

Genotoxic effects of nanofibrillar cellulose

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Nanofibrillar cellulose (NFC) is among the most promising innovations in the forest industry. NFC possesses unique properties compared with similar materials of larger size, but it is unclear whether this also results in differential toxic properties. Toxicity studies on nanocellulose materials are still scarce, and it is important to investigate the possible toxicity of NFC at an early stage of product development. The objective of the present study was to examine *in vitro* and *in vivo* the potential genotoxicity of four NFC materials (fibril diameter: 2-15 nm; length: several micrometers) and a bulk-sized cellulose material.

In vitro genotoxicity was assessed in human bronchial epithelial (BEAS 2B) cells by the single cell gel electrophoresis (comet) assay (24-h exposure, doses 9.5-950 µg/ml) to detect DNA strand breakage and by the cytokinesis-block micronucleus (MN) assay (48-h exposure, doses 25-1250 µg/ml) to show possible chromosomal damage. Our *in vitro* results suggested that the tested materials did not induce significant DNA strand breakage or chromosomal damage in BEAS 2B cells as measured by the comet and micronucleus assays.

For genotoxicity assessment *in vivo*, the comet assay was performed on lung cells and bronchoalveolar lavage (BAL) fluid cells and the MN assay on bone marrow polychromatic erythrocytes, after single pharyngeal aspiration to female C57BL/6 mice (24-h and 28-d follow up; doses 10, 40, 80 and 200 µg/mouse). The analysis of the *in vivo* samples is still ongoing and will be completed during the summer.

Our study provides new information about the genotoxicity of NFC and thereby contributes to the risk assessment of these materials.

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