

THE VITAMIN B₁ RELEASE FROM COLLAGEN, CHITOSAN AND HYALURONIC ACID BLENDS

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[ENGINEERING OF BIOMATERIALS 138 (2016) 44]

Introduction

Natural polymers are used for preparation of several materials for biomedical application. Collagen, chitosan and hyaluronic acid are biocompatible, biodegradable and non-toxic for human body [1]. The new aspect of biomaterials science is the use of polymeric materials as matrixes for the active compounds release [2]. Such systems enhance the efficiency of medical treatment because active compounds are incorporated directly in the target site of action [3].

Materials and Methods

Collagen (Coll) was isolated from rat tail tendons. Chitosan (CTS) and hyaluronic acid (HA) were purchased (Sigma-Aldrich, Poland). Collagen and chitosan were prepared as 1% solutions in acetic acid. Hyaluronic acid was dissolved in hydrochloric acid in 1% concentration. Coll and CTS were mixed in the weight ratio 50/50 and then 1, 2 and 5 wt% of hyaluronic acid was added. To the 15 ml of polymeric mixture vitamin B₁ was added. Mixtures were frozen in -80°C and lyophilized. Scaffolds were immersed in PBS solution (pH=7.4). After 2, 3, 4, 24 and 48 h, the volume 3 ml of solution was taken and replaced by the fresh PBS. The concentration of released vitamin was analysed by spectrophotometer with the use of standard curve method.

Results and Discussion

Results show that the concentration of released vitamin B₁ increases with increasing time of immersion. After 48 h the decrease of released rate was noticed. It is proper for the use of polymeric matrixes as drug delivery systems because drug should be released mostly in the initial time and then the released rate should decrease. The concentration of vitamin B₁ depends on the polymeric matrix content.

Conclusions

Polymeric matrixes based on chitosan, collagen and hyaluronic acid blends can be potentially applied as drug delivery systems what can significantly modify the therapy efficiency.

Acknowledgments

Financial support from the National Science Centre (NCN, Poland) Grant No UMO-2013/11/B/ST8/04444 is gratefully acknowledged.

References

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