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Research area: Product aims

Resource saving

Key words:

starch, recycling, process water, membrane filtration, metabolism, conservation, surface starch, glue, corrugated board

Title:
Recycling of starch from process waters to reduce the fresh starch consumption in paper and corrugated board production

Background/Problem area

The use of starch for surface strength enhancement or adhesive / coating colour preparation is state of the art in the paper industry. Many corrugated board adhesives are starch-based products today.

Their increasingly difficult economic environment and market situation forces paper and corrugated board manufacturers to look for ever more cost-effective raw materials. The results of a completed research project on "stray starch" have shown that starch introduced in the process water by paper for recycling can be preserved for the duration of paper production (approx. 2 to 5 hours) by suitable methods to become usable as recycled starch and substitute for fresh starch in surface starch and corrugated board adhesive production.

In this context, it has yet to be investigated how process water ingredients - especially starch - must be treated and separated to become usable as recycled materials (starch) for surface treatment or corrugated board adhesives.

Objectives/Research results

Aim of the project was to use process water ingredients as so-called recycled starches in surface starch or adhesive products for paper and corrugated board production.

The results show, that short time heating prevents the starch metabolism for 24 - 48 hour, but a temperature more than 75 degree and a treatment time of more than 23 seconds are needed. Also sodium hypochlorite is suitable to get this result. Tannin shows an ambivalent result. The total bacteria count is reduced by 3 power of ten with short time treatment and sodium hypochlorite, but after 24 and 48 hours the bacteria count increase significantly.

The examination showed that recycling starches and medium viscous starches introduced by paper for recycling are capable to replace fresh starch in surface starches and in corrugated board adhesives without thermal or chemical modification. About 10 - 30 % of the fresh native starch can be replaced by recycling starch without product deteriorations and setbacks of the end product properties.

Application/Economic benefits

The suitable treatment of process waters and recovery of ingredients like starch will lead to marketable recycled materials. The material recycling of process water ingredients could thus generate cost savings due to:

• reduced expenses for cost-intensive raw materials

• reduced wastewater treatment costs

Period of time: 01.04.2015 – 31.07.2017

Remarks

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