

## Effects of Initial Moisture Content on the Physical and Mechanical Properties of Norway Spruce Briquettes

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**Abstract :** The moisture content of densified biomass is a limiting parameter influencing the quality of this solid biofuel. It influences its calorific value, density, mechanical strength and dimensional stability as well as affecting its production process. This paper deals with experimental research into the effect of moisture content of the densified material on the final quality of biofuel in the form of logs (briquettes or pellets). Experiments based on the single-axis densification of the spruce sawdust were carried out with a hydraulic piston press (piston and die), where the densified logs were produced at room temperature. The effect of moisture content on the qualitative properties of the logs, including density, change of moisture, expansion and physical changes, and compressive and impact resistance were studied. The results show the moisture ranges required for producing good-quality logs. The experiments were evaluated and the moisture content of the tested material was optimized to achieve the optimum value for the best quality of the solid biofuel. The dense logs also have high-energy content per unit volume. The research results could be used to develop and optimize industrial technologies and machinery for biomass densification to achieve high quality solid biofuel.

**Keywords :** biomass, briquettes, densification, fuel quality, moisture content, density

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