

## Product distribution through the modeling of pyrolysis of a two-dimensional tobacco particle

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A mathematical model of tobacco pyrolysis accounting for the transport phenomena and chemical process is presented. A physical process is proposed to elucidate heat transfer includes radiation, conduction and convection, mass transfer includes convection and diffusion of volatile species and pressure and velocity variation across a 2-D, variable property tobacco shred. The variation of physical properties such as porosity, conductivity, permeability and mass diffusivity of the shred is monitored with the extent of pyrolysis. A single-step, multi-reaction scheme is used for prescribing pyrolysis products. Time and space evolution of main variables and the pyrolysis product distribution are simulated for both smoldering and puffing condition. The 2-D and the widely applied one-dimensional prediction are compared.