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### **Comparative Analysis of Antibiotic and Antioxidant Activity of Raw Hemp and Flax Fibers**

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#### **ABSTRACT (NO MORE THAN 500 WORDS:)**

This paper presents results of research aiming at investigation and comparison of antibiotic and antioxidant activity of the hemp and flax fibers in order to determine their functionality and safety for human skin. Decorticated, dew retted, water retted and osmotically degummed four varieties of hemp fibers as well as decorticated, wet degummed supported with ultrasound and cottonized three varieties of flax fibers were used as material for this research.

Antioxidant capacity of bast fibers was measured using two methods: FRAP - ferric ion reducing antioxidant parameter and DPPH radical reduction method.

In order to identify the compounds present in the fiber and to confirm the presence of phenolic acids: syringic, sinapinic, p-coumaric and ferulic acid in the tested hemp and flax fibers, spectrophotometric analysis was conducted by use of a total internal reflection method with an ATR attachment (Attenuated Total Reflectance). To determine the fiber antibiotic activity, MIC-Minimal Inhibitory Concentration for Staphylococcus aureus bacteria was evaluated.

The tested flax fibres showed higher antibacterial and antioxidant activity in comparison to the hemp fibres. The FRAP and DPPH parameters as well as the antibiotic units reached the highest values for both types of fibres extracted with the use of decortication method, however decorticated flax was additionally characterized with the best antibiotic activity among all tested fibers. The correlation between fibers bioactivity and their chemical composition was exhibited.

The highest ability to reduce Fe ions from Fe<sup>3+</sup> to Fe<sup>2+</sup> showed decorticated flax fibres of Modran variety. The subsequently applied processes caused reduction of the FRAP and DPPH values.

In the case of the Bialobrzeskie hemp extracted with use of different methods, the strongest correlation was found between the content of ferulic / syringic / sinapinic acids and values of the FRAP and DPPH as well as of lignin. The highest values of the Pearson correlation coefficient calculated for different varieties of hemp was observed for relationship between the ferulic acid and DPPH, p-coumaric acid and lignin content and the FRAP as well as for the sinapinic acid and DPPH and FRAP.

The results of the study proved that flax and hemp fibres exhibit inherent antioxidant and antibiotic activity, diversity of which depends on the plant variety, method of fibre extraction and subsequent stages of the technological chain applied for the fibre processing.