MWP

MWP – Young Researcher Abstract 2024

Project title: Machine learning-assisted non-destructive approach for analyzing extractives in wood pulp

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Abstract:

Extractives were evolved by trees as means of protection against adverse environmental conditions and they often have sophisticated structure and valuable bioactive properties. Despite that, some of them can cause issues in pulping and papermaking: wet-end chemistry disruption, deposits on machinery, odorization and spotting. This results in impaired paper quality, mill downtimes and large financial losses, as well as increased consumption of resources. For these reasons control of extractives in pulping and papermaking processes is vital. Conventional method involves solvent extraction and gravimetric analysis combined with gas chromatography. This procedure is costly, laborious and destructive. It is necessary to develop a new method, which is fast, non-destructive and easily applicable in the forest industry. In our research spectroscopy combined with machine learning is proposed as an alternative. The planned outcome will be a model for qualitative and quantitative prediction of extractives in pulps based on spectral data. The introduction of the new analytical method in the industry will lead to better utilization of the forest resources along with more sustainable, efficient and cheaper production of pulp and paper. This will potentially cause the cellulose-based products to be more competitive against fossil-based materials and preferred by the consumers.

Key words: Pulp Extractives, Spectroscopy, Machine Learning, Analytical Method