The aim of the thesis was to characterize chosen expression vectors used in biotechnologically important bacterial species, *Corynebacterium glutamicum*, and to test their use in studies of promoter activity control by sigma factors of RNA polymerase. Different properties of these vectors (level of expression of the cloned gene, leaky expression without inducer, dependence of expression level on inducer concentration and cell population homogeneity) were found by determination of expression level of the model *gfp*uv gene by fluorescence intensity assay of the produced protein and by *gfp*uv-expressing *C. glutamicum* cell population analysis using flow cytometry. The vector pEC-XT99A was chosen for testing the bi-plasmid system for assignment of a sigma factor to the chosen promoter. Although the level of expression provided by pEC-XT99A was not high, the vector showed no leaky expression, expression from the vector was comparable for a wide range of IPTG concentrations and the cell population was homogenous concerning the gene expression. Using pEC-XT99A from which individual stress *sig* genes were expressed, the σ^D factor was clearly assigned to the up-to-now unknown P*cg0420* promoter. Another vector for isolation and purification of *C. glutamicum* proteins was used to express the *C. glutamicum sigM* gene and to isolate the σ^M protein, although in its insoluble form. All vectors will be used for experimental work in the Laboratory of Molecular Genetics of Bacteria.