



International Research Network for Food Quality and Health

Seminar November 26., from 9-10 am CET at ZOOM

Organic Feed Changes Rat Physiology

The workshop is free of charge, but you have to sign up at shb@nexs.ku.dk, just write FQH as subject and you will receive a zoom link for the meeting

Program:

9.00-9.05 welcome by FQH president Carola Strassner

9.05 – 9.35 Organic feed changes rat physiology by Ewa Rembiałkowska



Prof. Ewa Rembiałkowska works in the Division of Organic Food of the Institute of Human Nutrition Sciences at the Warsaw University of Life Sciences, Poland.

In her research activity she deals with the sustainable diets, nutritional value of raw materials from organic and conventional production and the impact of organic food on human and animal health. She has published over 200 scientific papers in this field, 40 of them in highly scoring journals.

Prof. Rembiałkowska has been running a number of national and international research and implementation projects related to sustainable / organic food and farming. She is a member of the boards of several Polish, European and world organizations promoting this subject (FOA, FQH, OFSP, ISOFAR, ENOAT).

9.35-9.55 Discussions in plenum or break-out rooms dependent on number of attendants

9.55-10.00 Wrap-up, presentation of next workshop and goodbye

Abstract

Organic Feed Changes Rat Physiology

Abstract: Recent human cohort studies reported positive associations between organic food consumption and a lower incidence of obesity, cancer, and several other diseases. However, there are very few animal and human dietary intervention studies that provide supporting evidence or a mechanistic understanding of these associations.

Here we report results from a two-generation, dietary intervention study with male Wistar rats to identify the effects of feeds made from organic and conventional crops on growth, hormonal, and immune system parameters that are known to affect the risk of a number of chronic, non-communicable diseases in animals and humans.

A 2 - factorial design was used to separate the effects of contrasting crop protection methods (use or non-use of synthetic chemical pesticides) and fertilizers (mineral nitrogen, phosphorus and potassium (NPK) fertilizers vs. manure use) applied in conventional and organic crop production. Conventional, pesticide-based crop protection resulted in significantly lower fiber, polyphenol, flavonoid, and lutein, but higher lipid, aldicarb, and diquat concentrations in animal feeds. Conventional, mineral NPK-based fertilization resulted in significantly lower polyphenol, but higher cadmium and protein concentrations in feeds. Feed composition differences resulting from the use of pesticides and/or mineral NPK-fertilizer had a significant effect on feed intake, weight gain, plasma hormone, and immunoglobulin concentrations, and lymphocyte proliferation in both generations of rats and in the second generation also on the body weight at weaning. Results suggest that relatively small changes in dietary intakes of (a) protein, lipids, and fiber, (b) toxic and/or endocrine-disrupting pesticides and metals, and (c) polyphenols and other antioxidants (resulting from pesticide and/or mineral NPK-fertilizer use) had complex and often interactive effects on endocrine, immune systems and growth parameters in rats. However, the physiological responses to contrasting feed composition/intake profiles differed substantially between the first and second generations of rats. This may indicate epigenetic programming and/or the generation of “adaptive” phenotypes and should be investigated further.