Asclepios Tech

A healthily bright idea

InnoClimat 2021 - Montreux

November, 2021

FOOD L&W CLIMATE IMPACT

Loss and Waste

- Total edible food wastage is **1.3 billion tons**
  - **$1000 billion each year** of economic cost
  - **$700 billion each year** of ecologic cost
  - **$900 billion each year** of social cost
- **50%** of fresh fruits and vegetables are **lost or wasted**
- **30%** of the world's **people** do not have **enough food**
- **15%** to **50 %** of **nutrients** are **lost** within a week of harvest

Sources :Food Wastage Footprint - Impacts on Natural Resources. Summary Report, FAO 2013

➡ Emitted or produced to **no purpose**

- **6%** of **GHG emissions** due to **loss and waste** (3.3 billion tons - three times the share for aviation)
- **38%** of total **energy** usage in food system due to **loss and waste**
- **28%** of world agriculture **area** for **loss and waste** (1.8 billion hectares of lands)
- **28%** of **biodiversity** avoidable losses
- **250 km³** of **water** due to **loss and waste** (three times Leman lake volume)

Food Supply Chain creates ~13 B Tons CO_2Eq (26% of 51 billion tons per year GHG emissions)

CHALLENGES

- **Reduce L&W** in farm2fork supply chain by increasing sustainable preservation of the most fragile and valuable products: seeds, fruits, vegetables, tubers, cereals
- Deliver improved **profitability** with a **positive ecological and climate impact** in a "**one health**" approach

Benefits

- Meet COP26 objectives to tackle **climate change** (SDG 13)
- Meet the world's **food needs** (SDG 2 & 3)
- Fight against food **loss and waste** by making fruits & vegetables more resistant (SDG 2 & 12)
- Enable cultivation of high value-added F&V in rural, urban areas, conflict zones and **fragile** contexts (SDG 1, 3, 11 & 16)
- Reduce the **risk** of food **contamination** from fresh F&V and help preserve product **quality** (SDG 2 and 12)
- Create **employment** in the agricultural production chain, especially for youth and vulnerable groups, such as migrants (SDG 4 & 8)
- Promote the **empowerment of women** by making fruit and vegetable production and value chains more sustainable (SDG 5)

