

UNIVERSITY OF NIŠ
Faculty of Technology, Leskovac

BOOK OF ABSTRACTS

15th INTERNATIONAL SYMPOSIUM
„NOVEL TECHNOLOGIES AND SUSTAINABLE
DEVELOPMENT“

Leskovac, October, 20-21, 2023.

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POLY(METHACRYLIC ACID) HYDROGELS PREPARED BY "GREEN" METHOD: SWELLING PROPERTIES AND CONTROLLED RELEASE OF CAFFEINE

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Controlled release of drugs is a promising tool for improvement of therapy for many diseases because drug concentration for long period of time is kept constant, whereas number of drug doses and side effects are reduced. pH sensitive hydrogels, such as hydrogels based on poly(methacrylic acid) (PMAA), are extensively employed for drug delivery. The synthesis of the hydrogel is one of the most important factors which affect encapsulation of drug and its bioactivity. In present study, we investigate if the encapsulation of poorly water-soluble active substance (caffeine) during the synthesis of PMAA hydrogels, and later its controlled release from the PMAA hydrogels, can be achieved by applying novel "green" method for the hydrogels preparation. The PMAA hydrogels with encapsulated caffeine and various amount of crosslinker are prepared by free radical polymerisation in aqueous solution and ambient conditions by using novel initiation system based on hydrogen peroxide and vitamin C. The swelling behaviour of the PMAA hydrogels and controlled release of caffeine are investigated in two media with pH 1 and pH 6.8 as simulation of human stomach and intestines, respectively. The SDeq values of the PMAA hydrogels are eight times higher in the medium with pH 6.8 and as a consequence, three times higher amount of caffeine is released in that medium. The increase in the crosslinker amount leads to the decrease of SDeq values of the PMAA hydrogels and amount of released caffeine. The results show that the PMAA hydrogels have great potential for controlled release of poorly water-soluble drugs.