Morphology dynamic of confined *Physarum polycephalum* under acoustic perturbation

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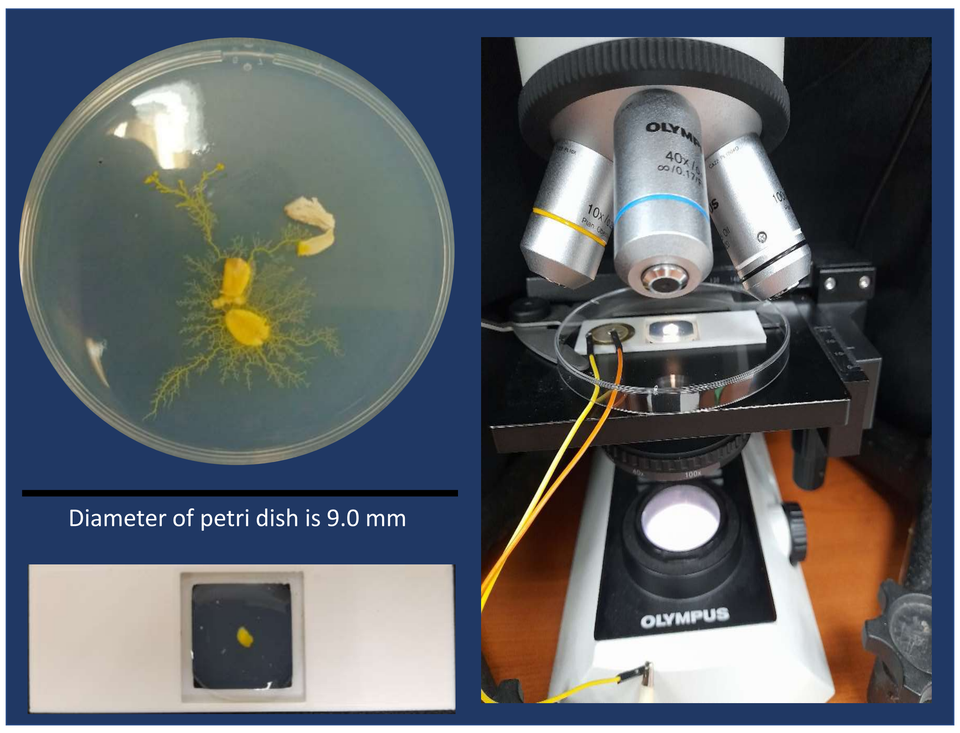
ABSTRACT

Physarum polycephalum is a myxomycete commonly known as true slime molds. It is a single-celled organism that joins together with other cells to form a mass super-cell to maximize its resources through pulsations. The nature of pulsation has been subject to many experiments such as the effect of light and electric field. Here, we report on morphological fluctuations of topologically confined *Physarum polycephalum* under acoustic forcing.

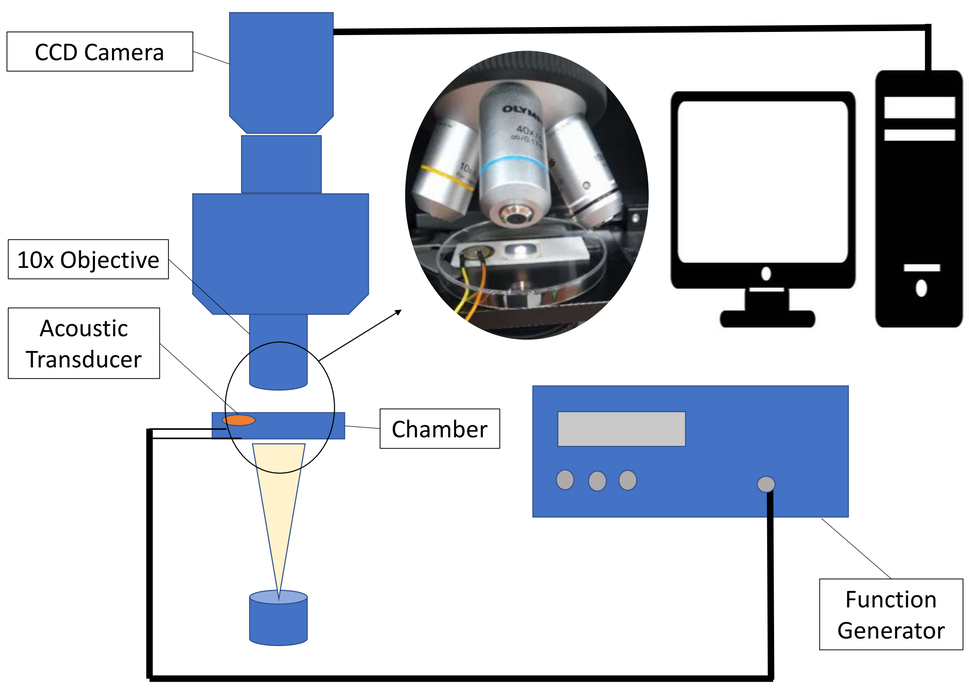
MOTIVATION

- The effect of light and electric field on the nature of pulsation of the *Physarum polycephalum* has been subject to many experiments
- In this experiment we used acoustic forcing to observe its effect on the nature of pulsation of *Physarum polycephalum.*

