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The Effect of Twisted Baffle on the Microbubble Generator Swirl Ventury Type

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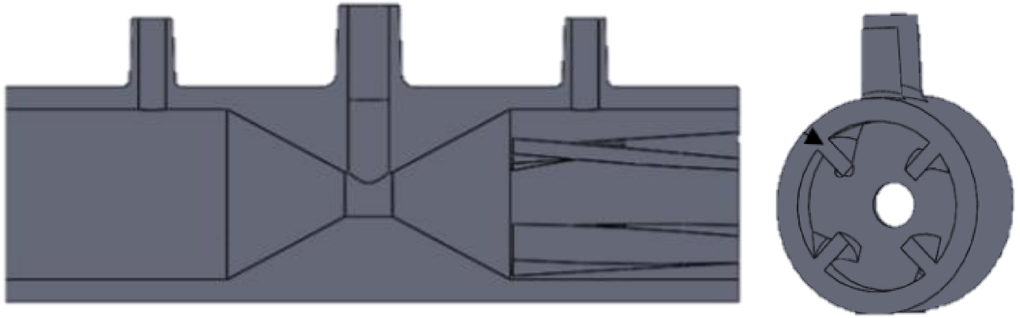
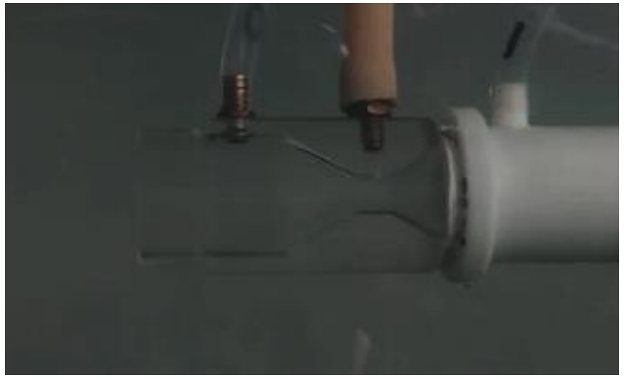
Introduction

- Microbubble has been widely applied in several field due to its high gas-liquid mass transfer rate [1].
- Modifications such as the addition of spiral fins [5], porous media [6], combined with orifices [7], have been made to increase the efficiency on the ventury microbubble generator to generate a microbubble. The addition twisted baffle on the inlet ventury not has been widely reported.
- The performance of the ventury will evaluated by bubble diameter, hydraulic power, bubble generating efficiency.





