This project is about chemical analysis of textile dyeing, the purpose was to investigate the color of the dyed textile and compare it to its and the dyes' chemical structures and ability to interact with each other. A fabric strip consisting of six different textile fibers: cellulose acetate, cotton, nylon, polyester, acrylic and wool was dyed with four different dyes: madder root, dyes extracted from red onion peel, indigo and methyl orange. An appropriate method was selected based on each individual dye. The conclusions that could be drawn from the results were that the chemical structures of both the textile fibers and the dyes affected the resulting colors. An example is that the dye extracted from red onion peel gave results with red tones which was explained by the components of the dye that could interact with the fiber, in this case its anthocyanins. Another example is nylons' constant dark pigmentation which was explained by its ability to bond to the dyes, it had many potential places for hydrogen bonds and ionic-polar bonds. A third example is that similar results between fibers could be linked with their chemical similarities, for example wool and nylon.