

Nutrition and Health Session

An overview for Whole Grain Summit participants

How to develop further knowledge on the health benefits of whole grain and to define a science-based quantitative recommendation for daily whole grain intake

- 1) Can we get a consensus on an international, science-based recommendation on whole grain intake?**

Table Host: Chris Seal, Newcastle University, UK

The evidence that increased WG consumption is beneficial for health is pretty universally accepted within the scientific community, although the mechanisms of action are not clear. This has resulted in many countries incorporating recommendations for WG intake into national dietary guidelines, but the degree of emphasis varies greatly between different countries. Some are very 'soft' and include statements around 'choosing whole grains where possible' and 'making more of your grains whole'. In other countries the recommendations are more explicit such as 'consuming 3 to 5 servings of whole grains every day' and 'consume 75g whole grain per 10 MJ per day'. Some countries, however, still have no mention of WG in their dietary recommendations. How can we change this? In this brainstorming session we will discuss whether we should encourage all countries to promote WG with at least a 'minimum' statement about incorporating WG into the daily diet. Is it possible to collate enough scientific evidence to support a stronger quantity-specific WG dietary recommendation and how could this be promoted and accepted globally?

- 2) When whole grains are not good news – how can concerns around cereals and health be addressed?**

Table Host: Kaisa Poutanen, VTT and University of Kuopio, Finland

In spite of the many health benefits associated with whole grain intake, many consumer groups have concerns about choosing them as part of their diet. One obvious group with good reasons for this is the coeliac patients, who by doctor's recommendations should avoid gluten in their diet. This poses challenges in reaching the nutrients which cereals provide a good source of, such as dietary fibre and some vitamins. Here use of pseudocereals and oats could add value to the dietary pattern. On the other hand, there are many people avoiding cereals due to general distrust about the nutritional value of gluten and carbohydrates. Here communication is needed about the need of energy nutrients and the fact that they should be accompanied by other nutrients and non-nutrients so as provide foods and diets with high nutrient density. On the other hand, development of hybrid products containing both grains and pulses would provide new food concepts offering balanced plant protein source. Dietary recommendations urging reduce red meat consumption, as well as sustainability of plant foods provide good basis for communication about the multiple benefits of such foods.

- 3) A new role for whole grains as the pillar of a healthy, sustainable diet – is this true and how can this be proven?**

Table Host: Koen Venema, Maastricht University, The Netherlands

There is a recognition that our current global food system is not sustainable. Two billion of the world population are malnourished when almost 800 million people are undernourished. Moreover, one-third of the population worldwide live primarily on meat-based diet leading to an over-consumption of proteins, while the other two-thirds live primarily on plant-based diet. It is now recognised that the meat-based diet requires more energy, land, and water resources than the plant-based diet which is more sustainable. Many studies have also related these dietary patterns to higher risk for cardiometabolic diseases. Now the question is how relevant is it to include whole grains in a sustainable diet, which grains would be the best candidates and how this will impact the nutrition and health status of the populations.

4) Better evidence underpins everything – creating standards for whole grain studies

Table Host: Rikard Landberg, Chalmers University, Sweden

Observational studies in different populations have consistently shown inverse associations for whole grain intake and risk of developing non-communicable diseases such as type 2 diabetes, coronary heart disease, colorectal cancer as well as some of their main risk factors. However, results from dietary intervention studies on the role of whole grain intake on risk factors have been mixed, despite clear hypotheses and suggested mechanisms investigated. Why is it so difficult to generate coherent evidence, particularly in randomized controlled trials? This question is fundamental and should be systematically addressed to take the science forward and bring efficient dietary solutions to the consumers' everyday life.

Study designs need to be carefully adopted to the specific outcome investigated. Recent science has revealed that "new" factors, such as gut microbiota, explain differences in response of several outcomes to dietary interventions. It remains an open question whether such factors should be accounted for already at randomization, i.e. entering the precision nutrition era. More individualized approaches as well as studies under real-life conditions in combination with objective measures of dietary exposures may be strategies to promote compliance; a large and well known problem in dietary intervention studies.

Irrespective of study design- whole grains are different. The content and composition of dietary fibre and bioactive compounds vary substantially between brown rice, whole grain wheat, rye and oats for example. Shall whole grains be treated the same irrespective of product matrix and grain type or is whole grain as a concept too broadly defined? Is it time to upgrade and adapt the "gold-standard" i.e. randomized controlled trial to better fit studies on diet and health? If so - how?

5) What are the future trends for whole grains and health and what will drive them?

Table Host: Kieran Tuohy, Fondazione Edmund Mach, Italy

Epidemiological studies show that whole grain consumption is associated to reduced risk of several diseases including type 2 diabetes, cardiovascular diseases and certain types of cancers. Moreover, many studies have shown some effects of whole grain intake on glucose and lipid metabolism, weight management, insulin sensitivity and inflammation processes among others. Moreover, more recently, several intervention studies have also investigated the effect of whole grain on gut microbiota to understand the mechanisms of action of health effects. Indeed whole grains are rich in fibers, phenolic compounds, vitamins and minerals which can act on these outcomes and display a huge variability in terms of composition depending on the grain species. Moreover, processing of these grains such as sprouting,

fermentation, extrusion etc. can impact also their physico-chemical characteristics and their effect on health. Thus it is now needed to define what are the future trends for research on whole grain and their Health impact (in term for example of cereals, processing and health outcomes) and what will drive them.

6) What is the impact of cereal processing on the health impact of grains, and how can this be measured?

Table Host: Chris Seal, Newcastle University, UK

Prior consumption, whole grain are often processed or milled which can be done by simple crushing or by fractionation, then recombination of fractions, i.e. white flour, bran and germ. The flours which are obtained are further processed to produce cereal-based food products. The impact of these processing on the nutrients contained in the grains is not always evaluated. Most of the studies showing positive impact of wholegrain consumption on health have been done with products made with recombined whole grain flours. However, the actual impact of processing on health outcomes is not really known yet. Moreover, to evaluate this issue, better physic-chemical characterization of whole grains and cereal-based products will be also needed. Therefore, the objective of this discussion will be to discuss:

- What is already known on the impact of processing on the composition of whole grain products and their health effects?
- How we can further explore this issue?
- How should we better characterize the cereal-based food products?