Streptococcus mutans is the earliest bacteria that forms dental caries in humans. This study determines the effect of acetone extract from Melastoma malabathricum stem against S. mutans by microscopic observation and absorption of fluorescence dye. The extraction of M. malabathricum stem using acetone yielded 0.5 g of acetone extract. Antimicrobial activity determined by disk diffusion assay showed that stem extract at the 30 mg/mL inhibit bacterial growth with inhibition zone diameter of 15 mm. The effect of the extract towards S. mutans by microscopic observation was done by Scanning Electron Microscope (SEM) and Transmission Electronic Microscope (TEM). Result from microscopic observation showed that the M. malabathricum extract damaged the cell’s shape by rupturing the surface and the wall, causing the cytoplasm to leak. The assay using propidium iodide (PI) as the fluorescence dye showed that it was absorbed into the observed cell through flow cytometry analysis. The absorption of propidium iodide in treated cell confirmed the possibility of disturbance in the permeability of the cell membrane’s structure. From the microscopic observation and cytometry analysis, it can be concluded that acetone extract of M. malabathricum act as anti-bacteria agent that cause damage to the cell wall and disturb the permeability of the membrane structure.