

Summary

Objectives

As is known nowadays a large quantity of renewable raw materials is lost in the course of the production process. Depending on the method of calculation losses of 10 to 90 % are common. The remaining organic residues often contain quite high amounts of potentially valuable ingredients (secondary plant-metabolites, highly structured biomolecules, etc.). These ingredients could be the basis for an additional transformation process thus increasing the overall value added of the whole production process.

The presented study aims at identifying some of the given potentials by collecting characteristic data of flows of organic residues in the sector of foodstuff and food-processing industries (focus on non –product material flows) as well as gathering information on the companies' R&D activities, their innovation methodology and the current applications and utilizations for organic residues.

The foodstuff and food-processing industry was chosen because of its high economical and ecological importance for Austria.

Results

In order to obtain the information needed contacts in the respective companies were interviewed based on a standardized questionnaire. Generally spoken this method proofed to be very successful. Fundamental data concerning organic residues flows within a given company were collected quite easily. Moreover possible material reduction (less input) was identified in some processes directly through evaluation of the questionnaire and optimized routes for cascaded utilization of the organic residues became visible. Furthermore pathbreaking works by Gunter Pauli ("Upsizing") were evaluated. The presented methodology was analyzed and its usefulness for given circumstances in Austria was investigated.

Some selected case studies showed which potentials are yet to be exploited. In one special case it was pointed out, how the implementation of cleaner production methods combined with a "waste-sharing" concept could lead to significant reduction in material flows as well as cost savings for the companies.

In addition the report tries to identify some of the most important facts why innovative industrial applications in the field of organic residues are not being put into practice. Some examples referring to this context are given below:

Since there already exist quite a few routes for using organic residues in Austria, there is no urgency for the companies which generate these residue flows to look for alternative ways of utilization. The feeding-stuff industry for example makes use of many organic residues and has huge processing capacities - sometimes even the farms themselves use organic residues directly as fodder. Since in this case revenues are generated for the foodstuff processors anyway no alternative application is sought for at the moment. If there is no other possibility at all, even disposal (e.g. composting) of organic residue is comparatively cheap. All these facts are hindering in the search for further applications of organic residues.

Another point is that there is often a lack of cooperation horizontally (within a certain branch) as well as vertically (up and down the line of production, respectively in differing sectors). Cooperative, managed networks could secure a high level of inter-corporate information flow thus bringing industries together in the objective of generating "zero emissions".

As it is for the small and medium sized enterprises (SME) they often lack of a R&D department and day to day business does not give sufficient time for innovative applications (for organic residues). Plus, there is little willingness to pay for external R&D.

Since there are many SME there is a problem of “economy of scale” which means that many of the organic residues flows are too small to be transformed into by-products by the companies themselves. Therefore the residues are sold and the chance of generating value added is missed.

Eventually some ideas were created for promising future projects on the field of utilization of organic residues. The following three examples shall give an idea, of how industries could benefit from a systemic approach towards problem-solving while making good use of existing synergies to generate more value added and reducing material flows to minimize the environmental impact of production activities:

- Utilization of auxiliary materials from the foodstuff industries. Some of these materials (bentonite, diatomaceous earth) could be of use in the building materials industries either as substitutes for raw materials or, e.g. as filling materials.
- Residues (draff) of the fruit processing industries could be used for producing valuable oils, aroma extracts or natural additives (e.g. food colour). A general concept for all participating producers could help overcome “economy of scale” – problems existing today, thus enabling the implementation of added value processes within Austria.
- Construction of an “**Integrated-Bio-Systems**”-based “micro”-brewery. A showcase like this could demonstrate the functionality of the concepts presented within this study and prompt industries to implement closed-loop production processes.