Magnetic nanofluids are colloidal suspension of surfactant coated superparamagnetic nanoparticles dispersed in liquid carriers. These nanofluids constitute a special class of materials that exhibit both magnetic and fluid properties. Tunable thermal conductivity in the presence of a magnetic field renders it as a recent research area for heat transfer applications. Stable fluids are a prerequisite for most of the applications. Surfactants are very important for the dispersion as well as the stability of magnetic nanofluids. Fatty acids are one of the most commonly used surfactants. Physical, chemical and thermophysical properties of the magnetic nanofluids are greatly influenced by the solvent-surfactant interaction and as well as the amount of surfactant on the surface of the nanoparticles. In the present study, to understand the effect of solvent-surfactant interactions as well as the magnetic dipolar interactions between the particles on the properties of the magnetic nanofluid, we have compared the properties of short chain and long chain fatty acid coated magnetite nanoparticles with comparable particle size dispersed in toluene. Thermal conductivity measurements showed difference in the critical concentration for both the magnetic nanofluids below which there is no appreciable change in the thermal conductivity from that of the base fluid.