PROTEIN 2FOOD PIONEERING CROPS FOR FUTURE GENERATIONS

PROTEIN2FOOD is an EU project funded under the Horizon 2020 Framework. PROTEIN2FOOD is about developing innovative, cost-effective and resource-efficient, locally produced, healthy plant proteins for human consumption.

Challenge

The increased demand for high quality protein-rich food that can satisfy a growing world population, while considering environmental sustainability, adapted land-use practices and food security is a global challenge.

Europe has a large consumption of animal-based proteins for food, i.e. meat and dairy products, while most plant proteins in the EU are used as feed instead of for human consumption. The EU currently imports 70% of its plant proteins, especially soybean, mainly from Brazil.

Fig. Soybean plant

As only a small fraction of plant proteins is grown in the EU, the EU is very vulnerable to fluctuations in world market prices.

The project will address the challenges by developing high-quality food protein from multi-purpose crops (seed crops: Quinoa, amaranth, buckwheat and grain legumes: lupin, faba beans, chickpeas and lentils) through optimised, sustainable production and processing methods.

Fig. Amaranth

Expected results:

1. Enhance protein production by 25% through new effective breeding techniques and optimised crop management, with an increase by 10% of the EU's arable land that is destined to protein-crop production; also using marginal soils.
2. Accelerate protein transition from animal-based protein to plant-based protein in Europe with a clear impact on reducing the carbon footprint.
3. Increase EU agro-biodiversity by introducing promising high-quality crops and legumes.
4. Prototypes of new protein-rich protein food with exceptional market potential.
5. Improve the EU's visibility in the area of food processing and technology through high impact-factor scientific publications.

Fig: Work Package set-up

The consortium

The project consists of a diverse consortium of 19 partner institutions comprising breeders and farmers, food-ingredient producers and product manufacturers from 13 different countries; Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Peru, Poland, Romania, Spain, Sweden and Uganda. The University of Copenhagen, Department of Plant and Environmental Sciences, Denmark, is the coordinator of the project.

PROTEIN 2FOOD

Impact

Food security

High-value seed crops with high protein quality (Quinoa, amaranth and buckwheat) and grain legumes of high protein quantity (Lupin, faba beans, chickpeas, and lentils) will be targeted to replace animal-based proteins for human consumption.

Fig. Lupin

In general, food production will increase in a sustainable way, especially for protein, by improving farm practices in Europe where yield gaps exist. To this end, precision farming systems will be used to improve plant varieties, and organic farming approaches.

Biodiversity

Increased plant-protein consumption will support increased biodiversity, as around 30% of the total human-induced biodiversity loss is related to livestock production (Westhoek 2011). Plant protein breeding programmes adapted to climate changes across Europe with improved crop rotation systems will increase EU protein crop production, increasing the use of marginal soils and introducing new, highly nutritious crops into Europe.

Environment

Through the use of multidisciplinary approaches (genetic, agronomic, food engineering and socio-economics) the project will improve the quality and quantity of available plant proteins. Increased growth of legumes will support enhanced resource-efficiency through a reduced need for fertilisers. Improved crop rotations will lead to improved soil fertility.

Fig. Quinoa field

Bioeconomy

The results will assist Europe in making the transition to a more resource-efficient society. It relies more strongly on local plant-protein production to satisfy consumers' needs in terms of food security and healthy diets, with excellent taste. The food industry's demands are met by developing sustainable and environmentally friendly aqueous processing methods for high value food proteins and side-stream products, as well as the supply of new innovative protein ingredients.

Human health

Tastier products based on plant proteins will get consumers' attention, resulting in increased consumption of vegetable protein. The effects will include health benefits due to the envisioned parallel reduction of saturated fat of animal origin, and the possibility of the introduction of more fibres, more unsaturated fat, more minerals and vitamins; together with the plant proteins. An ultra-structural conformation of the target food products will allow food technologists to improve the sensory quality of the products, thus furthering consumer acceptance of new, protein-based products.

Social innovation

Romania will be used as a model to investigate consumer-to-farmer co-drivers for the introduction of new crops and cropping systems that meet consumer demands for high-value food proteins. The aspect of fairer trade will be included in a sustainability context that evaluates environmental, economic feasibility and socio-economic aspects of introducing new crops and production methods.

For further information, please contact Louise Martinussen, Project mananger, loma@plen.ku.dk

UNIVERSITY OF COPENHAGEN