Practical Modeling of Cigarette Ventilation Rate

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ABSTRACT : A quantitative predicted model describing the effects of wrapping materials on the levels of filter ventilation was developed and evaluated. The development of the model was expressed in terms of a quadratic polynominal relationship which was validated with experimental measurements for numerous porosity of plug wrap and tipping paper, unencapsulated pressure drop of filter plug and cigarette column and vent position. Five independent factors were chosen for their effects on the various responese. Forth-six trial numbers were obtained as a results of using by Box-Behnken design and it was analyzed by the multiple regression analysis with forward stepwise in STATISTICA/pc.

Practical cigarette ventilation was affected linearly by porosity of tip paper(5.62), vent position of tip paper(3.43), pressure drop of cigarette column(2.12), porosity of plug wrap(2.06) and filter pressuredrop(0.12) in the decreasing order, and also the pressure drop of cigarette column and vent position of tip paper interaction F ratio among five factors had a P-value of 0.082, indicating comparatively higher interaction and significant at the level of $0.1(\alpha)$ between these factors. Based on the analysis of variance, the model fitted for ventilation was significant at 1% confidence leved and the coefficient of determination(0.83) was the proportion of variability in the date fitted for by the model.