GoNano potraviny

GoNano stakeholder workshop: Future food and nanotechnologies

information material

28 February 2019
9:30 – 17:00
Technology Centre CAS

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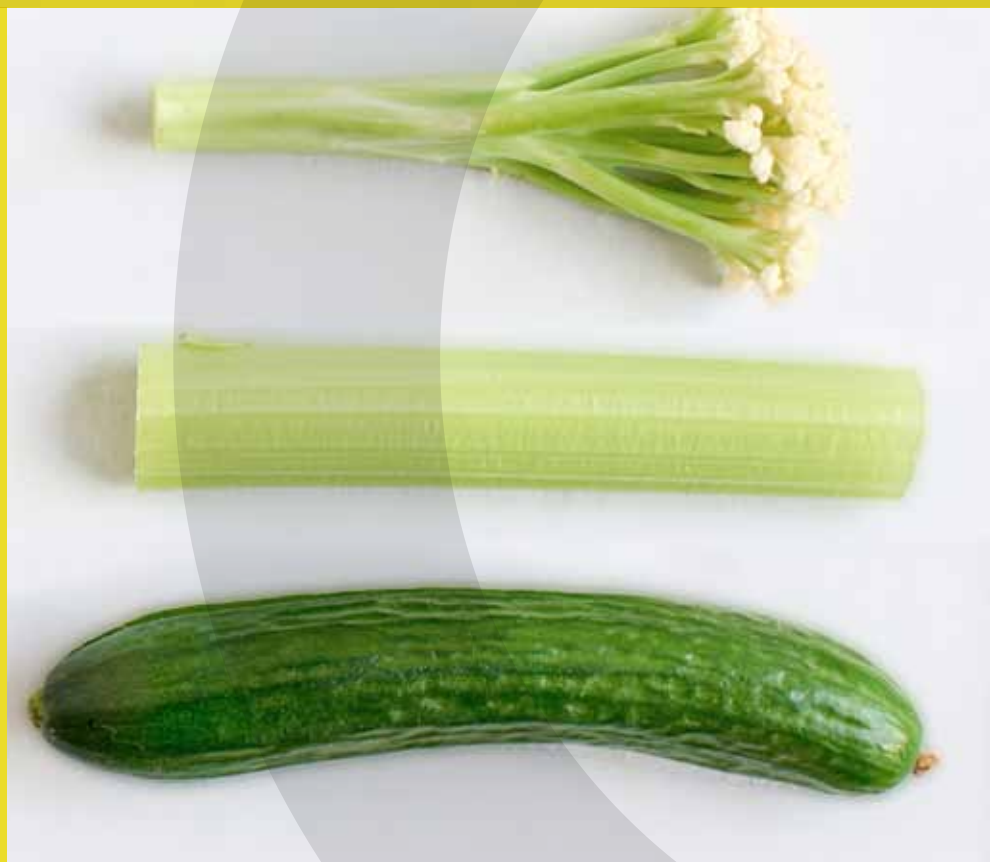
TECHNOLOGICKÉ CENTRUM AV ČR



About the meeting

This workshop on future food and nanotechnologies is part of a series of events and activities organised under the EU project GoNano, which aims to achieve better alignment between the multiple stakeholders involved in nanotechnology research and innovation.
In this workshop, researchers, engineers, industry, civil society organisations and policy makers will work together to co-create new design requirements for future applications of nanotechnology in the food area.

