

Non – Methanol based extraction method was developed for the estimation of nicotine, reducing sugars and chlorides in FCV tobacco leaf.

A simple, inexpensive, and less hazardous extractant for simultaneous extraction of nicotine, reducing sugars, and chlorides in tobacco cured leaf. The currently used reference extractant for nicotine, reducing sugars, and chlorides comprises methanol a major component of this reference extractant, is hazardous and expensive, hence, proposed and evaluated a simple extractant involving 10 %acetic acid for assaying nicotine, reducing sugars, and chlorides against reference extractant. The sample data were subjected to *Passing & Bablok's* regression analyses and were validated by *CUSUM* test for linearity. There was no significant deviation from linearity for nicotine, reducing sugars, and chlorides & found high correlation between the proposed and the reference extractants for Nicotine (0.993), reducing sugars (0.982), and chlorides (0.972). Data further analysed by *Youden* plot indicated high degree of comparability between the proposed and the reference extractants for all the three parameters. The estimated cost of extraction was less with the proposed extractant. It is suggested that the proposed extractant (10% acetic acid + 4 cc activated charcoal suspension) being simple and less expensive be used as an alternative to the hazardous methanol-based extractant.



A New Extractant for Concurrent Estimation of Nicotine, Reducing Sugars and Chlorides in Tobacco Cured Leaf

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ABSTRACT

The objective of the study is to develop simple, inexpensive, and less hazardous extractant for simultaneous extraction of nicotine, reducing sugars, and chlorides in tobacco cured leaf. The currently used reference extractant for nicotine, reducing sugars, and chlorides comprises 20% aqueous methanol + 5% acetic acid + 2 cc charcoal in 15:4:1 ratio. As the methanol, a major component of this reference extractant, is hazardous and expensive, we proposed and evaluated a simple extractant involving 10% acetic acid for assaying nicotine, reducing sugars, and chlorides in comparison to reference extractant. The sample data ($n = 30$) sets of both the extractants [proposed (x) and reference (y)] were subjected to Passing & Bablok's regression analyses. The regression models so obtained for reducing sugars ($y = 0.594 + 1.021x$), nicotine ($y = 0.044 + 0.8877x$), and chlorides ($y = 0.057 + 1.131x$) were validated by CUSUM test for linearity. The test indicated that there was no significant deviation from linearity for nicotine, reducing sugars, and chlorides. Spearman's rank correlation coefficient (ρ) with $P < .0001$ at 95% confidence interval also showed high correlation between the proposed and the reference extractants for Nicotine (0.993), reducing sugars (0.982), and chlorides (0.972). Analyses of the data sets by Youden plot method showed congregation of data points near to diagonal reference line and a few wild points. This type of data points distribution indicates the high degree of comparability between the proposed and the reference extractants for nicotine, reducing sugars, and chlorides in tobacco cured leaf. The estimated cost of extraction was less with the proposed extractant. It is suggested that the proposed extractant (10% acetic acid + 4 cc activated charcoal suspension) being simple and less expensive be used as an alternative to the hazardous methanol-based extractant.

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Introduction

Tobacco (*Nicotiana tabacum* L.) is the most widely grown commercial non-food plant. Tobacco leaf quality as gauged by nicotine, reducing sugar, and chloride content plays a vital role in determining its market price. The quality constituents of cured leaf viz., nicotine, reducing sugar, and chloride are generally extracted with organic solvents such as methanol, ether, ethanol, acetic acid, and other organics (Harvey, Stahr, and Smith 1969; Ngozi Donald 2020). Alkaloids can be removed from aqueous basic solution with organic solvents such as chloroform, ether, methylene chloride, and other organics that are immiscible with water (Wilkinson and Weeks (1994). The extractant involving 20% aqueous methanol + 5% acetic acid + 2 cc charcoal in 15:4:1 ratio (Harvey, Stahr, and Smith 1969) is widely used for determining nicotine, reducing sugar, and chloride contents in tobacco cured leaf and is considered as a reference extractant.