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## Towards the SDG Challenges

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## T3-P-6 Sustained release of lignin model compound dehydrogenate polymer (DHP) from alginate beads

Dragica Spasojević, Mira Stanković, Miloš Prokopijević, Olivera Prodanović, Jasmina Stojkowska<sup>27</sup>,  
Bojana Obradović<sup>28</sup>, Ksenija Radotić<sup>27</sup>

**KEYWORDS:** dehydrogenate polymer; alginate; drug release

### INTRODUCTION:

Alginate dressings are widely used in the treatment of exuding wounds<sup>29</sup>. The enzymatically synthesized lignin model compound dehydrogenate polymer (DHP) from coniferyl alcohol by the enzyme peroxidase, is the best lignin substitute used in various experiments<sup>30</sup>. In our previous work, we have shown that synthesized DHP has antibacterial and antibiofilm properties, and in combination with alginate has good potential for wound treatment<sup>31</sup>.

### OBJECTIVES:

The objective of this paper was to study the sustained release of DHP from low and medium viscosity alginate beads.

### METHOD / DESIGN:

Synthesized DHP powder (0.8 mg) was added to 2 ml 2% (w/v) sodium alginate low (4-12 cP, 1% at 25 °C) and medium ( $\geq 2000$  cP, 2% at 25°C) viscosity solution. The solution was transferred dropwise to calcium chloride in water for making the gel beads. In vitro release of DHP was monitored in 10 mL of distilled water. Aliquots were taken at predetermined time intervals (1, 2, 3, 4 and 24 h) and concentration of DHP was determined spectrophotometrically at 272 nm. The dissolution tests were performed in duplicate.

### RESULTS:

Figure 1 shows release profiles of DHP from low and medium viscosity alginate beads. Low viscosity alginate showed slightly faster DHP release (~5%) compared to medium viscosity beads. After an initial burst release in the first hours, microbeads allowed slow and continuous release of DHP. After 24 hours 35% (for low) and 40% (for medium viscosity alginate) of entrapped DHP was released, suggesting that the time of monitoring should be prolonged. Fitting experimental data into different mathematical models for drug release kinetics, the highest value of correlation coefficient (R<sup>2</sup>) was obtained for the Korsmeyer-Peppas model. The n value was smaller than 0.5, indicating that the DHP release can be characterized as quasi-Fickian diffusion.

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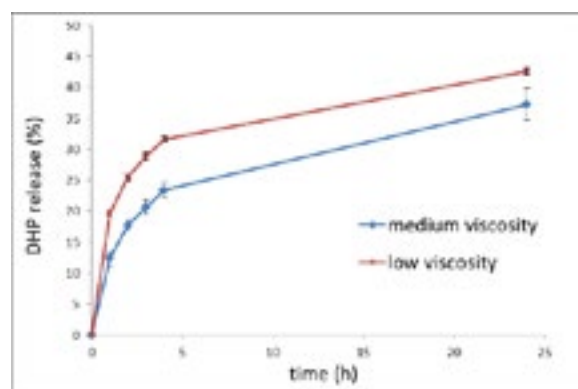


Figure 1. Release profiles of DHP from alginate beads (low and medium viscosity)

#### CONCLUSIONS:

The obtained results showed that alginate beads could be suitable for sustained DHP release. Prolonged release of antibacterial compound is beneficial for maintaining antimicrobial capacity, so it can be concluded from this study that DHP- alginate beads have good potential as chronic wounds healing agent.

## T3-P-7 Effect of spermidine supplementation on autophagy genes expression in honey bee

Srdana Đorđević<sup>32</sup>, Tatjana Čelić<sup>32</sup>, Elvira Vukašinić<sup>32</sup>, Ivan Pihler<sup>33</sup>, Danijela Kojić<sup>32</sup>, Jelena Purać<sup>32</sup>

**KEYWORDS:** polyamines; longevity; health; pollinators.

#### INTRODUCTION:

Honey bee (*Apis mellifera* L.) is one of the most important pollinators in the world, however the number of colonies has been decreasing in the last few decades. Scientist revealed that major reasons of this problem are poor quality of winter feeding, pathogens, climate changes and excessive use of pesticides. Spermidine is a naturally occurring polyamine that participate in multiple biological processes. Its mechanisms of action are just beginning to be understood. Exogenous supply of spermidine prolongs the life span of several model organisms, significantly reduces oxidative damages and induces autophagy. Autophagy is a cytoprotective cell mechanism by which cell recycles damaged molecules and regulates metabolism. It has been proven that loss of autophagy gene function significantly influences health and shortens life span.

#### OBJECTIVES:

The aim of this experiment was to examine the effect of spermidine supplemented food on the expression of autophagy genes, Atg3, Atg5, Atg9 and Atg13, in honey bee.

#### METHOD / DESIGN:

The honey bees (*Apis mellifera* L.) were collected from bee hives and sorted in plastic boxes, each representing one experimental group. Three experimental groups were formed: the control group (C) in which bees were fed with 50% sucrose solution, and two treatment groups S1 and S2, where the sucrose solution contained 1 mM and 0.1 mM spermidine, respectively.

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