The objectives of this research are as follows: to develop new green nano finishing treatment with casein for cotton fabrics. The effect of different casein add-ons (namely 1, 5, 10 wt. %) has been thoroughly investigated. The finishing treatment should have high tensile strength, flame resistance, environmentally-friendly, low add-on levels and cost effectiveness. Tensile tests, flame retardancy and air permeability were used to investigate the effects of the treatment. The fabric surfaces were also observed by Scanning Electron Microscopy (SEM) and Fourier Transform Infrared Spectroscopy (FTIR). According to the all test results, it can be concluded that casein is a green excellent agent for improving the tensile strength and flame retardancy properties of cotton fabrics.