Analysis of extractives in coniferous tree fractions

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Extractives from tree fractions could be an important feedstock for the production of biodiesel, bioactive food additives, cosmetics, glues and polymer precursors However, despite the significant quantities, fractions as needles, branches, bark, cones and stump wood are unutilized sources. The aim of this study was to develop green, sustainable and economically viable technologies for the separation and production of chemical compounds from different tree fractions of lodgepole pine, Scots pine and Norwegian spruce. Conventional soxhlet and supercritical CO_2 extraction methods were used. The extractive yields for different tree species and fractions differed significantly, the highest value was found in lodgepole pine bark (21%) and the lowest in Norway spruce cones (2%). The extractives composed numerous of fatty and resin acids and their derivatives, and also terpenes and sterols. The bark mainly contained fatty acids, stump heartwood – resin acids, needles- terpenes and fatty acids. Cones and branches for all tree species contained high amount of resin and fatty acids. All the data from the two extraction techniques were in good agreement. The use of such chemicals for production of new products may open new doors towards a sustainable forestry-based biorefinery.

Figure: Chemicals from forest residues by soxhlet and supercritical CO_2 fluid extraction techniques