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## REUSABILITY OF THE POTASSIUM IODIDE SOLUTION FOR O<sub>3</sub> DETERMINATION WITHOUT DEGRADATION

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### ABSTRACT

Potassium iodide (KI) is one of the critical reagent used in ozone determination. The measurement of ozone (O<sub>3</sub>) concentration in water sample is based on the oxidation of iodide (I<sup>-</sup>) in KI by O<sub>3</sub>, converting it to iodine (I<sub>2</sub>). In this study, the feasibility of using KI for O<sub>3</sub> concentration measurement was evaluated, along with testing how many times KI can be used while maintaining consistent results. The O<sub>3</sub> concentration was calculated by re-titrating the same KI solution with 0.1N sodium thiosulphate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>), without replacing the KI solution, and the regenerated KI solution was reused in subsequent experiments. In the experiments, two different ozone dosages were tested with non-thermal plasma: an average of 0.8 mg O<sub>3</sub>/min was maintained for 17 cycles, each lasting 60 minutes, and an average of 0.2 mg O<sub>3</sub>/min was maintained for another 17 cycles of 60 minutes each, with nearly the same amount of ozone being measured in both cases that was shown in Figure 1.

The result indicate that the same KI solution can be used up to 34 cycles without a significant change in O<sub>3</sub> concentration. On going to reaction with the same KI solution, the colour of the KI solution did not change.

This study was conducted to explore the potential of reusing a chemical reagent multiple times and contributes significantly to the literature by aiming to reduce environmental harm in various perspective. On the other hand, we have an evidence that the KI solution can be used for O<sub>3</sub> measurement more than a thousand minutes without altering the result.

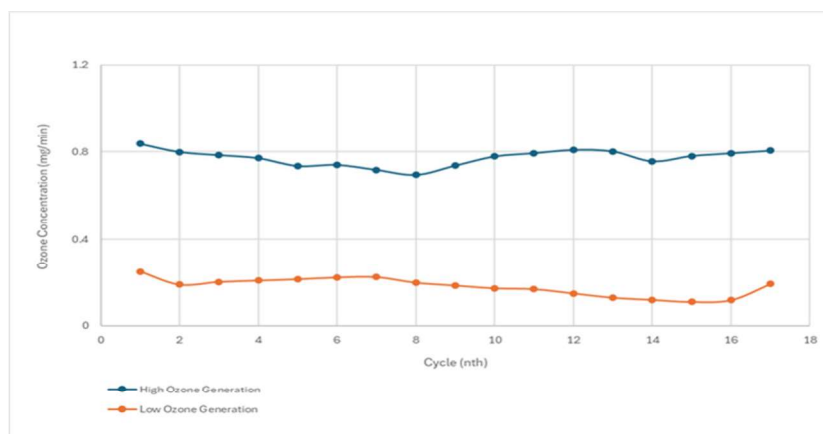


Figure 1. O<sub>3</sub> concentration (mg/min) across multiple cycles during high and low ozone generation

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**Keywords:** Reusable Chemicals; Ozone Determination; Environmental Sustainability