

# Analisis Plasma Activated Water (PAW) Hasil Produksi Sistem Plasma Generator Sederhana = Analysis of Plasma Activated Water (PAW) Production Results of a Simple Plasma Generator System

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## Abstrak

Di masa kini, keamanan bahan pangan telah menjadi salah satu fokus utama bagi seluruh komponen sektor pangan, karena meningkatnya kesadaran masyarakat akan makanan yang aman, lezat, dan sehat. Patogen asing dan mikroorganisme pengurai merupakan mikroorganisme yang paling bertanggung jawab atas wabah penyakit yang ditularkan melalui makanan. Terdapat beberapa teknik termal konvensional yang dapat digunakan untuk membasmi mikroorganisme ini, seperti pasteurisasi, sterilisasi, pemanasan ohmik, autoklaf, dll. Namun, teknik-teknik ini semakin kurang diminati di pasaran, karena penerapan panas yang sangat tinggi berdampak buruk pada atribut kualitas fisiko-kimia, nutrisi, dan sensorik dari makanan yang diolah. Oleh sebab itu, berbagai teknologi alternatif non-termal telah dikembangkan dan dipelajari untuk memperoleh bahan pangan yang tetap aman dengan minimnya penggunaan bahan pengawet dan bebas bahan kimia, namun tetap mempertahankan sifat alaminya seperti kualitas sensorik dan gizi dalam waktu yang lama. Sebagai solusi alternatif, salah satunya dapat digunakan Plasma Activated Water (PAW). Metode generasi PAW yang optimal dan sering digunakan adalah Dielectric Barrier Discharge (DBD), karena efisiensinya dalam menghasilkan plasma dan kemudahan pengaplikasiannya dalam skala besar. Pada penelitian ini, akan diciptakan Plasma Activated Water (PAW) menggunakan metode produksi Dielectric Barrier Discharge (DBD) dengan alat Ozone Generator. Agar sesuai dengan perkembangan zaman, maka peralatan Ozone Generator ini dicoba dilengkapi dengan sistem nyala-mati otomatis, agar campur tangan manusia dapat diminimalisir dalam pengendalian sistem sebisa mungkin. Dari percobaan, diukur parameter pH, konduktivitas, dan tingkatan ORP, dengan memerhatikan perkembangan parameter tersebut berdasarkan variasi percobaan volume air 100 mL, 200 mL, dan 300 mL, dan waktu treatment 1 menit, 3 menit, dan 5 menit. Hasil perkembangan parameter yang diukur diperoleh sudah sesuai dengan karakteristik terbentuknya PAW, yang ditemukan pada berbagai jurnal ilmiah yang meneliti karakteristik fisikokimiawi pada PAW. Sehingga, dapat dikatakan sistem Plasma Generator sederhana ini berhasil memproduksi PAW, dimana dengan parameter-parameter yang berhasil diukur, memiliki potensi untuk menjaga berbagai kualitas fisikokimia, sensorik, dan nutrisi pada bahan pangan lebih tahan lama.

.....Nowadays, food safety has become one of the main focuses for all components of the food sector, due to increasing public awareness of safe, delicious and healthy food. Foreign pathogens and decomposing microorganisms are the microorganisms most responsible for food-borne disease outbreaks. There are several conventional thermal techniques that can be used to eradicate these microorganisms, such as pasteurization, sterilization, ohmic heating, autoclaving, etc. However, these techniques are becoming less popular on the market, as the application of very high heat has an adverse impact on the physico-chemical, nutritional and sensory quality attributes of the processed food. For this reason, various alternative non-thermal technologies have been developed and studied to obtain food ingredients that remain safe with minimal use of preservatives and are free of chemicals, but still maintain their natural properties such as sensory and nutritional qualities for a long time. As an alternative solution, one of them can be used Plasma

Activated Water (PAW). The optimal and frequently used PAW generation method is Dielectric Barrier Discharge (DBD), because of its efficiency in producing plasma and ease of application on a large scale. In this research, Plasma Activated Water (PAW) will be created using the Dielectric Barrier Discharge (DBD) production method with an Ozone Generator. In order to be in line with current developments, the Ozone Generator equipment has been tried to be equipped with an automatic on-off system, so that human intervention can be minimized in controlling the system as much as possible. From the experiment, the parameters pH, conductivity, and ORP level were measured, by paying attention to the development of these parameters based on experimental variations in water volumes of 100 mL, 200 mL, and 300 mL, and treatment times of 1 minute, 3 minutes, and 5 minutes. The results of the development of the measured parameters were found to be in accordance with the characteristics of PAW formation, which were found in various scientific journals that examined the physicochemical characteristics of PAW. So, it can be said that this simple Plasma Generator system has succeeded in producing PAW, which, with the parameters that have been successfully measured, has the potential to maintain various physicochemical, sensory and nutritional qualities in foodstuffs that last longer.