

Pengaruh Salinitas dan Biopestisida terhadap Laju Pertumbuhan, Metabolit, Kontaminan dan Keragaman Bakteri dengan *Next Generation Sequencing* pada Kultur Massal *Arthrospira platensis* Gomont

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ABSTRAK

Arthrospira platensis memiliki prospek ekonomi yang baik. Namun, sistem kultivasi massal tidak terhindar dari kontaminan, sehingga diperlukan modifikasi kondisi kultur. *A. platensis* memiliki toleransi salinitas cukup luas dan modifikasi salinitas dapat digunakan dalam strategi mengatasi kontaminan. Selain itu, biopestisida juga mampu mengurangi kontaminan kultur mikroalga dalam waktu singkat tanpa menurunkan performa mikroalga. Oleh karena itu, penting untuk mempelajari pengaruh salinitas dan biopestisida terhadap pertumbuhan, nilai gizi, dan keragaman kontaminan bakteri pada kultur massal *A. platensis*. Penelitian dilaksanakan menggunakan Rancangan Acak Lengkap dengan lima tingkat salinitas: 5 ppt (S5B), 10 ppt (S10B), 15 ppt (S15B), 20 ppt (S20B), dan 25 ppt (S25B), dengan penambahan 0,5 ml/L biopestisida *Azadirachta indica* yang diberikan pada hari ke 2 dan 4. Laju pertumbuhan dihitung berdasarkan kepadatan harian dan biomassa. Pada hari ketujuh ditentukan karbohidrat, protein, lipid, dan pigmentasi. Selanjutnya, uji kontaminasi menggunakan *Total Plate Count* dan keragaman bakteri ditentukan dengan *Next Generation Sequencing*. Hasil penelitian menunjukkan bahwa S15B memiliki laju pertumbuhan tercepat dan kandungan karbohidrat tertinggi. Namun, S5B menghasilkan hasil terbaik dalam hal kandungan protein, klorofil, dan fikosianin, sedangkan S25B menghasilkan jumlah karoten dan lipid tertinggi. Selain itu, S15B juga merupakan perlakuan yang paling efektif untuk mengurangi kontaminasi bakteri, di mana beberapa bakteri patogen, termasuk Acidobacteriota, Chloroflexi, Gemmatimonadota, Myxococcota, dan Desulfobacterota, dapat dihilangkan sepenuhnya. Dengan demikian, kultur massal *A. platensis* dapat tumbuh lebih cepat dan mengandung metabolit lebih tinggi dengan pengurangan kontaminasi bakteri karena penyesuaian salinitas dan aplikasi biopestisida.

Kata Kunci: Salinitas, Biopestisida, Laju Pertumbuhan, Metabolit, Kontaminasi, Keanekaragaman Bakteri.

Effects of Salinity and Biopesticide on the Growth Rate, Metabolites, Contaminants, and Bacterial Diversity using Next Generation Sequencing in Mass Culture of *Arthrospira platensis* Gomont

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ABSTRACT

Arthrospira platensis has a promising economic future. However, because the mass cultivation method contains pollutants, the culture conditions must be modified. Salinity alteration appears to be a promising approach, given that *A. platensis* can withstand various salinities. Additionally, biopesticide is also expected to eliminate the contaminants. Therefore, it is essential to study the effect of salinity and biopesticide on the growth, nutritional value, and diversity of bacteria contaminants on *A. platensis* mass culture. A completely randomized design was applied that included five salinity levels treatment: 5 ppt (S5B), 10 ppt (S10B), 15 ppt (S15B), 20 ppt (S20B), and 25 ppt (S25B), with 0.5 ml/L of biopesticide *Azadirachta indica* applied on days 2 and 4. The growth rate was calculated based on daily density and biomass, and on the seventh day, carbohydrates, proteins, lipids, and pigments were determined. Furthermore, the contamination test and the diversity of bacteria were determined using Total Plate Count and Next-Generation Sequencing, respectively. The results showed that the S15B had the fastest growth rate and the largest carbohydrate content. However, S5B generated the best results in terms of protein, chlorophyll, and phycocyanin content, whereas S25B produced the highest quantities of carotene and lipids. Moreover, S15B was also the most effective treatment to reduce bacterial contamination, in which several pathogenic bacteria, including Acidobacteriota, Chloroflexi, Gemmatimonadota, Myxococcota, and Desulfobacterota, were eliminated completely. By that means, the mass culture of *A. platensis* was able to grow more rapidly and contain more nutrients while having less bacterial contamination due to the adjustment of salinity and the application of biopesticides.

Keywords: Salinity, Biopesticide, Growth Rate, Nutritional Value, Contamination, Bacterial Diversity.