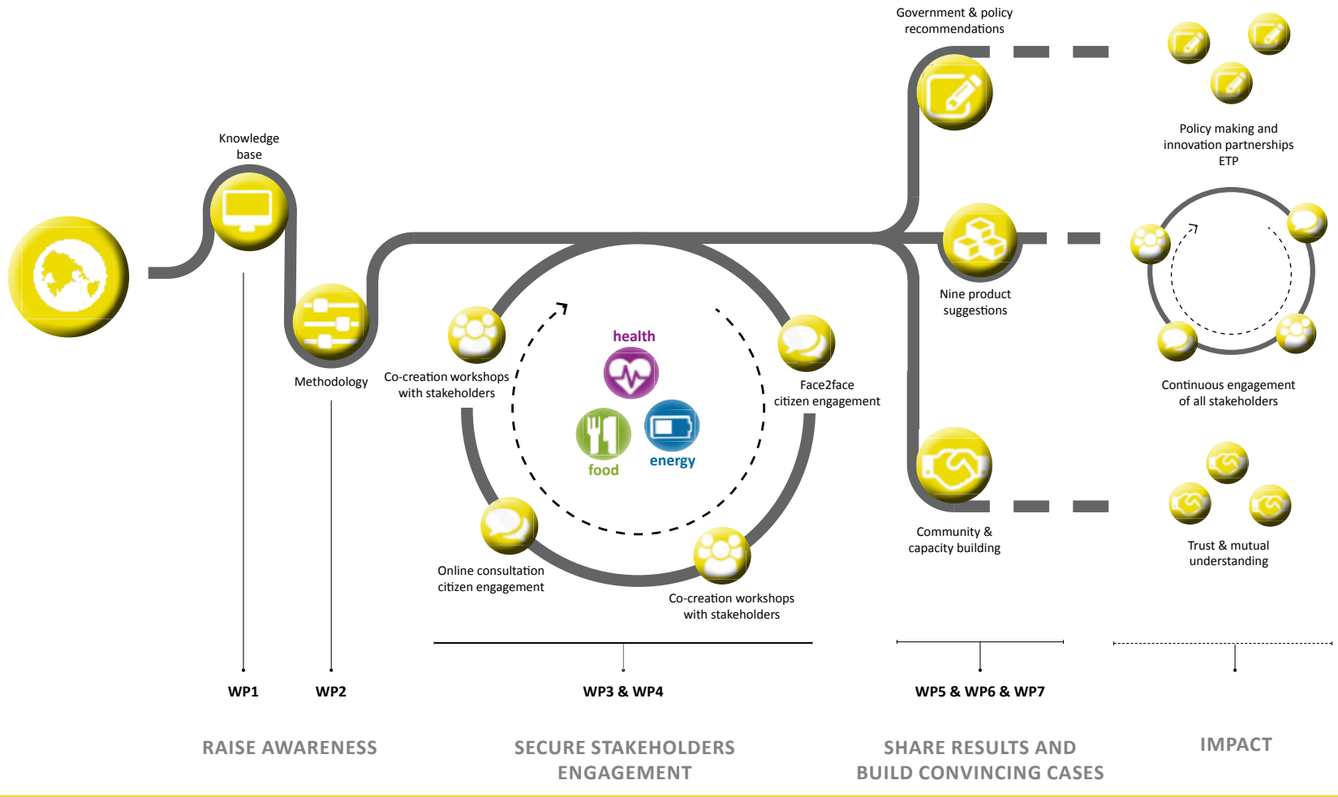
About the GoNano project

GoNano is an EU-funded project that enables a process of co-creation between citizens, civil society organizations, industry, researchers, and policy makers across Europe to align future nanotechnologies with societal needs and concerns. GoNano aims to demonstrate how researchers can work with publics and professional stakeholders to create novel suggestions for future nanotechnology products.

The GoNano project is built on the assumption that nanotechnologies are more likely to gain broad acceptance if they take public values and concerns into account at early stages of innovation. To test this assumption, a co-creation methodology will be explored in three different application areas of nanotechnology (Food, Health, and Energy). In this co-creation process, wishes, needs and product suggestions of both citizen and professional stakeholders are taken into account by means of a face-to-face citizen consultation, a stakeholder workshop, an online citizen consultation, and a second stakeholder workshop (see Figure 1 for a visual representation). The aim of the co-creation process is to end up with nine product and/or research suggestions (three for every thematic area).

GoNano project

Governing Nanotechnologies through societal engagement



GoNano co-creation process

What do we expect from you?

A varied group of stakeholders will explore possibilities for new product designs in the three different areas, building on the social needs and values identified in earlier stages of the project. Every stakeholder has its own perspective and knowledge and expertise, either directly or indirectly linked to nanotechnology. By linking different perspectives and expertise, we aim to develop new insights and specific suggestions for future development of food technologies. TC CAS will be the facilitator of the workshop, and all stakeholders are active participants in the co-creation process.

What will happen after this meeting?

1. GoNano researchers will analyse the outcomes of this stakeholder meeting about requirements for designing future nanotechnologies for food applications.
2. In Spring 2019, citizens across Europe will receive an invitation to evaluate the innovation ideas from the expert workshops.
3. In another round of expert workshops, researchers, engineers, industry, civil society and policy representatives, will re-work the design suggestions.
4. GoNano researchers will present the results to EU policy makers, and make the results available online, together with teaching material that show how people could work with citizens to develop innovative product designs.

