Germany
- Demonstration plant with 1 000 t p.a. capacity, in operation since end of 2016
- Novihum production technology: demonstrated, scalable, IP-protected
- Management: diverse, experienced, innovative

## Equity investors

- Sophisticated institutional investors



## Other funding





## NOVIHUM and lignite

- Lignite is fossilized organic material with valuable lignine structures
  - Very suitable for soil application if adjusted (e.g. nitrogen incorporation, as with NOVIHUM)
- NOVIHUM uses lignite as a raw material
  - Favorable CO2 footprint since it is not used for energy generation
  - Available infrastructure (mining, processing), favorable cost structure for large scale
  - Controllable quality, no microplastics, no pathogens, no pollutants
- The agricultural market offers a big opportunity for lignite's use beyond energy
  - Worldwide 1.5 billion hectares of cultivated land
  - About 1/3 of cultivated land considered degraded or severely degraded; ca. 10 million hectares of arable land is lost every year
  - Market can absorb several millions of tons per year of lignite for soil improvement





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