

## ABSTRACT

Two-phase flow is a flow consisting of a combination of two different types of phases. The application of two-phase flow especially in mini channels in daily life is applied naturally to human blood vessels where blood and oxygen flow together in the blood vessels. Human blood vessels have different diameters and positions. The human blood also have different viscosities between one and another. This research was conducted to determine the flow pattern and map of flow patterns in human blood vessels that were simulated using mini channels and using certain and the length of the test section 130 mm with a slope of  $30^\circ$  to the horizontal position.

The working fluid used was air and a mixture of water (distilled water) with glycerin with a concentration of 40%, 50%, 60%, 70% for each mixture. Variations in water and gas superficial velocity values in the range  $JL = 0.033 - 4.935 \text{ m / s}$  and  $JG = 0.025 - 66.3 \text{ m / s}$ . Research uses visualization methods using high-speed camera. The two types of the fluid will mix in the mixer which will then flow to the test section to take a picture of the flow pattern using the camera that has been arranged to get the flow pattern.

Based on the results of the study, the flow patterns that were successfully observed were: plug, bubbly, slug annular, annular, and churn. The dominant flow pattern in this study is plug and slug-annular. The effect of viscosity in this study is that the plug flow makes the flow pattern shorter, while the bubbly flow results in the bubbly flow pattern becoming more round. Flow pattern maps show the distribution of different flow patterns due to the increased viscosity. The results of comparing the maps of pattern of changes in viscosity flow with previous studies showed the results that are not much different, this can be seen from the shifting of the consistent flow pattern transition lines.