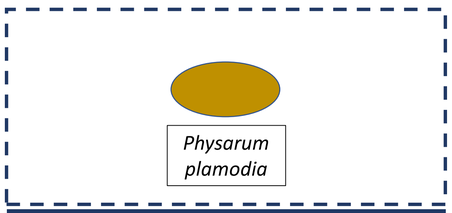
METHODOLOGY



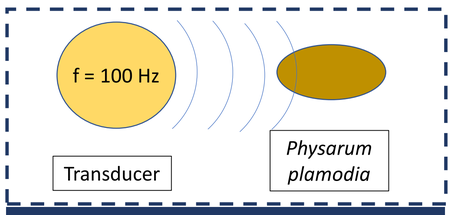
EXPERIMENTAL SETUP



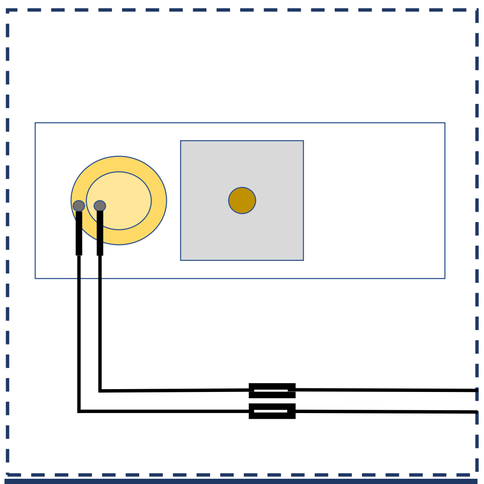
Schematic setup of recording the fluctuations of the *Physarum* plasmodia using CCD Camera



Free plasmodia

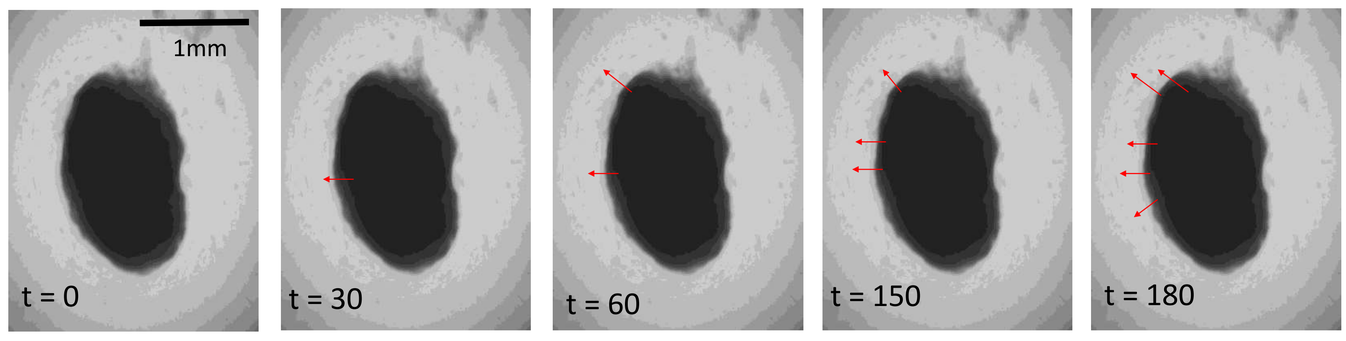


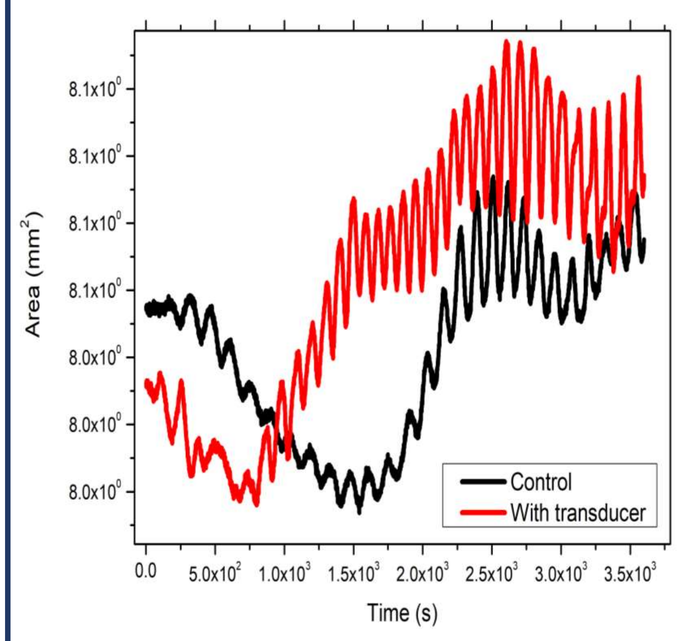
Schematic of plasmodia with the acoustic transducer



