

A 360° view of the effects of foods

By exploring both the beneficial and the harmful health-related properties in foods, consumers and authorities become better equipped to predict the health effects of individual foods, nutrients, and diets. The National Food Institute is leading in the area of risk-benefit assessments.

Fish is an important source of beneficial fatty acids and vitamin D, but fish can also contain harmful heavy metals such as methylmercury. Nuts contain healthy fats, but they can also contain carcinogenic moulds (aflatoxins). And red meat is one of the main contributors when it comes to unhealthy intake of saturated fat, but at the same time it contains important dietary iron.

“Risk-benefit assessments allow us to quantify, compare, and measure the health effect of specific foods or food groups,” says Senior Researcher and Head of Research Group Morten Poulsen, whose group heads up the International Network on Risk-Benefit Assessment of Foods.

What is a healthy diet?

The National Food Institute, which has a long tradition of research in the field of food safety, is leading within the area of risk-benefit assessments.

Among other things, risk-benefit assessments are used to quantify the health impact of eating in accordance with the official food-based dietary guidelines or following a specific diet compared to what an average Dane eats. Furthermore, the calculations make it possible to explore segmented population groups such as women of childbearing age or men over 50 years, and examine what happens to your health if one type of food is replaced by another.

Replacing steak with fish results in better health

A risk-benefit assessment conducted by the National Food Institute showed that the health of the average Dane - and in particular men over 50 and women of childbearing age - would benefit if people replaced some of their meat intake with fish and thus reach the recommended weekly intake of 350 grams of fish.

“The Institute’s calculations show that the Danish population can gain up to 7,000 healthy years of life annually if all Danes eat fish instead of red meat. However, the health benefit depends on the type of fish the consumer chooses. The greatest health benefit comes from eating fatty fish (such as herring and mackerel) or a combination of fatty and lean fish (such as plaice and pollock). The benefit is smaller if the consumer eats only lean fish”, Morten Poulsen says.

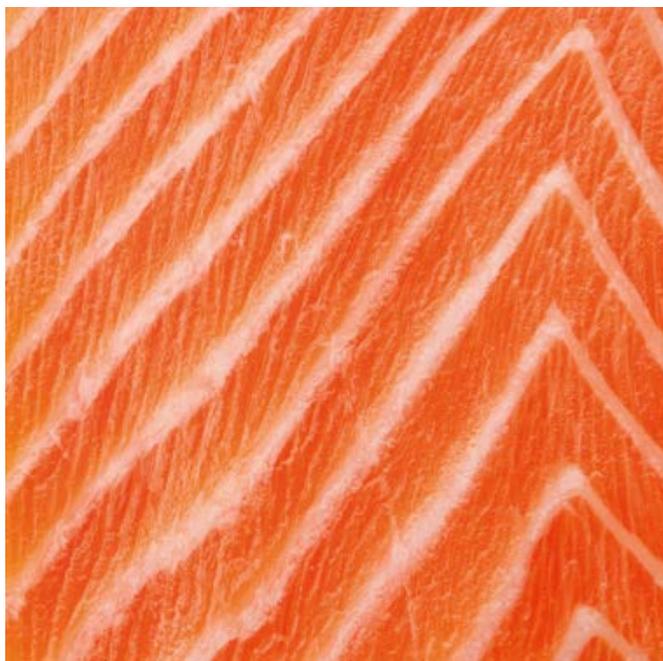
If consumers decide to eat only tuna, the overall assessment shows a significant health loss. Tuna is low in beneficial fatty acids and can have high concentrations of methylmercury. The health loss is assessed to be particularly high among women of childbearing age as a large intake of mercury can damage unborn children’s brain development.

Interdisciplinary cooperation is the key

Risk-benefit assessment is a relatively new discipline that draws on a number of disciplines such as nutrition, toxicology, microbiology, and epidemiology.

Risk-benefit assessments from the National Food Institute are used, e.g., to assess the effect of fortification, production methods, and dietary recommendations.

Red lettuce. Colourbox



The National Food Institute develops models to be used in risk-benefit assessments, which evaluate foods' harmful and beneficial effects.

📷 Salmon. Colourbox



The National Food Institute calculates the burden of disease of various foodborne diseases and can compare risks associated with different foods.

📷 Raspberry. Colourbox

In the assessments, the researchers often calculate the beneficial and harmful health effects by using the health metric disability-adjusted life years (DALY). DALY is a measure of how many years people will have to live with a reduced quality of life due to illness, and/or how many years are lost because a person dies earlier than expected.

Intervene to ensure as few people as possible become ill

Besides risk-benefit assessments, health metrics can be applied to explore the burden of disease in the population caused by different chemicals and disease-causing microorganisms, contaminants in food, and dietary risk factors such as a high intake of sugar or a low intake of fruit and vegetables.

Studies show that Campylobacter is the foodborne bacterium that makes the biggest contribution to the burden of disease in Denmark. Even in countries like Denmark, which have excellent monitoring systems, it is difficult to determine how many

people are affected by a foodborne disease every year. Many of these illness cases often stay under the authorities' radar because not all patients seek medical care, not all doctors seek a sample, and not all samples are analysed.

Researchers at the National Food Institute have estimated the burden of disease of the three foodborne pathogens Salmonella, Campylobacter, and verotoxin producing Escherichia coli (VTEC). These show that Campylobacter ranks highest followed by Salmonella.

The results help the authorities and food producers to assess where to intervene so that as few people as possible get sick from the food they eat.

"Risk-benefit assessments have given us an effective tool to examine the health effects in the population, promote healthy eating habits, rank food-related risks, and in the production of foods," Morten Poulsen says.

“The ambition is to use and streamline even more data so that the risk-benefit assessments can reach the public sooner. This would, for example, make it possible to conduct a risk-benefit assessment of different diet trends as soon as they reach the consumer. Today it takes too long, and the trends are usually over by the time the results are ready. We also hope to build a bridge between the industry, consumers, and authorities through even more interdisciplinary cooperation when it comes to assessing both the harmful and the beneficial.”

Morten Poulsen

Senior Researcher and Head of Research Group