Sistem Experimental Apparatus

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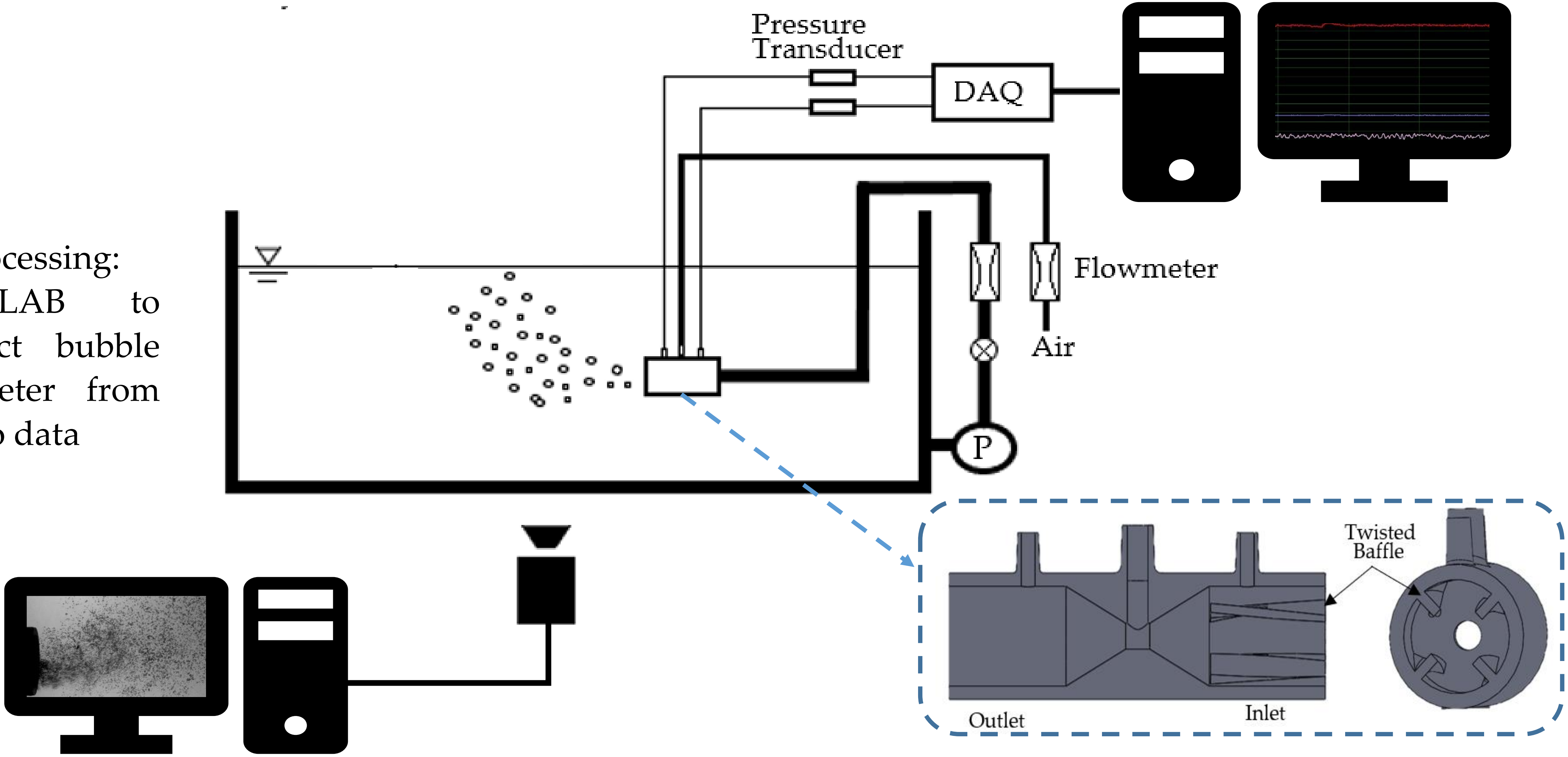
Data Processing:

- MATLAB to extract bubble diameter from video data



Results and Discussion

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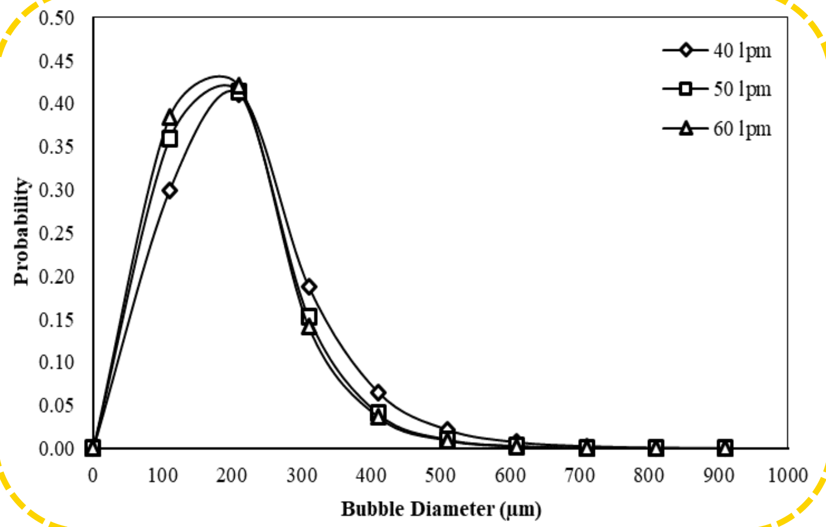
Bubble Size Distribution

