ABSTRAK

Ozon merupakan oksidator kuat yang banyak digunakan untuk sterilisasi, pemurnian udara, dan pengolahan air karena mampu menguraikan senyawa organik serta menonaktifkan mikroorganisme. Salah satu metode pembangkitan ozon yang efektif adalah *Dielectric-Barrier Discharge* (DBD), yaitu sistem plasma non-termal yang mampu menghasilkan ozon tanpa peningkatan suhu yang signifikan. Penelitian ini mengkaji karakteristik generator plasma ozon berkapasitas rendah berbasis DBD dengan variasi tegangan 300 V, 400 V, 1300 V, 1500 V, dan 1600 V serta variasi *flowrate* udara bebas 0,8 LPM, 2 LPM, dan 3 LPM. Karakterisasi dilakukan dengan mengukur hubungan tegangan terhadap arus dan daya listrik pada setiap variasi *flowrate*. Konsentrasi ozon ditentukan menggunakan metode titrasi iodometri dengan larutan KI sebagai penangkap ozon dan $Na_2S_2O_3$ sebagai titran. Hasil penelitian menunjukkan bahwa kenaikan tegangan cenderung meningkatkan arus dan daya listrik. Daya tertinggi diperoleh pada *flowrate* 2 LPM sebesar 8,187 W, sedangkan konsentrasi ozon tertinggi diperoleh pada *flowrate* 0,8 LPM sebesar 0,072 g/L. Kapasitas produksi ozon tertinggi juga diperoleh pada *flowrate* 0,8 LPM sebesar 5,76 g/jam. Secara kualitatif, *flowrate* rendah menghasilkan pembentukan ozon yang lebih efektif karena waktu tinggal udara dalam reaktor lebih lama. Dengan demikian, generator plasma ozon berkapasitas rendah berbasis DBD berpotensi dikembangkan sebagai perangkat penghasil ozon skala rumah tangga.

Kata Kunci : Plasma, Ozon, *Dielectric-Barrier Discharge* (DBD), Generator Ozon, Karakterisasi Tegangan, *Flowrate*, Konsentrasi ozon, Kapasitas ozon.

ABSTRACT

Ozone is a strong oxidizing agent widely used for sterilization, air purification, and water treatment because of its ability to decompose organic compounds and inactivate microorganisms. One effective method for ozone generation is Dielectric-Barrier Discharge (DBD), a non-thermal plasma system capable of producing ozone without a significant increase in temperature. This study examines the characteristics of a low-capacity ozone plasma generator based on DBD with voltage variations of 300 V, 400 V, 1300 V, 1500 V, and 1600 V, and ambient air flowrate variations of 0.8 LPM, 2 LPM, and 3 LPM. The characterization was conducted by measuring the relationship between voltage, current, and electrical power at each flowrate variation. Ozone concentration was determined using the iodometric titration method with KI solution as an ozone absorber and $Na_2S_2O_3$ as the titrant. The results showed that increasing voltage generally increased the current and electrical power. The highest power was obtained at a flowrate of 2 LPM, reaching 8.187 W, while the highest ozone concentration was obtained at a flowrate of 0.8 LPM, reaching 0.072 g/L. The highest ozone production capacity was also obtained at 0.8 LPM, reaching 5.76 g/hour. Qualitatively, a lower flowrate produced more effective ozone formation due to the longer residence time of air in the reactor. Therefore, the low-capacity ozone plasma generator based on DBD has potential to be developed as a household-scale ozone-generating device.

Keywords **:** *Plasma, Ozone, Dielectric-Barrier Discharge (DBD), Ozone Generator, Voltage Characterization, Flowrate, Ozone Concentration, Ozone Capacity*.