Potentials and possible safety issues of using biorefinery products in food value chains

Background
More than one third of all food produced globally goes to waste. New biorefining and bio-processing approaches can help make higher value products from many more components of large scale agro- and food processes than previously exploited. If we do not take advantage of such new bioprocessing opportunities we will soon be wasting even more and in certain cases miss out on opportunities for producing healthier foods.

Scope and Approach
In this short treatise we have selected recent bioprocessing examples that target production of new products from biomass, including plant and marine biomass, and especially from food- and agro-industrial side streams. We have coined these processes and the products from them as having potential since they also encompass improved resource efficiency, getting more value out the raw materials, and lowering of the climate impact of food production per ton produced. These targets go hand in hand with improved industrial competitiveness. A focus on the full use of the biomass, by biological (microbial or enzymatic) processing of residues and side-streams, can pave the way for production of higher value products, such as food and feed ingredients combined with production of bio-fertilizers and bioenergy.

Key findings and conclusions
The new opportunities for bio-based value chains from the yellow and the green agricultural and forestry bio-refineries, bioprocessing of different types of food- and agro-industrial side-streams and new materials from the blue biomass, e.g. seaweeds, and the red slaughterhouse side-streams are described, exemplified and discussed, and safety issues are addressed.

In conclusion
Increased resource efficiency via targeted biorefining, often employing enzymatic processing, may open the door to improved environmental sustainability and industrial competitiveness. Further, a biorefining agenda can create new jobs. Development of new business models may moreover pave the way for revenue sharing through the entire value chain.