

Characterization of char from the pyrolysis of tobacco with inorganic additives

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Char generated from the pyrolysis of tobacco treated with inorganic additives and the physico-chemical properties of char during smoldering combustion process of tobacco has been analyzed. Tobacco chars were prepared at the temperatures 300°C to 600°C under nitrogen atmosphere. Pyrolysis properties of char were analyzed by using pyrolyzer(TG) under oxidative as well as non-oxidative(inert) atmospheres. Chemical characteristics of char have been analyzed by using FT-IR and ¹³C CPMAS-NMR. Pyrolysis analysis of cut tobacco treated with inorganic compound showed that the maximum weight change temperature shifted from 319°C to 290°C, and addition of inorganic compounds decreased smoldering combustion temperature. Char formation decreased as the pyrolysis temperature increased. FT-IR analysis of char at various pyrolysis temperatures indicated that hydroxyl and carbonyl groups from char decreased as the pyrolysis temperature increased. The ¹³C CPMAS-NMR analysis of char showed that the oxygen functionality began to disappear as the char formation temperature increased. The peak of carbonyl groups was not detected over 350°C of pyrolysis temperature. The aromatic functionalities of char increased with pyrolysis temperature.

Adding inorganic salts to cut tobacco lowered cigarette smoldering combustion temperature, reducing the level of tar, CO, carbonyl and aromatic compounds, B(a)P and TSNA in mainstream smoke. The use of chemical additives to modify tobacco combustion is one of the useful approach to the reduction of cigarette smoke delivers.