Review of: "Infrared Spectroscopy (FT-NIR) and t-Distributed Stochastic Neighbor Embedding (t-SNE) as an Analytical Methodology for Rapid Identification of Tea Adulteration"

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Potential competing interests: No potential competing interests to declare.

The manuscript investigates the use of FT-NIR and advanced clustering techniques, including t-SNE, for detecting tea adulteration. The study evaluates the chemical composition of Chamomile, Ginseng, and Quebra-pedras by analyzing spectral data and identifying unique vibrational bands, demonstrating the efficacy of FT-NIR in distinguishing authentic samples from adulterated ones. With some refinements, this study could serve as a benchmark for developing innovative solutions to combat food fraud effectively, such as

1. Discussing more recent advances in similar studies in the Introduction Section, especially if other non-destructive techniques like Raman spectroscopy or machine learning approaches have been explored in food fraud detection.
2. The "Sample Collection and Preparation" section could benefit from additional details on the selection criteria for plant types. Why were Chamomile, Ginseng, and Quebra-pedras specifically chosen?
3. Discuss the limitations of using t-SNE over PCA for clustering. Although t-SNE is shown to perform better, it is computationally expensive and may not be suitable for larger datasets.
4. Highlight any recommendations for future research, such as validating the approach on a broader range of samples or real-world adulterated tea.
5. Consider adding a table summarizing key chemical groups and their spectral features for easier interpretation.
6. The study mentions high R^2 values but does not discuss external validation. Could the model be validated with blind or real-world adulterated samples?