The National Food Institute is searching for solutions that can help feed the world's growing population in an economically viable and sustainable way, e.g. through the biorefining of a wide range of raw materials.

📷 Grass. Colourbox

Eating grass is not for ruminants only

The juice of grass contains protein, which – in its concentrated form – is a new ingredient with the potential to become an important alternative to the proteins that are derived from meat in particular. This is one of the ways the National Food Institute works to feed the growing world population where more and more people will need protein on their plates.

How is it possible to develop sustainable foods to feed the growing world population? Part of the answer may be grass. Together with the research centre AU Foulum at Aarhus University, researchers from the National Food Institute have developed a method to extract protein from grass. The new ingredient has a good amino acid composition comparable to the one of soya, eggs, and whey. However, production of grass protein has a significantly lower impact on the environment and climate.

The composition of the world population places new demands on the production of food. The world population is growing fast, and many people are getting richer and richer and want to have a different type of diet. This means that there is a growing demand for proteins and thus, basically, for animal products.

Alternative and better methods to produce proteins, which do not have an adverse impact on the environment, are therefore needed. This is where grass enters the picture, because grass is an environmentally friendly crop. It is very hardy, it does not need much fertilizer, and people can actually eat it. However, it takes special methods to convert grass to food.

Grass juice becomes protein powder
People cannot eat grass, because unlike cows we do not have four stomachs. Grass is very rich in fibres and cannot be metabolized in our stomach.

However, the researchers at the National Food Institute have, together with AU Foulum, found a method to convert grass to an edible ingredient. First, grass is passed through a dewatering press, which works just like a huge juicer. It separates the raw material into two parts: One part consists of dry matter high in fibres, which can be used for cattle feed, and the other part consists of high-protein fluid. When the proteins are separated from the fluid, the result is a powder that consists of protein. The kilo price of protein powder is approximately ten times higher than the price as feed. The dry matter part can still be sold as cattle feed, which makes the concept relatively profitable and even more sustainable.

Grass can taste like liquorice and peanut butter
Besides grass being so high in fibres that people cannot eat it, it isn't very tasty. The taste is bitter and in large quantities, it

will be very uncomfortable for us. This may be nature's way of telling us that we should not eat grass in its pure form.

However, the National Food Institute has succeeded in making products such as protein bars with a grass protein content of up to 10 per cent, without people disliking the taste. The taste of grass is camouflaged by adding aromatic ingredients such as peanut butter, honey, ginger, and liquorice. As soon as the researchers manage to reduce the taste and colour of grass even more in the protein powder, the industry can use the properties of the protein in a wide range of foods.

Ryegrass is rich in the right amino acids
The most important quality parameter for proteins is the amino acid composition. Therefore, not all protein sources are good substitutes for protein sources from animal such as meat, eggs, and milk. Grass has turned out to be a good protein source as the amino acid composition in the protein concentrate from ryegrass etc. is very beneficial. In several cases, it is even better than products made from soy protein already on the market. This makes ryegrass an excellent protein source.

Eating grass does not solve all of the world's food problems. However, it is an important piece of the puzzle along with other alternatives such as insects and seaweed.

New on the plate
– and on the way to being approved by EFSA
It is one thing to enable the production of grass protein. It is another to ensure that it is safe to eat. Grass protein is a so-called novel food and as such it must undergo a process of approval by EFSA, the European Food Safety Authority. This approval means that EFSA assesses that the ingredient is safe to eat, meaning that it is not toxic and does not cause allergies e.g. in people who are allergic to grass pollen.

In the so-called InnoGrass project, the National Food Institute is at the head of studying the nutritional content of the grass protein and any unwanted substances such as toxins and allergens. The goal is to have the grass protein approved as food so that businesses can start using it in their own productions.

InnoGrass is financed by GUDP (Green Development and Demonstration Programme).

Some food businesses are already interested in using the grass protein in their products. However, applying for a novel food approval would be a large financial burden for most small and medium-sized companies. Therefore, the National Food Institute plays an essential role in the approvals process by contributing the necessary research-based documentation.

"For the National Food Institute, we see it as an important job to facilitate the approval of grass protein as a food ingredient. In that way, the Institute contributes to us moving closer to a radical change in our eating habits – away from animal proteins that have an adverse impact on the environment and towards more sustainable alternatives," Peter Ruhdal Jensen says.

" The ambition is that research from the National Food Institute can make the utilization of grass profitable. It must be able to compete with cheap products such as soya. It should be cheap to buy, offer good functionality in the foods, and it must be tasty. The idea is that we will eat many products based on grass. In particular, the market seems to be big among young consumers who, fortunately, pay great attention to the environment and sustainability. **"**

Peter Ruhdal Jensen
Professor