Studies of yeast Saccharomyces cerevisiae – a model eukaryot organism – often require determining the number of cells in a suspension. One of the methods often used for studying cell suspensions is the measuring of elastic scattering of light passing through the suspensions. Usual output of those measurements is the angular dependency of the intensity of scattered light, which bears information about the size of scatterers. This thesis studies time-dependencies of the intensity of scattered light and relationship of their statistical properties to the number of scatterers in a unit volume. For this purpose a simple model was proposed, which describes the connection between this quantity for a monodisperse suspension and the dependency of standard deviation of time-behaviour of the scattered intensity on the mean value of the same time-behaviour. An apparatus for computer controlled measurements of angular and timedependencies of scattered light intensity was completed for carrying out the experiments. Elastic scattering was measured on suspensions of yeast Saccharomyces cerevisiae and a model system (suspensions of 8m polymer particles). Experimental data were interpreted within the proposed model. Although yeast suspensions cannot be regarded as monodisperse, experimental data were in a good agreement with the predictions of proposed model. This indicates that the effects of polydispersity of yeast on measured data are small enough to allow for their interpretation within the proposed simple model.