Organization

The co-creation process in the food area is led by the Technology Centre of the Czech Academy of Sciences (TC CAS). Based on interviews with various stakeholders from all over Europe, three thematic areas of nanotechnology and food were defined: food packaging, novel foods, and nanofilters. In October 2018, 48 citizens from the Czech Republic were asked to provide suggestions and ideas for the development of nanotechnology in these application areas. This information material contains a summary of the results. The stakeholder workshop builds on the outcomes of the citizen consultation and explores how structured interactions between stakeholders can lead to specific design suggestions. This is the first of two workshops: the second workshop will be organised in October 2019. It will follow up on the design suggestions and subsequent online consultations with citizens.

Nanotechnologies and food

Nanotechnology is the application of technology at the nanoscale, which ranges from 1 to 100 nanometres. By way of comparison, a human hair is approximately 80,000-100,000 nanometres wide. The study, use and manipulation of materials at this scale enables the design of new and existing materials with novel physical, chemical, electrical, mechanical optical or magnetic properties. Nanotechnology is an enabling technology: its tools and methods can be applied across a range of scientific and engineering disciplines such as chemistry, biology, physics, medicine and materials science.

Nanotechnology offers potential solutions for environmental, health and food challenges. In the area of food it is applied in processing, preservation, packaging, handling and storage of food. Various nanomaterials and structures are utilized for these applications, including: Based on these nano-systems and structures, which are all labelled as 'nanotechnologies', various applications are being developed. Direct use of nanotechnology in food refers to the incorporation of substances in food, and must also be declared as such. Examples are colour improvement, fragrances, anti-oxidants, preservatives, and biologically active components (such as vitamins and omega-3). Another category of direct use of nanotechnology in food is synthetic food such as the production of artificial meat through growing tissue or by the use of stem cells. Indirect use of nanotechnology comprises the use of nanostructured materials in packaging technology and sensors.

Application areas

Based on the outcomes of interviews with stakeholders across Europe conducted as part of the GoNano project, three important application areas of nanotechnology in food were selected and discussed with citizens in the citizen consultation: food packaging, novel foods, and nanofiltration.

Food packaging

Much is expected of nanotechnologies in the context of sustainable packaging systems. Nanomaterials could contribute to reducing the amount of material needed and prolonging the shelf life of food products. The use of micro, nano, and smart bio-materials is expected to provide packaging systems with superior performance and reduced environmental impact. Possible applications include biodegradable packaging, transparent polymers and packaging with improved gas-barrier properties.

Smart packaging solutions, i.e. packaging that provides information about the quality of the contained food, could be realized using nano-sensors. Similarly, nanocoatings could improve mechanical, thermal, electrical, barrier and chemical properties. It could serve to make food packaging self-healing, self-cleaning, high-gloss, anti-scratching, super hydrophobic, corrosion-resistant, anti-fouling, stain-resistant, anti-odour, anti-microbial, conducting or water-repellent.

Reducing the degradation of food by smart packaging may reduce the environmental impact of packaged foods, but concerns have been raised about potential migration of nanoparticles from the packaging material to the food, resulting in possible contamination.

Novel foods

Nanoscale approaches might also yield new insights into the structure of ingredients, for example to improve food processing systems used to fractionate raw materials into functional ingredient classes. The possibility to have minimally processed, highly functional ingredients could reduce the use of additives and processing aids. Nano-encapsulation through nanomicelles allow ingredients with specific nutritional properties to be incorporated in specific matrix phases, and could be building blocks for new 'functional foods': novel ingredients/novel foods with specific functionalities, such as increasing the content of healthy substances (e.g. vitamins, carotene), changing specific properties (e.g. reducing allergy risks), enable targeted delivery/release of nutrients.

Nanofiltration

Worldwide population growth and climate change require innovative water treatment technologies in order to ensure the supply of clean water. Nanotechnology offers the potential of long-term solutions to increase energy efficiency and lower costs, through the adaptation of advanced filtration materials that enable greater water quality and reuse. Nanoadsorbents and nanotechnology-enabled membranes offer great potential to be used on a large scale, based on their stages in research and development, commercial availability, costs of nanomaterials involved and compatibility with existing infrastructure.

