Iodine in seaweed - occurrence, speciation, bioavailability and risk assessment

Seaweed is the common term for marine macroalgae plants, which may be divided into green, red and brown algae types. There is an increased interest to increase the exploitation of marine macroalgae for commercial purposes including the use in relation to food and feed production. Certain seaweeds have a great potential to accumulate various trace elements and contain consequently relatively high levels of both essential and toxic elements. Seaweed can even be used for bioremediation purposes in order to remove trace elements from the environment. The concentrations of iodine in seaweeds vary highly between the different types of seaweed. In green and red algae concentrations in the lower mg/kg are typically reported, whereas in certain brown algae concentrations in the g/kg range (dry mass) can be found. These very high levels raise concern about food and feed safety when brown algae are used consumed by either humans or animals. No maximum levels for iodine in seaweeds (or other types of food and feed) have been established in the legislation in EU. For humans an upper tolerable level at 600 µg/day has been established (SCF, 2003), hence consumption of as low as 100 mg of certain seaweeds would lead to an exceeding of this guideline value. There is a need for a better documentation of the iodine levels in seaweeds and further knowledge on the biological and environmental factors that may influence the concentration levels (e.g. seaweed type, location and season). Furthermore, the speciation of iodine may also be an important parameter to take into account when assessing the safety of seaweed food and feed applications.

The present lecture will include:
examples of the use of seaweeds in various food items examples of the determination of iodine and iodine compounds in seaweed samples by (HPLC-)ICP-MS discussion of the results obtained in relation to food and feed safety assessment.