

DIVERSITY IN THE DIET

THE TOOLS FOR A FUTURE PROOF FOOD SYSTEM

FOOD 2030: NUTRITION, CLIMATE, CIRCULARITY, INNOVATION



One of the key challenges for future food security is meeting the demands for sustainable sourcing of food while a demographic increase is expected. One way to obtain food is to increase the diversity of food sources using new raw materials. Examples of this are new products with high productivity/low environmental impact, like marine sources (algae) and insects. Other ways might be the fermentation of side-streams or cultivating animal cells in a laboratory.

SPECIFIC R&I BREAKTHROUGH TOPICS

New sources not fully exploited: There are diverse varieties of animal, plant and fungi species which are not fully exploited. One example could be the use of legumes, which some cultures use in their daily diets. There is still space for full exploitation of such already available sources. Also, food production and processing produces large quantities of unused side-streams which frequently end up composted or combusted. Those could be converted to food using fermentation processes, incorporating biotechnology, novel fungi, food bacteria and yeasts, or using refining processes.

Full exploitation of marine resources: The sea provides algae, seaweed and krill which are produced in abundance with a low impact on the environment. Harvesting those resources in a controlled manner and educating consumers to encourage acceptance of many of these resources could provide new raw materials with a low environmental impact.

Full exploitation of insects: The non-cordate phyla of arthropods, which includes insects, crustaceans, myriapods, and others, are a good source of protein. They provide very fast protein production under supposedly low environmental costs. Although used by some cultures, they are not mainstream. Consumer acceptance, environmental impact, and food safety are still challenging in this research.

Cultured meat and cellular aquaculture: Cultured meat is the name of laboratory meat, or in-vitro cell culture. Animal cells are replicated through a laboratory process. Theoretically, there is less environmental impact and no issues of animal welfare. Large investments are already ongoing in those technologies, but consumer acceptance and sustainability parameters are still under research.

EXPECTED IMPACT

Exploring new raw materials allows for a higher diversity in the use of resources and technological applications, as well as an improved health impact on consumers. Lower level organisms can provide higher efficiency in food production, while reducing the use of higher-level organisms that contribute largely to water and land use, and loss of biodiversity. The use of side-streams increases the efficiency of the food chain. Additionally, research into new raw materials opens a new market to consumers, new nutrients to explore, provides new sources of jobs and an increase in the resilience of the food system towards food security. It also provides diversity in consumer diets, offering ground for healthier diets as well as increased food security.

MARKET OPPORTUNITIES / CHALLENGES

- Exploring new resources provides resilience to the food system.
- Often, some of these new raw materials provide less environmental burden through production and processing, reducing the environmental footprint.
- Opportunity for new markets and business models but could replace other markets (e.g. cultured meat vs cattle production). It could be seen both as an opportunity and a challenge.
- Opens the door to new nutrients and sensorial properties in the diet.
- Consumer acceptance and cultural changes might be a challenge.
- Some of these new raw materials require further research to overcome issues, such as food allergies in insects, efficiency in cultured meat, or legislation and labelling application to the final products.

EXAMPLE REFERENCES

ETP Food for Life (2016) Strategic Research and Innovation Agenda. <http://etp.fooddrinkeurope.eu/news-and-publications/publications.html>

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Post MJ & Hocquette JF (2017). New sources of animal proteins: cultured meat. New Aspects of Meat Quality. Amsterdam, The Netherlands: Elsevier

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ASSOCIATED TRENDS IN FIT4FOOD2030 (URL)

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| ○ Malnutrition | ○ Health and food consciousness. |
| ○ Scarcity of natural resources | ○ Special diets like vegetarian, vegan or low carb |
| ○ Cultured/in vitro meat | ○ Globalisation of diets |
| ○ Novel food | ○ Food regulation |
| ○ Alternative protein sources | |

ASSOCIATED CASES IN FIT4FOOD2030 (URL)

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| ○ Mosa meat | ○ Perfect day |
| ○ Entomo farm | ○ Finless foods |
| ○ Impossible foods | ○ Memphis meats |
| ○ Agriprotein | ○ Beyond meats |
| ○ Allmicroalgae | ○ Clara foods |
| ○ Ultima Restaurant | ○ New Wave Foods |