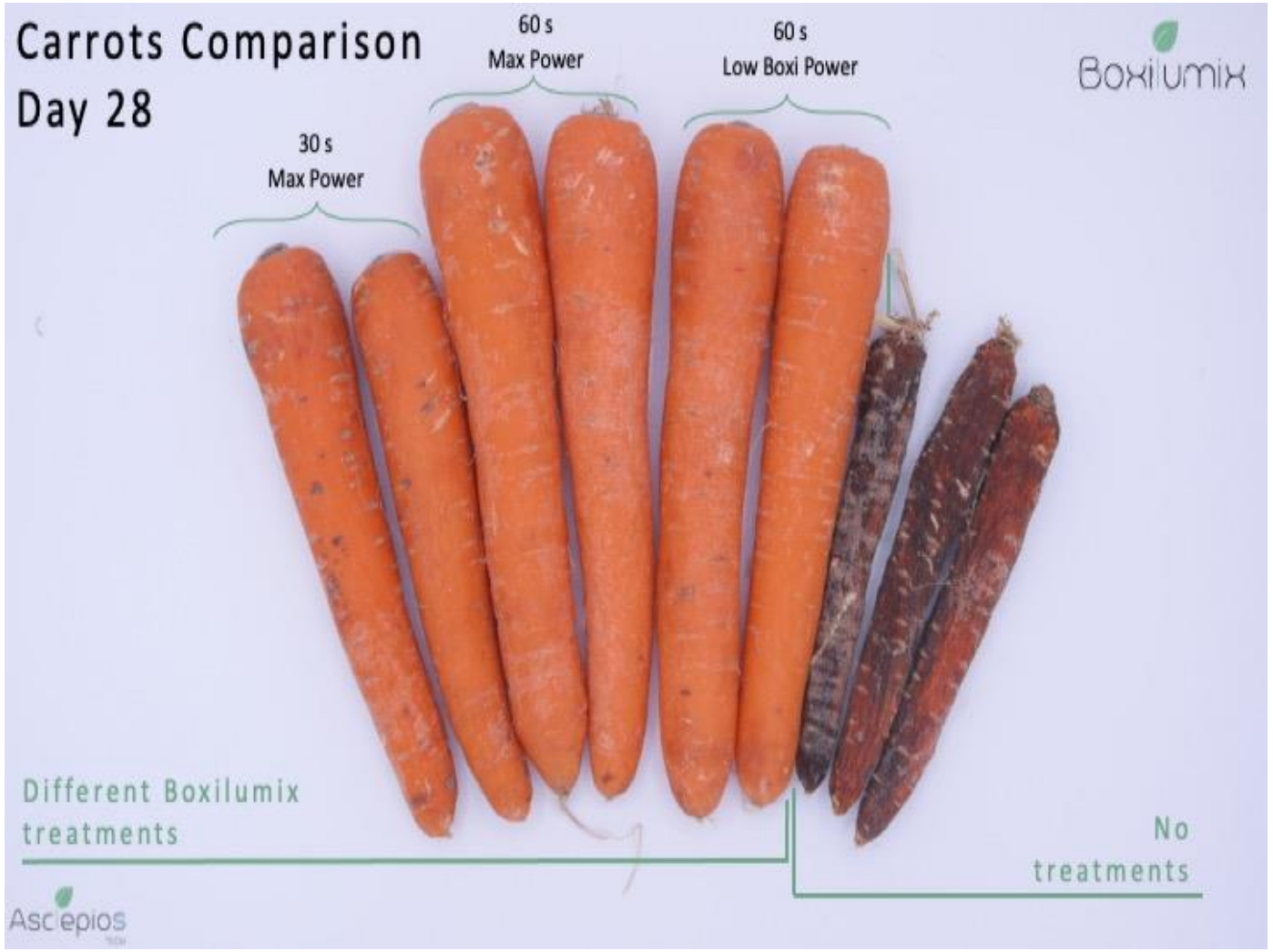
A healthily bright idea: **Boxilumix®**

- **F**arm 2 fork sustainable innovative digitalized non-thermal lighting solution
  Efficient - Accurate – Linked to knowledge database
  Energy-efficient – Repairable – Life cycle management
  Low pollution: water and noise free

- **G**rowing immune defenses of plants by soft signaling
  Reducing agrochemical products use, softening, water mass product loss and waste (**up to 50%**)
  Efficient decontamination of seeds, fruits and vegetables and water (**99,99%**)
  Enhancing natural preservation in refrigerated and ambient temp. (**up to 4 times** their shelf life)
  Nutritious flavorful durable healthy agro-food

- SDG : Contribute to 10 among 17 UN Sustainable Development Goals
- Green Deal : halve global emission by 2030, deliver a healthier, fairer zero carbon world in time
- SIF : Ecologic and economic impact
  solarimpulse.com/efficient-solutions/boxilumix
- International Food Waste Coalition IFWC- Innovation Lab – extend Shelf Life :
  https://internationalfoodwastecoalition.org/resources/innovation-lab/extend-shelf-life/

