



Chemical methods in the development of eco-efficient wood-based pellet production and technology.

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Abstract: Up to 20 million tons of waste wood biomass per year is left unused in Finland, mainly in the forests during forestry operations, because supply and demand does not meet. As a consequence of high heat energy prices, the looming threat of climate change, the greenhouse effect, and due to global as well as national demands to considerably increase the proportion of renewable energy, there is currently tremendous enthusiasm in Finland to substantially increase pellet production. As part of this European objective to increase the eco- and cost-efficient utilization of bio-energy from the European forest belt, the aim of our research group is - by means of multidisciplinary research, especially through chemical methods - to promote the development of Nordic wood-based pellet production in both the qualitative and the quantitative sense. Wood-based pellets are classified as an emission-neutral fuel, which means that they are free from emission trading in the European Union. The main fields of pellet research and the chemical toolbox that has been developed for these studies, which includes a new specific staining and optical microscope method designed to determine the cross-linking of pellets in the presence of various binding compounds, are described in this paper. As model examples illustrating the benefits of this toolbox, experimental data is presented concerning Finnish wood pellets and corresponding wood-based pellets that include the use of starch-containing waste potato peel residue and commercial lignosulfonate as binding materials. The initial results concerning the use of the developed and optimized specific staining and microscopic method using starch-containing potato peel residue as binding material are presented.

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