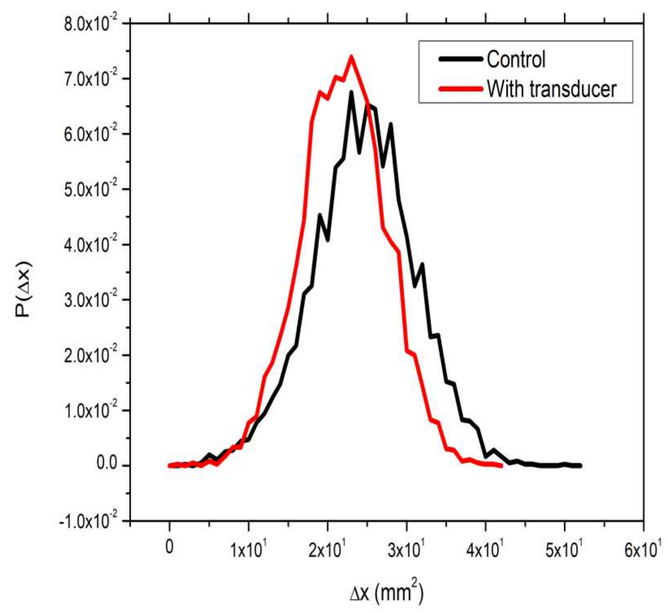
Schematic of the chamber with the acoustic transducer

INITIAL RESULTS

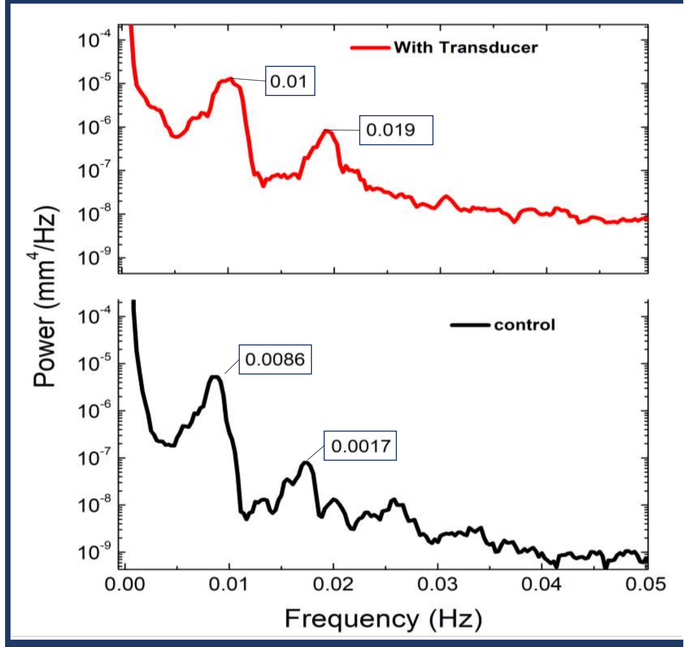




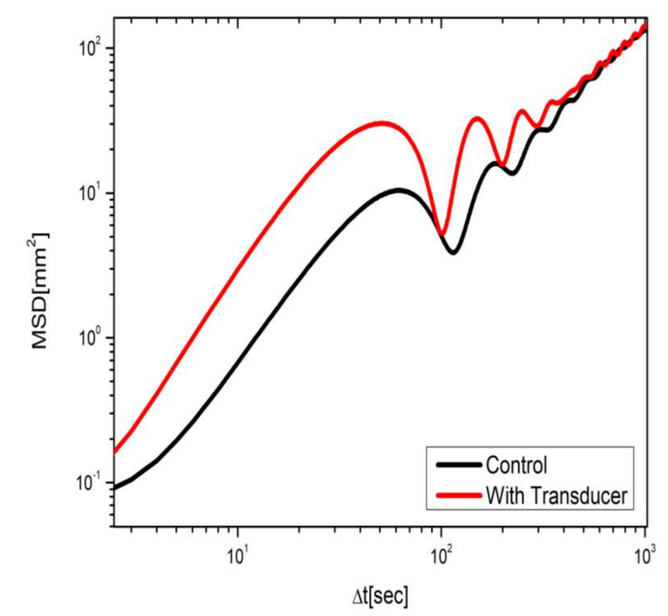
Area Fluctuation



Probability Distribution



Power Spectrum



Mean Squared Displacement

SUMMARY

- Initial result shows that the area fluctuation of the *Physarum* plasmodia with the acoustic agitation increased faster over time than the one without it (control)
- Probability distribution of the periods taken from the fluctuation showed side peaks similar to our previous study [Reserva, R., Filipinas J.L.D., Jerez, M.J., Confesor, M.N. Physica A 603 (2022). Non-equilibrium tracer dynamics in oscillating active gel]
- The MSD shows unique oscillatory components compared to our previous study without extend forcing

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