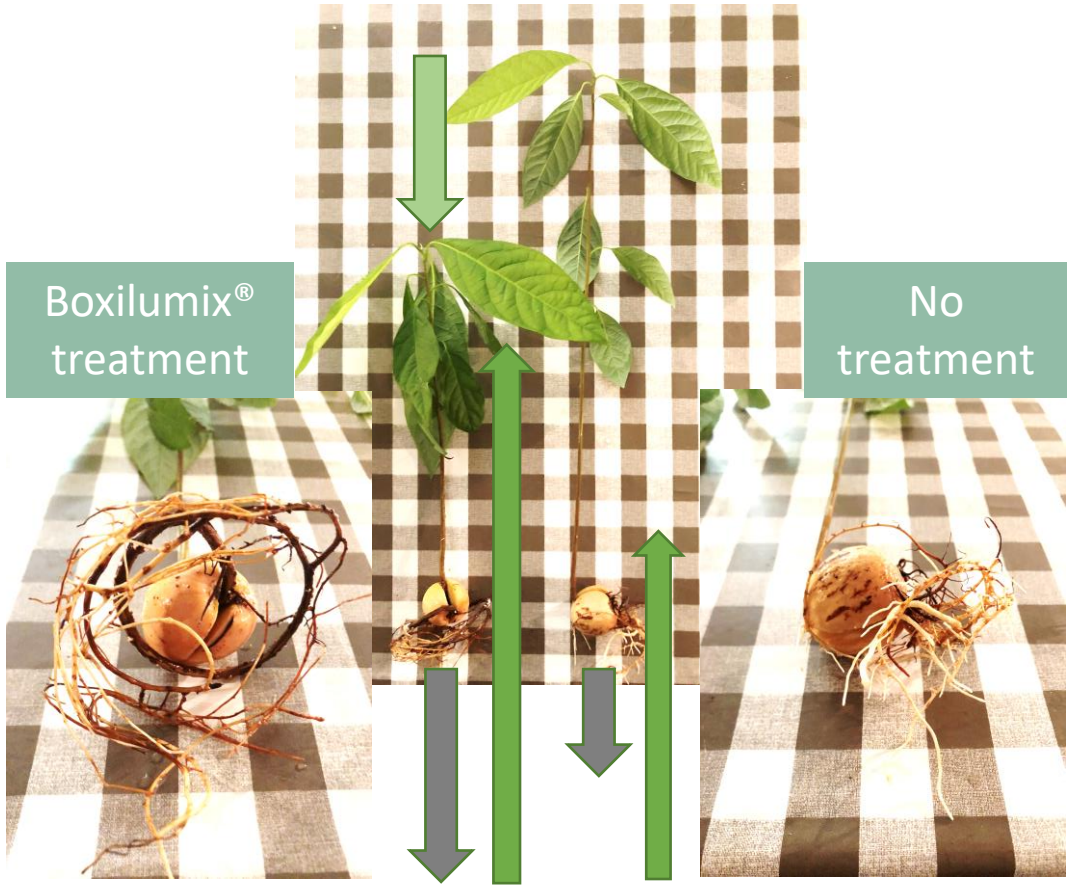
PRESERVATION ENHANCEMENT



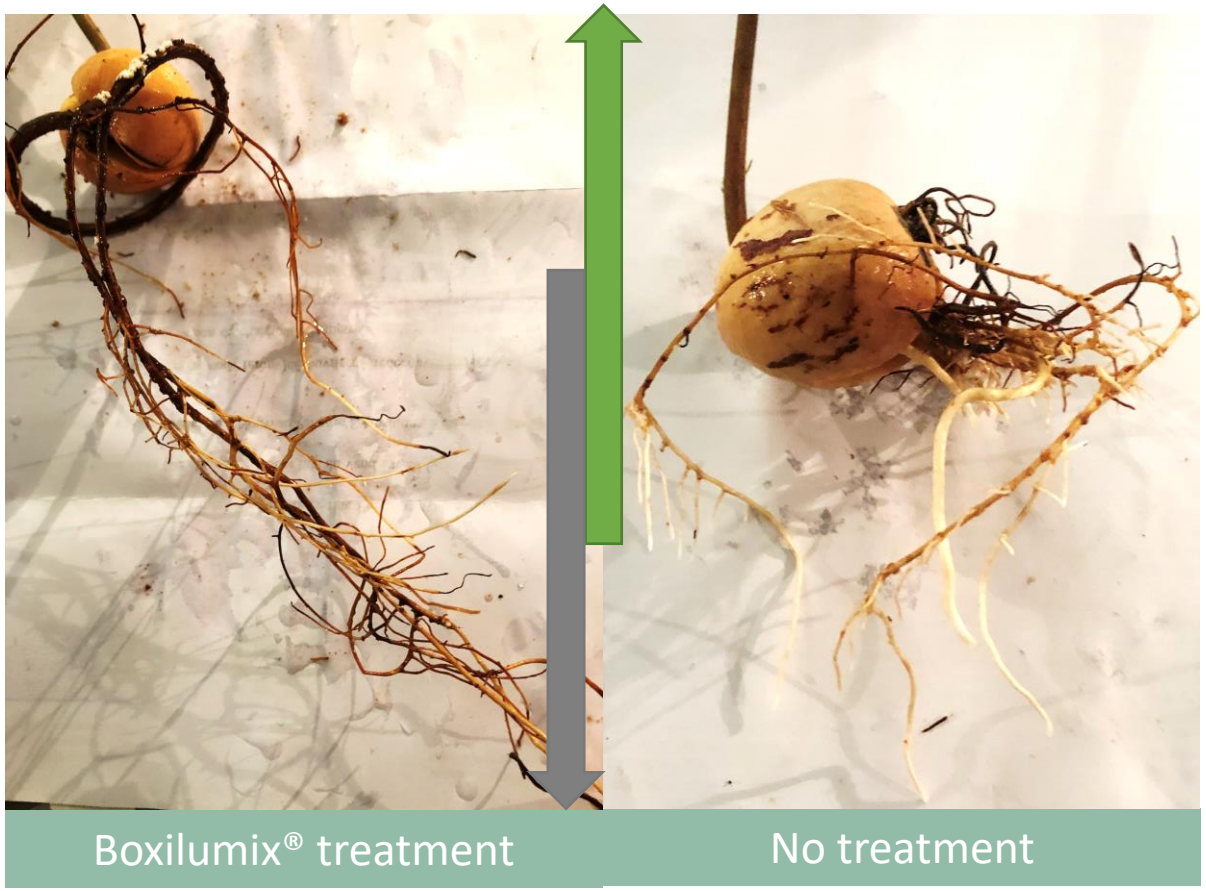
WHICH ONE DO YOU PREFER?

