

Data Mining among Leaf/Smoke Components and Sensory Properties about Tobacco Leaves Blending Ratio

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An idea of close connection among leaf, smoke components and sensory properties has been assumed by a number of researchers. Many researchers tried to find out their connections, but few results have been showed up clearly until now. This study was focused on the relationship within leaf, smoke components and sensory properties following tobacco leaf blending.

The experimental conditions were designed two way layout for completely randomized design with 2 factors as follows; one is the sample cigarettes of four type by flue cured mixed with burley (40:60, 60:40, 80:20 and 100:0) and the other is three characteristics including sensory properties, leaf components and smoke components. In detail, sensory properties for smoking tastes were 8 attributes, that is, impact, irritations, bitterness, hay-like, tobacco taste, smoke volume, smoke pungent and mouth clean. The six smoke components were total particulate matters, nicotine, tar, carbon monoxide, puff number and nicotine to tar ratio. And, leaf components were eleven the same as, nicotine, total sugar, total nitrogen, chloride, pH, ammonia, ether extract, total volatile base, nitrate, crude fiber and crude ash etc.

Sensory evaluation method, known as quantitative descriptive analysis, was used to evaluate the perceptual strength with 15 score scale by samples respectively in regard to all attributes. Raw data from 10 trained panelists were obtained and statistically analyzed. Based on the MANOVA, clustering analysis, correlation matrix and partial least square (PLS) method applied to find out which smoke component is affected on

sensory properties. Especially, PLS method was used to remove the influence between explanatory variables in the leaf, smoke components derived from the results.

A highly correlated tendency between leaf and smoke components and sensory attributes were verified above ten items in all ($p < 0.01$). In addition, total nitrogen, ammonia, total volatile base, nitrate in the leaf components were found to have close connections with impact, bitterness, tobacco taste, irritation, smoke volume, smoke pungent etc ($p < 0.05$). About the results of PLS analysis, influence variables are used to explain about the correlation. In terms of bitterness, with only two explanatory variables, Leaf-NO₃ and Leaf-crude fiber were enough for guessing their correlation. Especially, in the distance-weighted least square fitting analysis variable carbon monoxide was verified as high influencing index about bitterness, hay-like, smoke volume.