

PCDD/F IN THE PULP AND PAPER PRODUCTION

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Abstract

In order to verify the origin of the PCDD/F in the pulp and paper production the products and process liquors of three different pulp production lines were examined: Pulp and paper made out of pine wood with chlorine bleaching (production line 1) or with H_2O_2/O_2 bleaching (production line 2) and pulp and paper made out of beech wood with chlorine bleaching (production line 3).

The process liquors of production line 1 had PCDD/F concentrations ranging from 25-342 ng/L (PCDD/F). In the pulp no PCDD/F were detected before bleaching (raw pulp), while 473 ng/kg PCDD/F were measured after the bleaching process.

Production line 2 (pine wood with H_2O_2/O_2 bleaching) showed PCDD/F concentrations at a low ppt level (0,4-4 ng/L) in the process liquors and 322 ng/kg in the pulp after bleaching.

In the process liquors from production line 3 (beech wood with chlorine bleaching) just Cl₈DD was detected (2-4 ng/l). The pulp was also contaminated with Cl₈DD; in this case the Cl₈DD concentration in the bleached pulp (123 ng/kg) was not significantly higher than in the raw pulp (105 ng/kg).

The congener pattern of the PCDD/F of production line 1 one showed increasing concentrations from Cl₅DD to Cl₈DD (Cl₄DD was not detected) and increasing concentrations from Cl₄DF to Cl₈DF. In the samples from the other production lines only Cl₈DD was detected.

Our results show that the emissions of PCDD/F in process liquors from the production of pulp out of pine wood can be reduced by using H_2O_2/O_2 bleaching instead of chlorine bleaching. The PCDD/F concentration in the product was 1/3 less in the H_2O_2/O_2 bleached pulp than in the chlorine bleached pulp.

The use of beech wood for the pulp production with chlorine bleaching leads also to lower concentrations of PCDD/F (only Cl₈DD were detected) in the product and in the process liquors.

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