

Comparative classification of Sri Lankan tea from seven regions using pH, total polyphenolic content, and dry matter content as analytical parameters

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Black tea infusions prepared from BOPF grade samples representing the seven major Sri Lankan tea-growing regions, Nuwara Eliya, Uda Pussellawa, Dimbula, Uva, Kandy, Sabaragamuwa, and Ruhuna, were evaluated using pH, total polyphenolic content (TPC), and dry matter content (DW) as classification parameters. The results demonstrated distinct regional variation across all measured properties. TPC ranged from 16.38 ± 1.36 %DW to 24.58 ± 2.23 %DW, with the highest value observed in Ruhuna and the lowest in Uva, while Nuwara Eliya also exhibited relatively high TPC compared to other regions. Dry matter content showed a narrower range between 90.55 ± 0.73 % and 94.25 ± 1.03 %, with Uva and Sabaragamuwa recording the highest values, whereas Dimbula showed the lowest. The pH values ranged between 4.89 ± 0.10 and 5.28 ± 0.18 , confirming the mildly acidic nature of all infusions, with Sabaragamuwa having the highest pH and Uva the lowest. Regional variations suggested possible relationships between polyphenolic content, acidity, and liquor characteristics. Statistical analysis using one-way ANOVA confirmed significant differences among the regions for TPC ($F = 12.109$, $p <$

0.001), dry matter content ($F = 20.61$, $p < 0.001$), and pH ($F = 66.16$, $p < 0.001$), demonstrating the strong influence of geographical origin on tea composition. The combined evaluation of these parameters enabled effective differentiation of regional characteristics, although some overlap was observed among mid-grown regions. These findings highlight the suitability of pH, TPC, and dry matter as simple analytical indicators for classification and their potential application in developing rapid identification and authentication systems for Sri Lankan black tea.

Keywords:

Sri Lankan tea; seven regions; pH; dry matter content; total polyphenolic content

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