Tereza Bártová[a]

L. Pisklákivá[a,b], K. Skuhrovcová[a,c], M. Šimek[a], J. Seidelmannová[a], V. Velebný[a]

[a]Contipro a.s., Dolní Dobrouč 401, 561 02, Czech Republic
[b]Nanotechnology Centre, Energy and Environmental Technology Centre, VŠB–Technical University of Ostrava, 17. listopadu 2172/15, 708 00 Ostrava, Czech Republic
[c]Centre of Polymer Systems, Tomas Bata University in Zlín, Třída Tomáše Bati 5678, 760 01 Zlín, Czech Republic

Tereza.Bartova@contipro.com

Evaluation of Hyaluronic acid in HA/PVA nanofibers by Raman spectroscopy

Hyaluronic acid (HA) is recently one of the most frequently used materials for the preparation of nanofibers and their subsequent application in the cosmetic industry and medicine. In both fields, its moisturizing, healing effect and quick solubility in water are the biggest benefit [1, 2]. Nanofiber samples of HA mixed with the fiber-forming polymer (Polyvinylalcohol (PVA)) in different ratios were electrospun via 4SPIN LAB® device [1, 3]. The amount of HA, which is contained in nanofibers, is usually evaluated by LC-MS. However, such a method is time consuming, destructive and financially demanding. Therefore, a method for the evaluation of HA by component analysis using Raman spectroscopy was developed. Raman spectroscopy successfully overcomes the mentioned shortcomings of LC-MS and can serve as a comparative technique not only for nanofiber analysis. The results from LC-MS and Raman spectroscopy were compared and it was confirmed that the methods correlate to each other (Tab. 1).

Sample	HA (wt%) expected	HA (wt% ± SD); Raman	HA (wt% ± SD); LC-MS
HA/PVA_1	79,1	79,3 ± 1,3	79,9 ± 0,5
HA/PVA_2	79,1	80,7 ± 1,5	79,4 ± 1,0
HA/PVA_3	60,0	59,1 ± 0,6	57,8 ± 2,1

Table 1 – Results of evaluation of HA in nanofiber samples

References

[1] Knotkova, K.; Hruba, J.; Velebny, V. Patent application CZ2007299A3, Feb 04, 2009.
[2] Knotkova, K.; Salvetova, E.; Ruzickova, J.; Velebny, V. Patent CZ308492B6, Sept 23, 2020.
[3] Contipro a.s. Electrospinning device 4SPIN. 4SPIN.
https://www.4spin.info/index.php?option=com_content&view=article&id=1&Itemid=191 (accessed Sept 20, 2024).
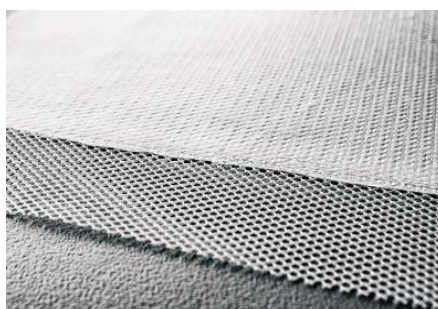
Figure

Figure 1: HA/PVA nanofibers electrospun onto substrate