DAY 3 – Novel Food and Technologies

Questions for **Christina Hartmann:**

Joana Prata: How to deal with the public's confusion between new technologies and ultra-processed foods?

> **Christina Hartmann**: I am not sure whether consumers are confused. They might just consider both negatively.
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> On one hand, consumers fear of new technologies need to be tackled by for instance information provision based on the use of non-technical terms. On the other hand, even researchers claim that ultra-processed foods are bad in general or that food processing is bad and makes the food unhealthy. But in fact, rather than focusing on the processing degree, the attributes of the product need to be considered. That means that also in public discussions, we need to talk about characteristics of the product and should not encourage consumers to use the wrong evaluation criteria. Using similar technologies, industry could produce a healthy snack or an energy-dense, high sugar snack. In the end, consumers are strongly guided by taste and taste expectations, benefit and risk perception. Different strategies need to be employed that work with people's consume motivations.

Jorn Iamke: I was wondering how much the influence of perceived naturalness in the decision to consume different foods (e.g. GM-food in the US) differs in different parts of the world? Why is this?

> **Christina Hartmann**: How natural consumers around the world evaluate certain food products differs, of course, and is influenced by food culture. Additionally, on an individual level, some consumers place more value on naturalness, while others do not necessarily take this product characteristic always into account when making a purchase decision. How strong the effect of perceived naturalness is and how much it influences consumption cannot be determined with the available data. We just saw that when it comes to cultured meat acceptance, in almost all tested countries around the world, a lack of perceived naturalness was a strong barrier for willingness to consume.

Paula Corres: Which are the current potential strategies to avoid consumer reluctance to novel food products (e.g. meat alternatives, etc.)? Thank you very much for such an interesting presentation.
Ludovico Sepe: thank you for the presentation. According to the studies which are the best ways to increase the acceptance of novel food and technologies?

> **Christina Hartmann**: Different strategies could be used to increase people's acceptance of novel foods. First and foremost, strategies that enable consumers to get in contact with the novel food by enabling access, possibilities to try, combined with familiar dishes and flavors etc. Strategies that we very well know from research about acceptance of the insect-based products. Positive product attributes and potential benefits (if there are any) need to be highlighted. Misconception should be tackled and last but not least, these products need to taste good!

Questions for **Andrea Germini:**

Muhammad Ghufran: What role the EFSA is playing or intends to play in encouraging consumers to use novel foods that can help in attaining the food sustainability goals

> **Andrea Germini:** EFSA's mandate on novel foods is to provide independent and reliable scientific advice to the European Commission on the safety of novel foods intended to be placed on the EU market. EFSA's activities in this area may indirectly contribute to food sustainability goals by ensuring that the safety of new products meant to contribute to food sustainability is assessed with the highest scientific standards, therefore ensuring consumers safety.

Pilvi Kemppinen: What are the impacts these novel carbs have on human health compared to natural sugar/fiber/starch? May novel carbs have impact on the increased prevalence of functional gastrointestinal diseases/syndromes (e.g. heartburn, IBS, IBD, Cronh's disease)?

> **Andrea Germini:** EFSA's assessment on novel foods only addresses the safety of those products. Potential beneficial effects are addressed by the Health Claims regulation. The design of these novel carbohydrates often aims at e.g. reducing glycemic index, or provide new source of fibers, therefore addressing some of the recent consumers trends.
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> These products, not being yet on the market, cannot have contribute to increase the prevalence of functional gastrointestinal syndromes. Their assessment as performed by EFSA, including toxicological and when deemed necessaries also human studies, aims at ensuring that new products that enter the market are safe for all the general population for chronic consumption as food.

Rostyslav Bubnov: My question is regarding nanoparticle-based novel food. What progress is so far? Any specific documents under development? Thank you!

