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Research area: Process aims
Paper, paperboard and board // Surface treatment

Key words:
Rapeseed, protein, starch, binder

TITLE:

Replacement of synthetic binder and cobinder by a combination of starch and especially prepared rapeseed proteins for cardboard coating

Background/Problem area

Binder systems in conventional coating colours for coated cardboard contain mainly synthetic products. The shortage of fossil raw materials and the changing political framework, e.g. due to emissions trading, call for a change in thinking. Besides reducing the specific water volume and optimising the use of energy in papermaking, the use of regenerative raw materials must be accelerated in converting. Starch has been used successfully as a binder and cobinder in coating technology, although at present the share of the binder system is limited to about 2/3 depending on the paper grade.

Objectives/Research results

Within the scope of the research project, a binder system for coating cardboard is to be developed on the basis of purely vegetable raw materials. Starch derivatives and especially modified rapeseed proteins can be used as a possible replacement for fossil raw materials whilst at the same time guaranteeing product quality.

The use of rapeseed proteins on an industrial scale has not yet occurred. Appropriate procedures for the specific use of rapeseed proteins in cardboard coatings are to be developed in order to transfer the results both from the laboratory and pilot scale to the industrial scale. This research project is therefore aimed at developing a new approach for reducing the use of fossil raw materials for this application. Moreover, the research project aims to transfer the results of laboratory trials to the pilot scale and to prepare samples for pre-industrial processing.

The project comprises a first part aimed at producing suitable rapeseed proteins which in a second part of the project will then be studied with respect to the application of protein-containing coating colours and the effects on the quality of the coated cardboard.

Protein-containing coating colours will be examined within the scope of laboratory-scale and pilot trials with respect to their qualitative impact on coating colour rheology and attainable cardboard quality. The objectives of this research are to evaluate the produced rapeseed proteins in the coating formulations by conducting coating trials and to identify the requirements on the protein preparation process to achieve the desired binder properties. Furthermore, coated cardboard samples will be prepared on the pilot coater of the research institute. The suitability of these samples for manufacturing folding boxes will be examined in industrial-scale print trials. The relevant converting properties such as creasability and gluability and the recyclability of the folding boxboard will also be investigated.

Application/Economic benefits

At the conclusion of the project, the expanded use and manufacture of vegetable protein products of rapeseed from domestic cultivation and the processing of the same for industrial board manufacture in compliance with the European quality requirements will have been achieved. This will give rise not only to the development of new business lines for oil seed processing and individual sectors of mechanical engineering as well as a higher value added for the rapeseed meal from the oil pressing.

Rapeseed meal will be raised to the next stage of the food chain, and new sales markets will open up for plant engineering due to new processing capacities. Cost savings in the formulation amounting to approx. 8% can be achieved by replacing 12 parts of latex binder and 0.5 parts of synthetic additives in the coating colours by 10 parts of starch and 6 parts of rapeseed protein.

Period of time: 01.03.2010 – 31.08.2012

Remarks

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