

Making microbubbles with spiral method

Physics and Astronomy

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Microbubbles are tiny bubbles smaller than 50m in diameter. They have advantages over normal bubbles and have been utilized in many fields. Among the multiple methods of making producing microbubbles this study focuses on the spiral method .

Our purposes were (1) to produce microbubbles with less cost and with more ease, and (2) to clarify the process in which the spiral method produces microbubbles.

We created two devices that produced two different types of water streams: a straight stream and a spiral stream. We conducted first experiment to make sure of an effect of the spiral stream.

As a result, we found the spiral stream contributed to the production of microbubbles.

We hypothesized that in spiral method the spiral water stream of different speeds grind bubbles by friction, thus dividing them into smaller bubbles.

In order to gain the sufficient speed of rotation of the spiral water stream, we improved the device by equipping it with an electric router to enable the propellor to rotate at 10,000rpm, which produced microbubbles successfully. However, when the rotation exceeded 10,000rpm, the production of microbubbles fell abruptly.

The observation of the relationship among the retention of bubbles in the device, the rotation, and microbubble production, and the relationship between the different shapes of the devices and microbubble production indicate that the decrease in the microbubble production was caused by the water flowing with greater force than the friction.

Based on these findings we have verified our hypothesis and succeeded in building a cost-effective device to produce microbubbles.

1. In this research project, the student directly handled, manipulated, or interacted with (check ALL that apply):

<input type="checkbox"/> human participants	<input type="checkbox"/> potentially hazardous biological agents
<input type="checkbox"/> vertebrate animals	<input type="checkbox"/> microorganisms
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3. This project is a continuation of previous research (Form 7): YES NO

4. My display board includes non-published photographs/visual depictions of humans (other than myself): YES NO

5. This abstract describes only procedures performed by me/us, reflects my/our own independent research, and represents one year's work only: YES NO

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