ROOTS BENEFITS

Avocado after 3 months



Roots & branchs signaling impacts

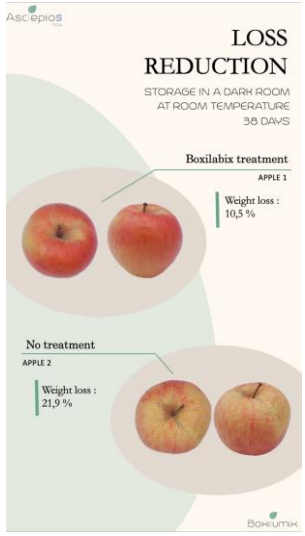


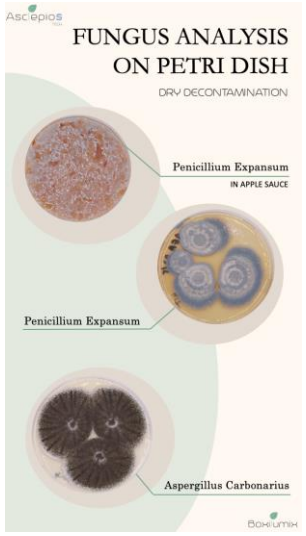
Carbon mass stands for ~ 50% Roots mass
Main root stronger, deeper, ~ 50%

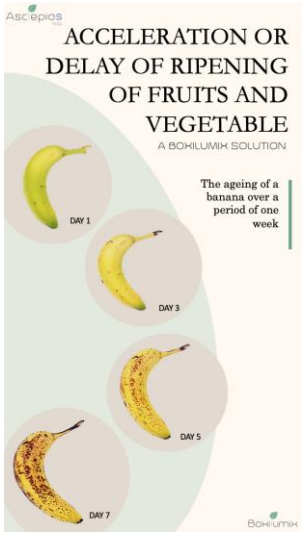
BEST VALUE PROPOSITION

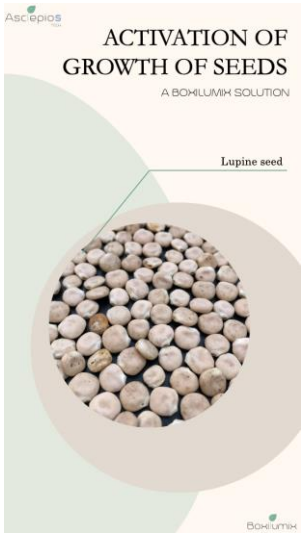
Increase fair incomes to producers
Reduce loss in agriculture value chain
Reduce chemicals, energy and **water** use

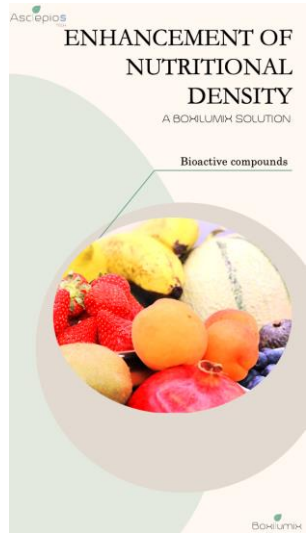
Provide **healthier nutritious food** to consumers
Reduce retails and home food **waste**
Preserve **soil** and manage CO_2 sequestration