> **Andrea Germini:** The EFSA Scientific Committee has published and recently updated two guidance documents addressing the assessment of engineered nanomaterials and the assessment of nanoparticles present in foods (more info at https://www.efsa.europa.eu/en/topics/topic/nanotechnology).
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> Specifically with regards to novel foods, EFSA is completing the evaluation of the first product submitted as engineered nanomaterials, and assessing some applications where nanoparticulate materials may be present in the final product as a consequence of specific e.g. sources, processing.

Artis Robalds: What is the difference between enriched food and fortified food? Or are these terms synonyms?

> **Andrea Germini:** The two terms have been used as synonyms in the presentation. In more specific legal terms the "Regulation (EC) No 1925/2006 of the European Parliament and of the Council of 20 December 2006 on the addition of vitamins and minerals and of certain other substances to foods" refer to the enrichment/addition of vitamin and minerals into a food with the terms fortification.

Eric Jhon Cruz: In the case of plant-derived novel food, are pesticide residues in the final product being considered in the risk assessment process? Is the potential pre-concentration of residues a significant concern in selected novel foods such as plant extracts and protein powder for example? Thanks!

Andrea Germini: Pesticides residues are addressed by a specific sectorial legislation which foresees also the enforcement of monitoring activities on the final products intended to be placed on the market. Therefore this element is not part of the risk assessment of novel foods. Should there be elements during the novel food assessment, giving raise to concerns that e.g. with the proposed production process, exceedance of the legal limits on maximum residues of pesticides would be technically unavoidable, this would be clearly indicated to the European commission in the conclusions of the novel food opinion.

Questions for **Nikoletta Papadopoulou:**

Eric Jhon Cruz: Question for Nikoletta Papadopoulou regarding what makes a GM plant: 1) are plants created through transient expression systems (for example via certain viral vectors) considered as GM plants and do they have to go through the whole risk assessment? 2) is random mutagenesis via for example irradiation considered as a GM method?

How the sustainability dimension is being measured in the GMO risk assessment process?

Nikoletta Papadopoulou:

1. GMOs are officially defined in the EU legislation as organisms in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating and/or natural recombination. Techniques of genetic modification yielding GMOs are described in Annex IA of Directive 2001/18/EC. Depending on whether genetic elements from the expression system have stably integrated into the plant, or not, and the scope of the application, the risk managers at EU will determine under which EU legislation the organism/product should be risk assessed and under the remit of which scientific Panel/Unit in EFSA such application would be risk assessed.
2. Techniques of genetic modification yielding GMOs are described in Annex IA of Directive 2001/18/EC. In vivo and in vitro random mutagenesis techniques are reviewed in a recent EFSA opinion (final opinion to be published by end of year) following and EC mandate to EFSA (link). The judgment of the Court of Justice of the European Union (CJEU) in Case C-528/16[1] on mutagenesis held that Article 3(1) of Directive 2001/18 on the deliberate release of Genetically Modified Organisms (OGM)[2] must be interpreted as meaning that "only GMOs obtained by means of techniques/methods of mutagenesis which have conventionally been used in a number of applications and have a long safety record" are excluded from the scope of that directive (that would include irradiation). The CJEU in its reasoning referred to the "application of conventional methods of random mutagenesis" without distinguishing further between in vivo and in vitro random mutagenesis and distinguished them from "new techniques/methods of mutagenesis which have appeared or have been mostly developed since Directive 2001/18 was adopted".[3] However, there is a decision by the French conseil d'Etat, following the CJEU case, which considers in vitro mutagenesis as GMO.

   [1] Case C-528/16, Confédération paysanne and Others, Judgment of 25 July 2018, EU:C:2018:583.

   [2] Directive 2001/18/EC of the European Parliament and of the Council on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC (OJ L 106, 17.4.2001, p. 1), Article 4.

   [3] Case C-528/16, Confédération paysanne and Others, Judgment of 25 July 2018, EU:C:2018:583, points 48 et 51.

