



## Hibiscus mucilage for enhancing the flow in blood-stream-like microchannel system

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### ABSTRACT

Active drag reduction (DR) methods have been used to enhance flow in pipelines. Such techniques could be applied in the vasculature to improve blood flow without altering the properties of the blood. However, most tested DR additives have been artificial and are considered toxic. In the present work, organic mucilage from hibiscus leaves was extracted and tested with microfluidic devices simulating human heart vessels. Custom-made microchannels were connected to an open-loop micro-flow system. Pressure measurements were used to evaluate the flow enhancement performance of mucilage additives at different concentrations (100–500 ppm). Velocity profiles in the microchannels at narrowed areas were observed using a micro-particle image velocimetry system. A maximum flow increase in 63% was observed at an operating pressure of 50 mbar at 300 ppm hibiscus mucilage.

### KEYWORDS

Drag reducing additives; microchannels; mucilage;  $\mu$ -PIV; natural polymers