Even though nanotechnology offers great potential for water treatment, there are potential drawbacks, too. Major practical challenges are the cost of nanostructured materials along with the difficulty of scaling up nano-based treatment processes for commercial use. In addition, health and safety issues around the use of nanomaterials have to be addressed in the domestic water industry, particularly with respect to the direct application of nanoparticles into the receiving natural bodies of water. Nanofunctionalized materials may carry unforeseen risks as nanoparticles might leach into the environment where they can accumulate over long periods of time.

Regulatory debate

The agro-food industry is highly regulated with particular focus on food safety and quality. Several EU regulations related to food safety include provisions addressing nanomaterials.

Novel Food regulation: The Novel Food Regulation lays down rules for the placing of novel foods on the market within the Union. Use of engineered nanomaterials is considered as producing a novel food and therefore subject to the novel food regulation.

Food additives regulation: This regulation mandates the European Food Safety Agency (EFSA) to carry out a new evaluation of additives previously authorised but whose particle size has been modified by the use of nanotechnologies. EFSA adopted new guidelines for the evaluation of food additives in 2012 that provide specific information for the characterisation of nanomaterials.

Plastic food contact materials regulation: This regulation provides for a case-by-case assessment of substances in the nanoform (which are not specifically defined). The regulation further provides that substances in the nanoform shall only be used if explicitly authorised and mentioned in the specifications in Annex 1 of the regulation.

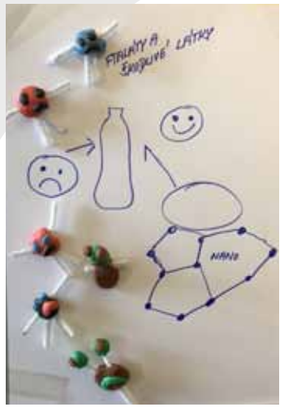
Active and intelligent food contact materials regulation: This regulation includes an approval procedure and safety assessment provisions and also provides for a case by case assessment of substances in the nanoform.

Provision of food information to consumers' regulation: This regulation provides for a specific definition of nanomaterials and a labelling requirement for all ingredients, including food additives, present in food products in their nanoform. Labelling consist of adding the word "nano" next to the name of the ingredient in the ingredients' list.

Outcomes of the citizen workshop

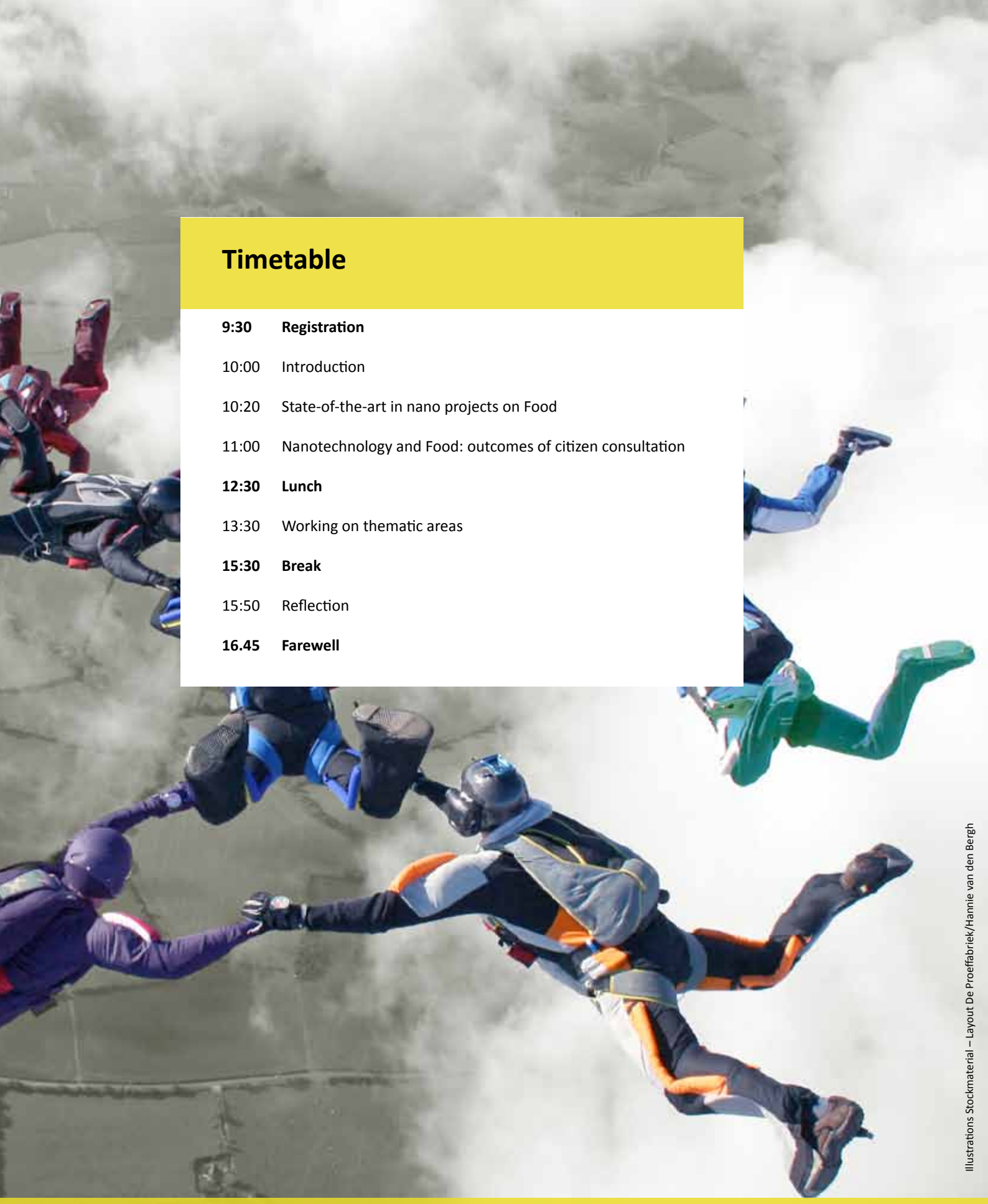
On 20 October 2018, 48 citizens from across the Czech Republic from various backgrounds (age, education, professions) gathered to discuss the future of nanotechnologies in three food application areas:
1) Smart food packages
2) Nanofilters
3) Novel foods