1. Here I am unclear which aspects sustainability are meant to be considered. I see two: a) In the GMO risk assessment process, Environmental Risk Assessment (ERA) considers the impact on the environment caused by, for example, the introduction of GM plants, the use of certain substances in food, feed and plant protection products, or the introduction and spread of plant pests. In specific fields, such as GMOs or pesticides, EFSA is requested by EU legislation to carry out ERA. In addition to ERA, EFSA also assesses the risks posed to human and animal health by chemical contaminants or microbiological hazards which may be present in the environment and consequently may enter the food chain. ERA conducted by EFSA helps policy makers and regulators take sound decisions that protect the environment. b) On the regulatory point of view, a new regulation passed by the European Parliament and Council of the EU, applicable since 27 March 2021, sets new rules on transparency and sustainability strengthening the way EFSA carries out its role as risk assessor in the EU food safety system. More information on EFSA's website.

Questions for **Lynn Frewer:**

Rostyslav Bubnov: I have two questions to prof. Lynn Frewer: 1. What instruments do you consider effective to decrease culture-associated negative emotions in population? 2. My question is regarding nanoparticle-based novel food. What progress is so far? Any specific documents under development? Thank you!

Lynn Frewer: It is not the objective of (e.g.) risk communication strategies to reduce negative emotions, for example associated with food technologies, but rather to understand peoples concerns and address these as well as technical risk estimates. The issues of nano-based novel foods does not seem to have raised specific consumer concerns compared to GM foods however. Here is an article which may be of interest regarding effective risk communication:

Frewer, L.J., Fischer, A.R.H., Brennan, M., Bánáti, D., Lion, R., Meertens, R.M., Rowe, G., Siegrist, M., Verbeke, W. and Vereijken, C.M., 2016. Risk/benefit communication about food—a systematic review of the literature. Critical reviews in food science and nutrition, 56(10), pp.1728-1745.

Here are some articles on nanotechnology and food (as well as other technological innovations).

Frewer, L.J., Gupta, N., George, S., Fischer, A.R.H., Giles, E.L. and Coles, D., 2014. Consumer attitudes towards nanotechnologies applied to food production. Trends in food science & technology, 40(2), pp.211-225.

Coles, D. and Frewer, L.J., 2013. Nanotechnology applied to European food production–A review of ethical and regulatory issues. Trends in food science & technology, 34(1), pp.32-43.

Fischer, A.R., Van Dijk, H., de Jonge, J., Rowe, G. and Frewer, L.J., 2013. Attitudes and attitudinal ambivalence change towards nanotechnology applied to food production. Public Understanding of Science, 22(7), pp.817-831.

Gabriele Lombardi (Sapienza Università di Roma): The acceptance highlighted in the UK's public is comparable to the southern European one? Are there studies in Mediterranean areas of these

acceptance levels? My feeling is that in Southern Europe the concerns of public about this matters are more present.

> **Lynn Frewer**: If the question relates to food technologies in general, each must be considered in relation to its context , time of application (or near application) when there is some discussion about the technology, and specific factors related to the technology itself. The only way to answer the question about a specific technology is to conduct a comparative analysis between two or more cultural contexts using identical dependent variables to assess opinion, or to conduct a systematic review and analysis. There is evidence that attitudes change in time as well as across cultures.
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> Systematic review and meta-analysis:
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> Frewer, Lynn J., Ivo A. van der Lans, Arnout RH Fischer, Machiel J. Reinders, Davide Menozzi, Xiaoyong Zhang, Isabelle van den Berg, and Karin L. Zimmermann. "Public perceptions of agri-food applications of genetic modification–a systematic review and meta-analysis." Trends in Food Science & Technology 30, no. 2 (2013): 142-152.
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> Knight, J.G., Mather, D.W., Holdsworth, D.K. and Ermen, D.F., 2007. Acceptance of GM food—an experiment in six countries. Nature biotechnology, 25(5), pp.507-508.