Cellulose as excipient for 3D printed oral solid pharmaceutical forms

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Abstract

3D printing is an emerging advanced processing technology which can add benefits towards specific applications in the pharmaceutical sector, since it is a tool for designing simple, accurate, cheap, structured and tailored drug delivery systems. [1] Among the different 3D printing techniques, syringe extrusion is one of the most suitable for the obtaining of pharmaceutical forms.

In order to obtain 3D printed oral solid forms different polymers can be employed as excipient. However, it is of utmost importance that the employed inks show suitable rheological characteristics to avoid collapse and achieve good shape fidelity. [2] Therefore, many formulations require rheological behavior modifiers to achieve the required viscosity and viscoelasticity characteristics. [3]

In this context, in this work dicarboxilated cellulose nanofibers (DC-CNF) were employed for the obtaining of pharmaceutical forms containing atenolol (AT), which is a beta blocker employed to control hypertension among other illnesses.

Tablets containing the recommended daily dosage of atenolol were successfully printed. Furthermore, it was observed that the added drug acted as a rheological modifier and improved the shape fidelity of the printed samples, as well as the printability of the ink (Figure 1).

References

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Figure

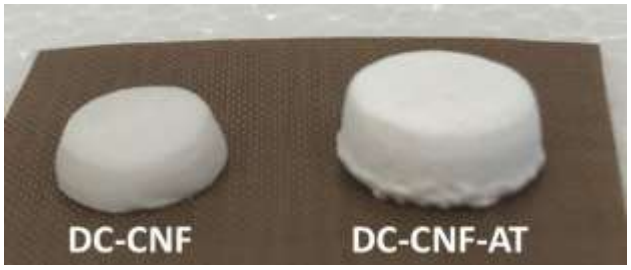

Figure 1: Image of the 3D printed forms (design measurement: Ø=12 mm; h=5 mm): DC-CNF (left) and DC-CNF-AT with atenolol (right).