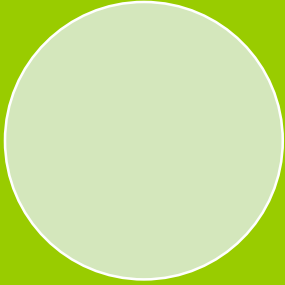




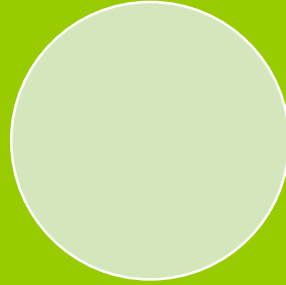
# Challenges in recovery of food ingredients from vegetable industry by-products



Paulus Kusters  
16 October 2017  
FOOD 2030 Brussels

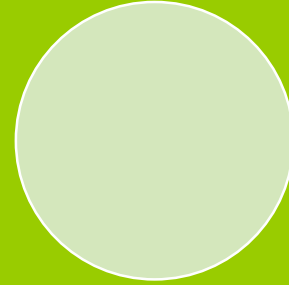


No  
compromise  
on taste



Healthy food for  
more people

- Plant based proteins
- More fiber intake
- Clean label, free from ..
- Fast GOOD food



Stop wasting our  
planet ... sustainable  
products and  
process

# Premium plant-based Food ingredients



- Extraction and marketing of functional proteins and fibers from vegetable remnants and other plant leaves:
  - RuBisCo: High functionality and outstanding AA Profile, neutral taste, no allergens
  - Fibers: Secondary binding agent and fiber enhancement

**Sourcing**

**Extraction**

**Marketing & Sales**

**Customers**

**Leaves  
from  
processing**



**Leaves  
from  
fields**



**RuBisCo**



**Fibers**



**Food Ingredients**



# Providing ingredient solutions, that food industry can only get from us

## PepsiCo seeks novel protein sources with 'easy to pronounce' names and 'a good sustainability story'



By Elaine Watson+  
05-May-2017

3 comments

Pepsico, Mondelez - May 2017



PepsiCo has conducted 'extensive work' into soy, moringa, Khai-nam (duckweed), cricket powder, meal worm powder, pea, and dairy protein

Related tags: NineSights, Open innovation, NineSigma, PepsiCo, Mondelez International

PepsiCo is seeking "new and novel protein sources for snacks and beverages," while Mondelez International is looking for new technologies to improve the

**"Wishes to avoid the following proteins:  
dairy, egg, meat, gelatin, soy, moringa,  
duckweed, cricket powder, mealworm, pea"**

## Specific requirements:

- Label-friendly
- Sustainability story
- Avoid animal-based
- Outstanding functionality
- Good taste, texture and mouth-feel
- No heat treatment
- Natural origin (plant-based)

# Backbone: EU Project

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- Partners
  - Industry
    - Florette (F)
    - Bionet Engineering (Sp)
    - Ruitenberg Ingredients (NI)
    - GreenProtein (NI)
    - Innovarum (Sp)
  - Research
    - TNO (NI)
    - INRA (F)
    - Univ. of Belgrad (Sb)



Horizon 2020  
European Union Funding  
for Research & Innovation



Bio-based Industries  
Consortium



***Revalorisation of vegetable processing  
industry remnants into high-value functional  
proteins and other food ingredients***

- Period: September 2016 till February 2021
- Total budget 5,5 million Euro
- EU contribution 4,3 million Euro
  
- Goals:
  - Realise a DemoPlant = TRL 7
  - Develop full scale process conditions
  - Make commercial viable product for market introductions and testing

- Economic valorisation of high moisture raw materials
- Valorise 100% of raw material with clear focus on high value components
- Scale up rules to TRL7 with verification to pilot
- Multiplication of system
  - Industrial by-products (2020 onwards)
  - Field products (2022 onwards)



# Technology Readiness Levels

- TRL 0: Idea.** Unproven concept, no testing has been performed.
- TRL 1: Basic research.** Principles postulated and observed but no experimental proof available.
- TRL 2: Technology formulation.** Concept and application have been formulated.
- TRL 3: Applied research.** First laboratory tests completed; proof of concept.
- TRL 4: Small scale prototype** built in a laboratory environment ("ugly" prototype).
- TRL 5: Large scale prototype** tested in intended environment.
- TRL 6: Prototype system** tested in intended environment close to expected performance. Piloting
- TRL 7: Demonstration system** operating in operational environment at pre-commercial scale.
- TRL 8: First of a kind commercial system.** Manufacturing issues solved.
- TRL 9: Full commercial application,** technology available for consumers.

THANK YOU