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AERODYNAMIC PROPERTIES OF HEMP FIBRE AND CORE

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ABSTRACT Decorticated hemp material is a mixture of fibre and core. Separation of the core from the fibre is an important process to obtain clean fibre. Several machines, including vibratory separators and straw walkers, have been used for the separation process of decorticated hemp material. However, results in the literature showed that using these machines, one could not obtain clean fibre. This study explored the potential of using an air flotation system for removing core from fibre. The specific objective was to study the aerodynamic properties of fibre and core which are the prerequisite for the development of an air flotation system. A testing apparatus is currently being designed to measure the terminal velocity of fibre and core. The apparatus consists of an air blower, a flow straightener, a vertical transparent column, and a stationary screen. In a test, hemp material (fiber or core) is placed on the screen in the column. Through the flow straightener, air is forced by the blower into the column. When the terminal velocity of the material is reached, the material begins to float, and the velocity is recorded with an air velocity measuring sensor. The test will be run for treatments: various hemp fibers and cores for retted and non retted conditions. Each treatment will be replicated 10 times. Before the terminal velocity test, fibre and core material will be characterized in their length, width, and thickness and mass. Based on these measurements, drag coefficients of hemp fibre and core will be determined for each test. The experiment is undergoing and the results will be presented in the conference presentation and paper.

Keywords: hemp fibre and core, terminal velocity, drag coefficient, drag force