SUMMARY

Given thesis "Mechanical, surface and durability properties of the cellulose derivatives" aim is to evaluate the mechanical and physical properties of the novel cellulose derivatives and compare them with commercial cellulose diacetate. Due to the absence of research for the longer side-chains, the aging durability of the derivatives is also assessed.

Technological tests (tensile, contact angle, surface roughness, colorimetry, mass) are carried out in TalTech Laboratory of Wood Technology. In aging the material undergoes three different conditions for 672 hours: humid, dry and UV chamber.

Biopolymers like cellulose, starch, and chitin produce over 170×10^9 tons of biomass, of which cellulose is 35-50%. This concludes that cellulose is the most abundant biopolymer. It is possible to chemically modify it and the synthesis of cellulose allows for obtaining needed strength and biodegradability. However, its difficult structure and insolubility in traditional solvents are restricting its full potential for usage. Nevertheless, ionic liquids have shown promising results in cellulose synthesis and this thesis is planned to be investigating their mechanical properties of the latter.

When compared to cellulose acetate, the investigated materials had an increased thermoplastic behavior and hydrophobicity. Given cellulose esters are mechanically similar to LDPE and HDPE, respectively. Although with aging, 672 hours of constant contact with humidity, dryness, and UV show a decreased performance. UV reduces the material toughness by still holding on to the strength, depending on the relative humidity the material shows only minor decreases in values. According to the determined results, it is plausible that the fatty acid cellulose esters could be utilized for future bioplastic applications.