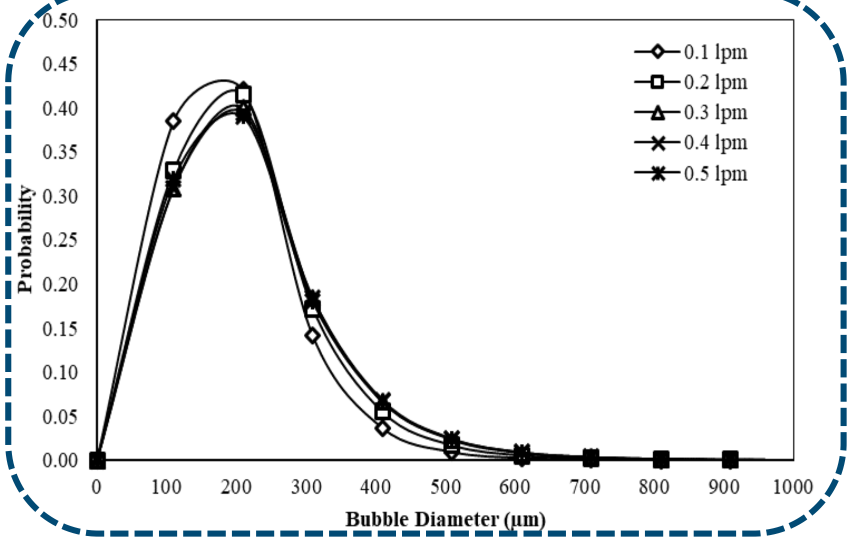
Pressure Drop

Hydraulic Power

Bubble Generating Efficiency

Bubble Size Distribution





Swirl Ventury Microbubble Generator successful generated 100 – 300 μm bubble diameter. An increase in water flow rate increases inertia forces and inhibit initial bubble formation so that the average bubble diameter will decrease.

In the meantime, enlargement of the gas flow rate should diminish bubble stability while increasing the effect of bubble coalescence. Coalescence is defined as forming large bubbles from small ones. Colaessence decreases probability curve distribution.