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CLIMATE BENEFITS

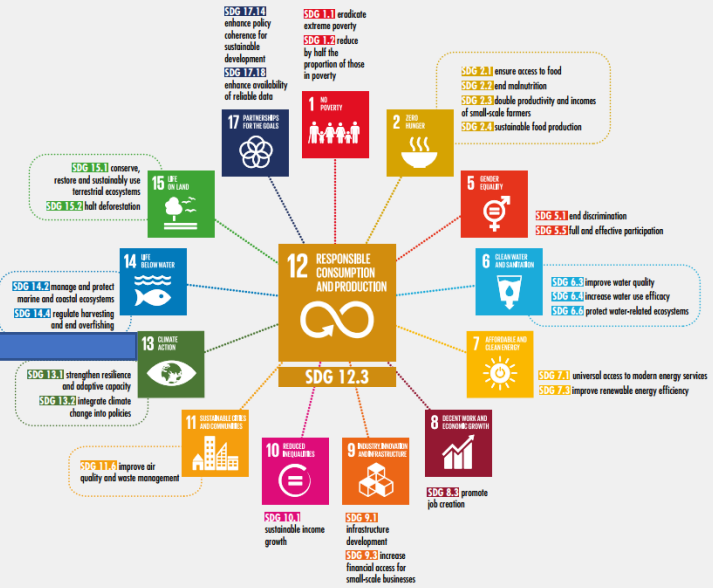
	Pre Harvest	Post Harvest
Climat change		
Ozone depletion		
Ionising radiaotion, HH		
Photo-chemical Ozone formation		
Acidification		
Eutrophication freshwater		
Eutrophication terrestrial		
Eutrophication freshwater		
Ecotoxicity freshwater		
Water use		
Ressource use, energy carriers		
Ressource use, mineral & metals		
Generic example computed for apple orchards	More than 90% reduction compared to traditional technics based on distribution of pesticides & fungicides	15 - 50% compared to traditional technics

pact categories (with respective EF impact category indicators) and EF impact or PEF studies

EF Impact Assessment Model	EF Impact Category indicators	Source
Bern model - Global Warming Potentials (GWP) over a 100 year time horizon.	kg CO_2 equivalent	Intergovernmental Panel on Climate Change, 2007
EDIP model based on the ODPs of the World Meteorological Organization (WMO) over an infinite time horizon.	kg CFC-11 equivalent	WMO, 1999
USEtox model	CTUe (Comparative Toxic Unit for ecosystems)	Rosenbaum et al., 2008
USEtox model	CTUh (Comparative Toxic Unit for humans)	Rosenbaum et al., 2008
RiskPoll model	kg PM2.5 equivalent	Humbert, 2009
Human Health effect model	kg U^{235} equivalent (to air)	Dreicer et al., 1995
LOTOS-EUROS model	kg NMVOC equivalent	Van Zelm et al., 2008 as applied in ReCiPe
Accumulated Exceedance model	mol H+ eq	Seppälä et al.,2006; Posch et al., 2008
Accumulated Exceedance model	mol N eq	Seppälä et al.,2006; Posch et al., 2008
EUTREND model	fresh water: kg P equivalent marine: kg N equivalent	Struijs et al., 2009 as implemented in ReCiPe
Swiss Ecoscarcity model	m^3 water use related to local scarcity of water	Frischknecht et al., 2008
CML2002 model	kg antimony (Sb) equivalent	van Oers et al., 2002
Soil Organic Matter (SOM) model	Kg (deficit)	Milà i Canals et al., 2007

ofluoromethane, also called freon-11 or R-11, is a chlorofluorocarbon.
te Matter with a diameter of 2.5 µm or less.
ethane Volatile Organic Compounds

FIGURE 1
FOOD LOSS AND WASTE AND THE SUSTAINABLE DEVELOPMENT GOALS



NOTE: The rounded boxes refer to the expected impacts on food security, nutrition, natural resources and the environment.
SOURCE: FAO