The main aim of this bachelor thesis was synthesis and physico-chemical and preliminary biological characterization of water-soluble biocompatible polymeric system for targeted delivery of acetylsalicylic acid to inflamed tissue. Such polymer conjugates should be employed in the future for the therapeutic use within the treatment of chronic inflammatory diseases. The project included the preparation of a series of suitable acetylsalicylic acid derivatives and the synthesis of a polymeric carrier based on *N*-(2-hydroxypropyl) methacrylamide copolymer. Finally, the acetylsalicylic acid derivative was attached to the polymer forming a polymeric conjugate with pH-sensitive bond between the drug derivative and polymer chain, thus allowing controlled release of the drug in the target site. The work includes SEC, NMR and HPLC characterization of all synthesized compounds, verification of their stability in solutions with different pH and results of the release of drug derivatives from the polymeric carrier at physiological pH, or mildly acidic pH modeling inflamed environment. Moreover, the cytotoxicity bioassay of acetylsalicylic acid derivatives using LDH assay did not prove any cytoxicity at the level of necrotic activity. Also, their cyclooxygenase 1 inhibitory activity was observed and discussed. The polymeric conjugate of acetylsalicylic acid or its derivative could provide advantages over the administration of its parent drug such as increased drug solubility, stability during transport in the blood and reduction of side effects. Other benefits of acetylsalicylic acid include in particular the ability to induce the synthesis of resolvins (anti-inflammatory mediators). This feature of acetylsalicylic acid could be the subject of further research on teh developed polymer nanotherapeutics.