



### PPS-jaarrapportage 2017

De PPS-en die van start zijn gegaan onder aansturing van de topsectoren dienen jaarlijks te rapporteren over de inhoudelijke en financiële voortgang. Voor de inhoudelijke voortgang dient dit format gebruikt te worden. Voor PPS-en die in 2017 zijn afgerond is een apart format "PPS-eindrapportage" beschikbaar.

**De jaarrapportages worden integraal gepubliceerd op de websites van de TKI's/ topsector. Zorg er svp voor dat er geen vertrouwelijke zaken in de rapportage staat.**

De PPS-jaarrapportages dienen voor 1 maart 2018 te worden aangeleverd bij de TKI's bij [info@tkitu.nl](mailto:info@tkitu.nl) of [info@tki-agrifood.nl](mailto:info@tki-agrifood.nl). Voor Wageningen Research loopt de aanlevering via een centraal punt.

Algemene gegevens	
PPS-nummer	<b>AF-16506</b>
Titel	<b>Safeguarding product structure and mechanical properties while using new sustainable sources and processing steps: a multiscale and interdisciplinary approach</b>
Thema	
Uitvoerende kennisinstelling(en)	<b>Gezond&amp;Veilig</b>
Projectleider onderzoek (naam + emailadres)	<b>Marcel Meinders Marcel.meinders@wur.nl</b>
Penvoerder (namens private partijen)	<b>TiFN</b>
Contactpersoon overheid	<b>onbekend</b>
Startdatum	<b>1-1-2017</b>
Einddatum	<b>1-1-2021</b>

### Goedkeuring penvoerder / consortium

De jaarrapportage dient te worden besproken met de penvoerder/het consortium. De TKI's nemen graag kennis van evt. opmerkingen over de jaarrapportage.

De penvoerder heeft namens het consortium de jaarrapportage	<input checked="" type="checkbox"/> goedgekeurd <input type="checkbox"/> niet goedgekeurd
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Evt. opmerkingen over de jaarrapportage:	
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### Korte omschrijving inhoud/doel PPS

In this project we investigate the effects of more sustainable sourced materials and more sustainable process operations on food ingredient composition, and the consequences for the structural and mechanical properties of multiphase food products (emulsions/foams/filled gels).

We identify the key objective as:

- To investigate to what extent more sustainable ingredient sources and processes can be used to manufacture products with desirable structural and mechanical properties.

Hereto we distinguish the following project objectives:

- Understand the conditions to produce products with desirable structural and mechanical properties from more sustainable ingredient sources.
- To quantify sustainability effects of source and processing methods for a set of sources and processes.
- To formulate main lever rules that relate the properties of sustainable produced complex ingredient mixtures for a given source, to desired product properties like structure and rheological and mechanical properties on all length scales relevant to the product

## Resultaten

With a growing global population, food consumption will exceed from that of today. Since raw materials, energy and water are becoming scarcer, we need to adapt to more sustainable sources and production methods for our food. These methods may lie in using other food sources such as plant proteins instead of animal proteins and in using milder processing routes. The latter may include fewer purification steps, in turn implying the use of more complex mixtures as an ingredient, as opposed to first purifying these complex mixtures and then mixing them in the right proportions. In these adaptations we have to safeguard product quality, i.e. the sum of structure, mechanical (including rheological) properties, texture, taste, smell, safety, and nutritional value. All this requires a detailed knowledge on how the nature of a sustainable source and sustainable processing methods affect ingredient composition, and how the consequent compositional complexity affects final product quality.

In the current project we will investigate to what extent more sustainable ingredient sources and processes can be used to manufacture products with desirable structural and mechanical properties. A multiscale interdisciplinary approach will be used, combining process and product analysis with sustainability analysis. Firstly, this approach connects the properties of the system on a molecular level to macroscopic properties and stability of emulsion/foam/gel-based products, using the intermediate colloidal scales to bridge these length scales. Secondly, this approach connects the properties of the respective scales along the food chain, from sustainable source to primary production and final product. Concerning the sustainability of ingredients, two routes will be investigated within the project: one being less refinement of sources and the other being replacement of animal (dairy) proteins by other sustainable protein sources like plants. In order to estimate sustainability (resource efficiency) along the chain – for common processing chains as well as the proposed alternative processing chain configurations - use will be made of exergy sustainability assessment methodology developed within TIFN projects

The main deliverables of the project are

- List of ingredient and ingredient sources that will be used in the project, based on maximal expected sustainability gain when using less refinement and/or replacement by animal protein as well as on commercial availability
- Insights\* in to what extent mild refinement of chosen plant sources can be used to produce food products with desired structural and mechanical properties
- Insights\* in possible sustainability gain when using mild refinement and/or replacement of animal by plant proteins in production of food with desired structural and mechanical properties
- Insights\* in the relations between ingredient composition of complex mixtures of plant proteins , plant and dairy proteins , and plant ingredients , interfacial, film, and food product structure and mechanical properties
- Insights\* in to what extent local pressures can be measured in foods
- Local dynamics measured and related to rheology for liquids that contain non-refined plant material and dairy protein mixtures
- Generic knowledge\* and a set of rules relating the key structural and mechanical properties of a specific set of products to those of the complex ingredient mixture and processing routes, including a quantification of sustainability

\* in terms of scientific papers, reports, papers, etc..

The benefits include main lever rules that enable to identify for a given product the most sustainable processing steps and ingredient source(s). These main lever rules allow an optimization of product structure and mechanical properties while at the same time:

- making a significant improvement in achieving more sustainable production
- applying a wider choice of raw materials in the production process
- Obtaining important insights in the relation between the properties of a complex ingredient mixture, process, and the mechanical and structural properties of the food system, which allows better control manufacturing foods with desired properties,

**Aantal opgeleverde producten in 2017** (geef in een bijlage de titels en/of omschrijving van de producten of een link naar de producten op openbare websites)

Wetenschappelijke	Rapporten	Artikelen in	Inleidingen/ workshops
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artikelen		vakbladen	
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**Bijlage: Titels van de producten of een link naar de producten op een openbare website**

- FPP\_TIFN\_SustainabilityComplexity\_Final (Full project plan)
- 1712Projects1and5extenstionsTiFN\_Final (extension to full project plan)
- IngredientChoice (July 2018)
- A2R TiFN Workshop: From Ambition to results (November 2017)
- MaterialsTiFN\_SustainableIngredients (December 2017)
- ScopeTiFN\_SustainableIngredients (December 2017)
- WBS\_TiFN\_SustainableIngredients (December 2017)