The desire to improve comfort of life drives continuous development of industry and technical sciences. It causes seeking for better and better solutions. One of the most important extensively explore scientific topics are biodegradable implants. This kinds of implants are temporary. After completing their mission consisting of support the damaged tissue in its healing, they dissolve. The widespread use of biodegradable implants would eliminate the problems connected with leaving them in the human body like chronic inflammation or stent restenosis. Another advantage of using such implants would be the fact that second intervention by the doctor to remove the implant is no needed. It would greatly improve comfort of the patient.

Design of material from which a biodegradable implant will be made is not simple and requires a great deal of researcher work. The material with such purpose has to be harmless to the human body (biocompatible), exhibits appropriate dissolution rate (biocorosion) and be properly resistant (have adequate mechanical properties). It was proven that zinc possesses the ideal corrosion rate and good biocompatibility, what makes it a suitable candidate for this type of application. However, this metal has one drawback. It exhibits low strength and plasticity. Due to its low melting point is very difficult to apply classical methods (plastic deformation) to improve its properties. Many efforts have been made to improve these properties. For example to zinc alloys various vital elements like Mg, Ca or Sr were added and subsequently obtained alloys were hot extruded or rolled. The absence of high mechanical properties by using such treatments it may be a consequence of the fact that the deformation at elevated temperature results in the recrystallization process. This limits from grain refinement and thus does not allow for the strengthening of this alloy. Therefore, in order to obtain high mechanical properties it is necessary to change the way of deformation process of the alloy.

The aim of present work will be analysis of synergy of two factors. The first is the use of copper as an alloying element, which greatly facilitates plastic deformation. The second is combined deformation process consisting of hot extrusion and subsequent cold rolling. Addition of cold plastic deformation will allow for achievement of ultrafine grain structure that will contribute to obtain high mechanical properties which are required for medical implants. The application of such combination of plastic deformation will be possible due to the use of a suitable alloying element.

Investigated within project microstructural changes by means of advanced electron microscopy methods will allow for deeper knowledge, understanding and more detailed control of processes that improve the properties of the new alloy.