INTISARI

Microbubble memiliki pemanfaatan yang luas di dunia industri dikarenakan karakteristik dan sifatnya lebih unggul dibandingkan dengan gelembung konvensional meliputi luas permukaan yang besar dan *rising velocity* yang lambat. Keuggulan yang dimiliki *microbubble* membuat peneliti melakukan pengembangan lebih lanjut mengenai topik *microbubble*. Salah satu alat untuk membangkitkan *microbubble* yakni menggunakan *microbubble generator*.

Penelitian ini menggunakan *microbubble generator* tipe *twisted fin baffle* dan *spiral baffle*. Penelitian dilakukan untuk mengetahui pengaruh variasi debit air dan udara serta jenis *microbubble generator* menggunakan *twisted fin baffle* dan *spiral baffle* terhadap nilai distribusi ukuran gelembung, *pressure drop*, *hydraulic power*, *bubble generating efficiency*, dan oksigen terlarut yang dihasilkan. Debit air dan udara divariasikan, yakni Q_L = 50 – 70 lpm dan Q_G = 0.1 – 0.7 lpm. Penelitian menggunakan kamera berkecepatan tinggi untuk mendapatkan vidio visual *microbubble*. Kemudian, *pressure transducer* digunakan untuk mendapatkan data tekanan dan *dissolved oxygen meter* digunakan untuk mendapatkan data oksigen terlarut.

Hasil penelitian menunjukkan bahwa debit air dan udara serta jenis *microbubble generator* menggunakan *twisted fin baffle* dan *spiral baffle* mempengaruhi unjuk kerja dari *microbubble generator*. Dimana, kenaikan debit air berdampak pada ukuran gelembung yang lebih kecil dan seragam, naiknya nilai *pressure drop*, *hydraulic power*, dan oksigen terlarut serta turunnya nilai *bubble generating efficiency*. Sebaliknya, kenaikan debit udara berdampak pada ukuran gelembung yang lebih besar dan tidak seragam, perubahan nilai *pressure dro*p serta *hydraulic power* yang kurang signifikan, tingginya nilai *bubble generating efficiency*, dan rendahnya nilai oksigen terlarut. Hasil perbandingan menunjukkan *microbubble generator* tipe *twisted fin baffle* memiliki ukuran gelembung yang lebih kecil dan seragam dibandingkan dengan *microbubble generator* tipe *spiral baffle*. Selain itu, *microbubble generator* tipe *twisted fin baffle* menghasilkan nilai lebih tinggi terhadap nilai *bubble generating efficiency*, dan oksigen terlarut dibandingkan dengan *microbubble generator* tipe *spiral baffle*.

Kata kunci: *Twisted fin baffle*, *Spiral baffle*, Unjuk kerja *microbubble generator*

ABSTRACT

Microbubbles have wide applications in the industrial world due to their superior characteristics and properties compared to conventional bubbles, including a larger surface area and slower rising velocity. The advantages of microbubbles have led researchers to further develop the topic of microbubbles. One of the devices used to generate microbubbles is the microbubble generator.

This study uses a microbubble generator of the twisted fin baffle and spiral baffle types. The research was conducted to determine the effects of variations in water and air flow rates, as well as the types of microbubble generators (twisted fin baffle and spiral baffle) on bubble size distribution, pressure drop, hydraulic power, bubble generating efficiency, and dissolved oxygen produced. The water and air flow rates were varied, with QL = 50 – 70 lpm and QG = 0.1 – 0.7 lpm. A high-speed camera was used to capture visual videos of the microbubbles. Pressure transducers were used to obtain pressure data, and a dissolved oxygen meter was used to collect dissolved oxygen data.

The research results showed that the water and air flow rates, as well as the types of microbubble generators (twisted fin baffle and spiral baffle), affect the performance of the microbubble generator. An increase in water flow rate led to smaller and more uniform bubble sizes, an increase in pressure drop, hydraulic power, and dissolved oxygen, and a decrease in bubble generating efficiency. Conversely, an increase in air flow rate resulted in larger and less uniform bubble sizes, less significant changes in pressure drop and hydraulic power, higher bubble generating efficiency, and lower dissolved oxygen levels. A comparison showed that the twisted fin baffle microbubble generator produced smaller and more uniform bubble sizes than the spiral baffle microbubble generator. Additionally, the twisted fin baffle microbubble generator achieved higher values for bubble generating efficiency and dissolved oxygen compared to the spiral baffle type.

Keywords: Twisted fin baffle, Spiral baffle, Microbubble generator performance