In this study, we aimed to produce thermo-regulating cotton fabrics with heat storage property. For this aim we used the microcapsules with Poly(Methyl methacrylate-co-acrylic acid) (PMMA-co-AA) shell and n-octadecane core that we produced in our project. We focused on microcapsule application process to the fabrics to get high heat storage capacity in fabrics and determination their thermal properties. We applied the microcapsules to the fabrics by using 1,2,3,4-Butanetetracarboxylic acid (BTCA), and Fixapret Resin F-Eco (F-ECO) as cross-linker. The chemical characterization of the microcapsule incorporated fabrics was carried out by Fourier transform infrared (FT-IR) spectroscopy method as their thermal properties was measured by a Differential Scanning Calorimeter (DSC). The morphology of the fabrics and the presence of the microcapsule on fabric were analyzed by Scanning Electron Microscopy (SEM) instrument. Thermo-regulation property of the fabrics was investigated by Thermal History System composed of insulated boxes, temperature sensors and a data-logger. According to the results, the heat absorption of the fabric samples was between 1.4 and 11.6 J/g at about 25-27 °C while they release between 0.7 and 7.7 J/g at about 23-25 °C. Also FT-IR spectroscopy and morphology analysis showed that microcapsules were applied to the cotton fabrics successfully.