

عنوان مقاله:

FABRICATION AND EXPERIMENTAL CHARACTERIZATION OF A THERMOPLASTIC MICROPUMP WITH
RECTANGULAR CHANNEL CROSS-SECTION FOR BIOMEDICAL APPLICATION

محل انتشار:

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خلاصه مقاله:

In this study, a peristaltic thermoplastic micropump was designed and fabricated for a biomedical application. Extended experiments were performed on the fabricated micropump in order to obtain its operational characteristics including maximum flow rate and head. The micropump are pneumatic which is fabricated by sandwiching multi layers of poly methyl methacrylate (PMMA) and thermoplastic polyurethane (TPU) film as a membrane. A computer numerical control (CNC) micromilling method is used to make a rectangular channel on PMMA sheet. The use of rectangular cross-section in the channel makes the manufacturing process more effective in terms of cost and time. A thermal fusion bonding method is served to bond the TPU film to the PMMA layers in a single step. The fluid flow rate through the micropump as a function of pneumatic gas pressure and frequency of microvalves was obtained. The fluid flow is increased by increasing the frequency with a maximum at a frequency of 15 Hz. The maximum flow rate that can be generated using the fabricated micropump is about 350 $\mu\text{L}/\text{min}$. The introduced micropump in this study was shown to be reliable with low-cost production that can be used in lab-on-a-chip devices.

کلمات کلیدی:

Micropump, Fabrication, Microfluidics, Biomedical

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