The aim of this thesis is to investigate theoretically photoelectron spectra of small water molecular clusters. This work is motivated by the recent experimental results of Hartweg et al [Phys. Rev. Letters **118**, 103402, 2017] which showed that with an increasing number of constituent molecules in the water cluster the asymmetry parameter characterizing the photoelectron angular distribution converges to a universal shape. At the moment there are no theoretical calculations to support this finding. Therefore, we have developed a very simple model of photoionization of molecular clusters based on the use of photoionization data for a single molecule. We have found that the results of our model are sensitive to the different conformations of the clusters. Some of our results for the photoelectron angular distribution exhibit trends observed in the experiment. Nevertheless, the validity of our model will have to be studied in the future with the help of accurate calculations before the results can be conclusively interpreted.