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Research area: Product aims
Raw materials // Recovered paper

Key words:
Paper for recycling, corrugating base paper production, parallel utilisation, fractionation, platform chemicals

TITLE:

Developing a process concept for the first parallel utilisation of recovered paper for packaging paper and levulinic acid production

Background/Problem area

Packaging paper and board are mainly produced from recycled fibres. Another characteristic of this product segment is the comparatively low reject ratios resulting from highly closed pulp cycles. This leads to increased concentrations of contaminants and minerals lowering the paper-technological usage value of fibrous raw materials. Paper producers must therefore resort to additional technical and/or technological measures which cause extra costs.

Another important trend is the increased use of renewable raw materials for energy production. In this context, the energy recovery from recovered paper has repeatedly been discussed as well.

Because of the ever more difficult economic and technological situation of paper mills resulting from these developments, for example rising energy and additive costs and mounting price pressure, manufacturers are increasingly interested in finding alternative value creation chains for recovered paper. One option is the parallel, profitable production of high-quality goods or materials from the partial pulp flows of stock preparation plants in paper mills.

Objectives/Research results

Aim of this research project is the development of a process concept enabling parallel utilisation paths of recovered paper in packaging paper production through systematic separation of a partial flow in the stock preparation plant and its use in a biorefinery process chain for levulinic acid production. Levulinic acid is just one example for suitable biorefinery processes here. The concept is intended to help the industry decide about practical implementation measures. Presently used production methods for levulinic acid were identified, and their technological and economic performance was evaluated. Different recycled fibre pulps were tested for their suitability as raw materials for chemical conversion.
Another focal point was the identification of suitable pulp flows to be discharged from the papermaking process as raw material for levulinic acid production. For this purpose, several fibre fractions were produced on laboratory and pilot scale to assess their paper-technological properties and the yields achievable by chemical conversion. The economic efficiency of the overall process concept depends mainly on the efficient separation and profitable use of minerals present in the separated partial flow. East Germany was used as a reference region to establish the mass flows of recovered paper and rejects in package production together with relevant logistic and structural data.

Application/Economic benefits

The technological concept of parallel utilisation paths of recovered paper in paper mills is new and profitable. Especially in view of the constantly rising demand for lignocellulosic materials, the extra value generated by this concept will enable paper mills to finance their fibrous raw materials also in the face of mounting competition. This can secure the future of especially small paper mills.

The new concept for the parallel production of packaging paper/board and platform chemicals enables paper mills to adjust higher reject ratios resulting in better properties of the fractions used for papermaking. This offers also a solution to the quality problems caused by increasingly closed paper recycling cycles, a route which had been blocked so far by the unfavourable cost-benefit ratios of the manufacturing structures prevailing in packaging paper and board production.

Period of time: 01.10.2010 – 30.09. 2012

Remarks

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