Participants discussed possible future scenarios to formulate their wishes and concerns related to the future applications, and to formulate messages to the key stakeholders which will eventually produce and work on these applications in nanotechnologies.



Social values	Technology	Social needs expressed in workshop	Suggestions made by citizens
Safety, sustainability	All applications	**Control and certification system, strict rules for producing and using nanotechnologies**	Legislation should be centered around the needs of the citizen.
Human health, recyclability	All applications	**Biological degradability**	Nanoproducts should guarantee that they would be biologically degradable.
Safety, Reliability, Openness, Transparency	All applications	**Guaranteed safety of nanotechnologies when it comes to nanoparticles and their possible accumulation in the food chain**	New products have to serve customers and they have to be non-threatening to health.
Sustainability, circular economy	All applications	**Mind the context in the development of the technologies**	
Sustainability	All, nanofilters	**A solution to the global climate change**	The state should support nanofilters, also in the Third World.
Sustainability, affordability, wellbeing	Nanofilters	**Clean and affordable water (both in households and in the third world as well)**	Researchers should invent new methods to clean water and guarantee its abundance.
			The media should inform transparently about both pros and cons.
Safety, Reliability	Smart food packages	**Food protection against bacteria and against the negative effects of the environment**	
Reliability	Smart food packages	**Prolonged shelf life of the food**	Researchers and producers: make packages that can preserve food for a long time.
Sustainability, responsibility	Smart food packages	**Substitute for plastics and other non-ecological packaging systems**	They could contribute to a more effective food production system that would be less demanding on the environment, and also that they would e.g. enable food to be transported over longer distance.

Social values	Technology	Social needs expressed in workshop	Suggestions made by citizens
Customization	Smart food packages	**Personalized advertisement on the packages**	Producers can use smart food packages as a opportunity.
Sustainability, human health	Novel foods	**Substitute for chemical treatment of the foods (herbicides etc.)**	Researchers should invent new methods to treat crops.
Sustainability, reliability	Novel foods	**Effective food, substitute for food supplements**	Researchers should adjust food for specific clients (athletes, people with allergies etc.).



Timetable

9:30	**Registration**
10:00	Introduction
10:20	State-of-the-art in nano projects on Food
11:00	Nanotechnology and Food: outcomes of citizen consultation
12:30	**Lunch**
13:30	Working on thematic areas
15:30	**Break**
15:50	Reflection
16.45	**Farewell**

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