Review of: "Flame Photometry: For the Determination of Alkali Metals in Commercially Sold Fireworks"

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Potential competing interests: No potential competing interests to declare.

The structure of the manuscript is overall sound. The manuscript uses flame photometry to determine alkali metals in commercially sold fireworks. The authors provided a comprehensive description of their method and used it to achieve the desired results. The manuscript uses flame photometry and focuses on the study and analysis of the effect of nitrate and metal species in firecracker samples on determining two elements, potassium and sodium. Based on this, the flame photometric analysis of four types of fireworks purchased in the real world was used to determine potassium and sodium in firecrackers, showing the potential for real-world applications. This study effectively demonstrates the potential of flame photometric methods for the determination of target metals in different mixtures. I have some suggestions which the authors may find beneficial.

1. The introduction to flame photometry is very detailed in Results and Discussion. However, it would have been better if it had appeared in the Introduction.
2. In the sample preparation process in Results and Discussion, can you explain on what basis the percentage of various components is divided? For example, when preparing sample mixtures containing potassium nitrate and different known nitrate precursors, on what basis are the compositional contents of each of the nitrate precursors, as well as the firecracker components aluminum and sulfur, divided in samples 1, 2, 3, 4, and 5?
3. In the determination of potassium and sodium in the commercially sold firecrackers, why is the percentage of sodium nitrate content not tracked for sample 3 versus sample 4? Can you explain why?
4. The authors found that the bias was higher when the potassium percentage was at a higher concentration, speculating that this could be attributed to an increase in ionic interactions. Further discussion of this factor would be useful. And the same situation occurred for the determination of sodium in the firecracker samples, which could be further analyzed in relation to the commonalities between the two.
5. More experimental details should be given. In the present manuscript, it is hard to understand how the authors can distinguish different elements (i.e., potassium, sodium, barium, and strontium) without a spectrometer for recording the spectroscopy.
6. Expand the discussion to include potential limitations of this study and how these limitations could be addressed through follow-up studies (sample size and its limitations, variability of samples, applicability of determinations of components other than alkalis and alkaline earth metals in fireworks samples).
7. The author states that the use of excessive, adulterated, or banned chemicals in fireworks is a major and serious problem, which is why the present study was undertaken. The text concludes by exploring the levels of sodium and

potassium in commercially available fireworks. The international or national standards for sodium and potassium content in fireworks could be stated for comparison.