

Review Report

The manuscript “A rapid method for methanol quantification in spirits using UV Visible spectroscopy and FTIR” (#104989) describes the quantification methods to determine methanol content in spirits using UV-Vis and FTIR spectroscopy.

Basic reporting:

1. This manuscript should be submitted to a professional research paper writing service to improve its language quality and address any linguistic inaccuracies.

Examples:

- I. The term "ultraviolet-visible spectrometry" is abbreviated as both "UV Vis" and "UV VIS" in various sections. To enhance clarity for readers, it is recommended to adhere to ISO standards and maintain a consistent abbreviation throughout the article.
- II. There are capitalization errors in the text, such as in line 31 where "Methanol" is capitalized in the middle of a sentence. Chemical names should not be capitalized unless they appear at the beginning of a sentence.

2. In the introduction section, references must be provided for many sentences. However, widely recognized public information does not require citation. Any sentence that is based on another person's work must be properly cited.

Example:

- I. Line 56. “Although IR spectroscopy has some advantages over UV VIS in terms of wide range of sample types, they are both important in food industry for quality control measures.”

3. Figures and quality:

- I. Some of the figures appear pixelated. It would be beneficial to improve their resolution to enhance the reading experience for the audience.
- II. Please ensure that all values in the figures are rounded to three significant digits.
- III. In Figure 2 (UV-Vis spectra 1), the Y-axis (absorbance) should start from zero. Additionally, please reduce the number of ticks on the wavenumber axis and increase the font size for better graph visibility.
- IV. In Figure 5 (FTIR spectra 1), it would be helpful to label the methanol peak.
- V. In Figure 9, kindly remove the labels on the data points and consider either increasing the size of the dots or using different shapes for ethanol, heads, and SP. Increasing the font size will also improve readability.
- VI. Figure 10 looks good in terms of resolution; no changes are needed for this figure.

Experimental design:

1. The current manuscript is appropriate for the aims and scope of the *PeerJ Analytical Chemistry* journal.
2. The methods involving UV-Vis and FTIR are described in sufficient detail.
3. In line 153, the author states, "As shown in Equation 1," however, Equation 1 is not provided.

Validity and findings:

1. The manuscript titled "A Rapid Method for Methanol Quantification in Spirits Using UV-Visible Spectroscopy and FTIR" (#104989) presents techniques for determining methanol content in spirits through the use of UV-Vis and FTIR spectroscopy. The UV-Visible spectrometry method described involves the use of potassium dichromate in acidic

conditions to oxidize alcohols, leading to the reduction of chromium from the Cr (VI) (yellow color) oxidation state to Cr (III) (green color). It is worth noting that this method has been widely recognized since the 1990s. (Hari, M.; Deoki, N. Spectrophotometric Determination of Some Monohydric Alcohols Based on Their Oxidation by $\text{K}_2\text{CrO}_4\text{-HNO}_3$ System. *Indian J. Chem* **1994**, *33*, 359–361. ; Tgd, S.; Rsrđ, S.; Fgd, C.; Dda, S. ATR-FTIR and UV-Vis as Techniques for Methanol Analysis in Biodiesel-Washing Wastewater. *Química Nova* **2023**, *46*, 698–705.). Previously published methods have reported alcohols (ethanol and methanol) at a wavenumber of 600 cm^{-1} . The current manuscript provides a clarification regarding the correlation of methanol at 970 cm^{-1} , which is considered one of the novel aspects of this study. To enhance clarity, it would be beneficial to highlight this correlation by zooming in on the 970 cm^{-1} region in Figure 2.

2. Another commonly reported method, FTIR, is widely recognized for its effectiveness in quantifying ethanol and methanol content in various samples (Pérez-Ponce, A.; de la Guardia, M. Partial Least-Squares–Fourier Transform Infrared Spectrometric Determination of Methanol and Ethanol by Vapour-Phase Generation. *Analyst* **1998**, *123* (6), 1253–1258. ; Coldea, T. E.; Socaciu, C.; Fetea, F.; Ranga, F.; Pop, R. M.; Florea, M. Rapid Quantitative Analysis of Ethanol and Prediction of Methanol Content in Traditional Fruit Brandies from Romania, Using FTIR Spectroscopy and Chemometrics. *Not. Bot. Horti Agrobot. Cluj Napoca* **2013**, *41*, 143.). Could you kindly compare the previously established FTIR methods for ethanol and methanol quantification with the current method you have developed, and emphasize the significant improvements? It is important to clearly demonstrate the advancements made, as presenting a method without novelty or improvement may not add substantial value to the literature.