Pressure Drop

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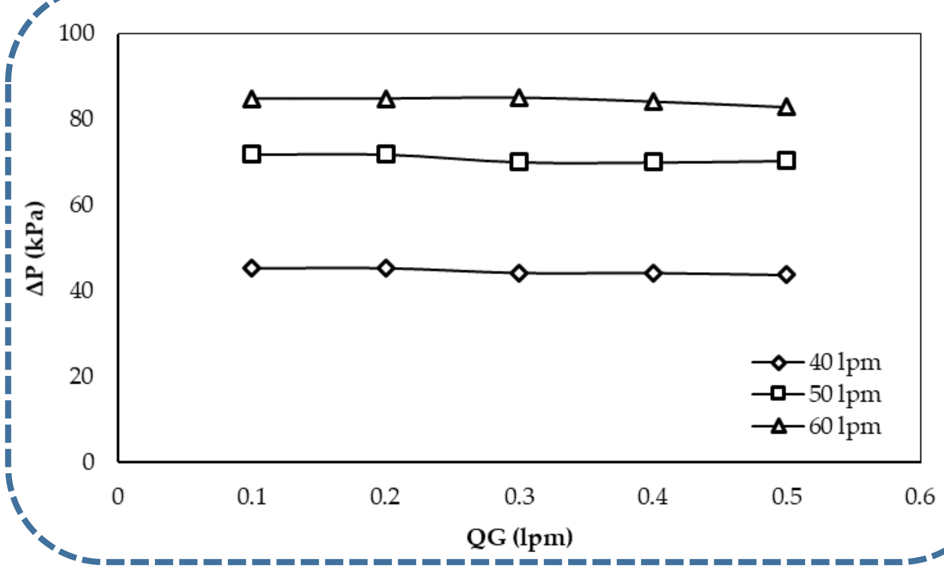
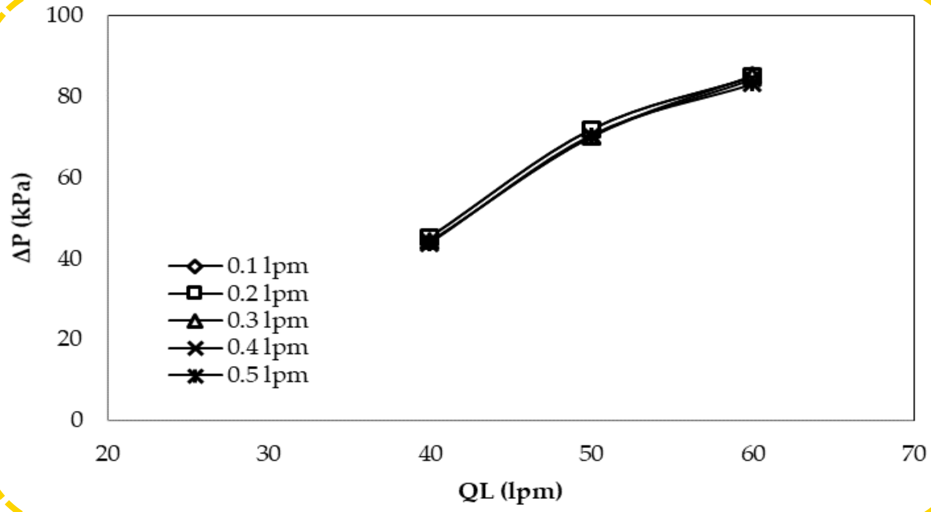
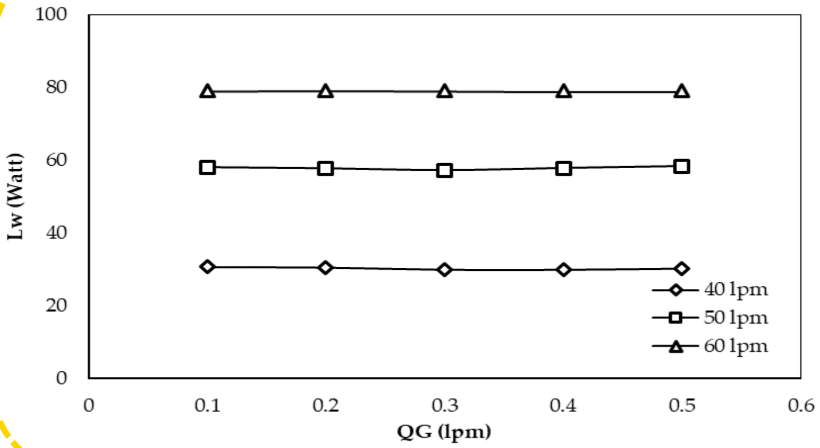
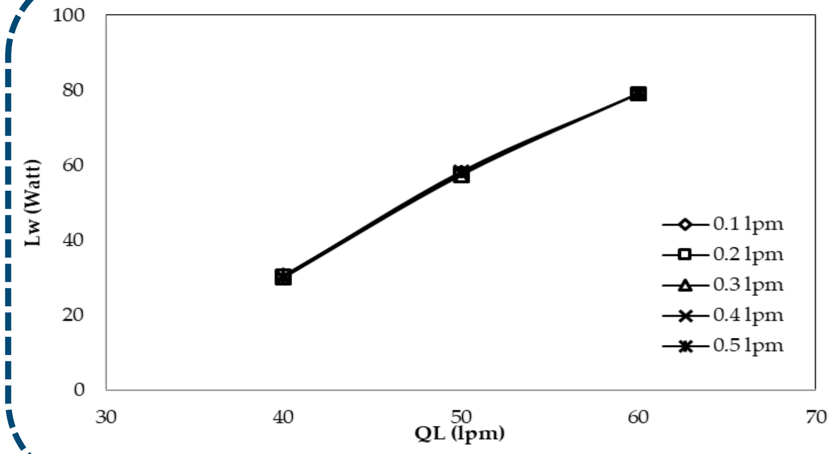
A combination of QL and QG has a distinct response. The pressure drops are linearly increased with increasing water flow rates. Conversly, the enhancement of gas flow rate created an identical graphic and it is not significantly affected pressure drop.





Hydraulic Power

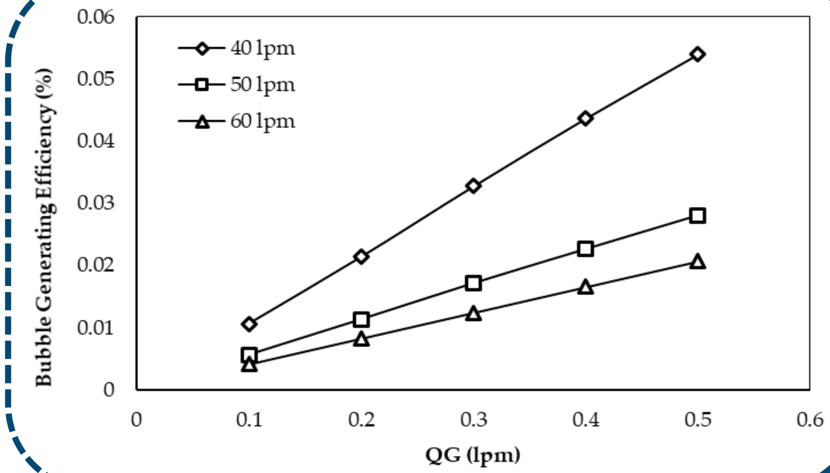


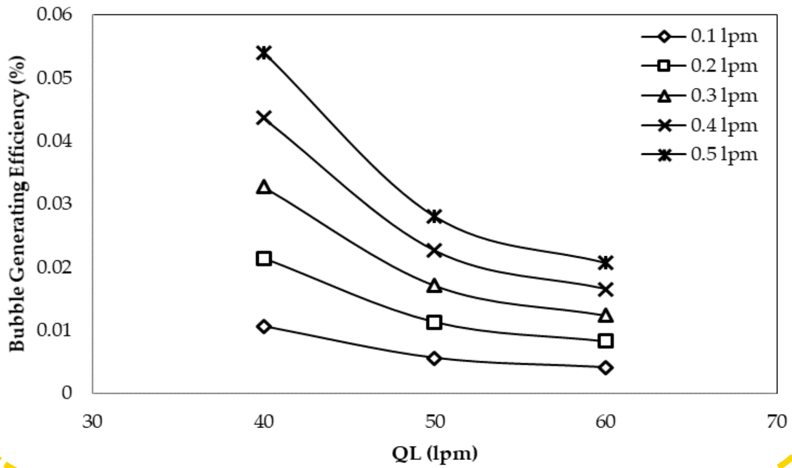


Hydraulic power represents stored energy from water flow in a microbubble generator. Hydraulic power increased linearly with pressure drop and QL. An increased QL will increase the hydraulic power by 22 - 27 W, while an increase QG will only increase 1 W and conduce almost the same graphic. So, we can conclude that the water flow rates more significantly affected Lw than gas flow rates.

Bubble Generating Efficiency

Bubble-generating efficiency means the energy received by air from water flow rates. Bubble-generating efficiency decreases with an increase in hydraulic power. The lower values of bubble-generating efficiency indicates that energy inside the water is used to break air into a tiny bubble in the microbubble generator rather than suck air into it





Conclusion

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Swirl ventury microbubble generator success generated 100 – 300 μm diameters. The bubble size linearly to gas flow rate and decrease as increases of water flow rate. Hydraulic power increase linearly with pressure drop and QL. The higher Lw decrease in ηB means the better performance of the microbubble generator

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Thank You