

Syringeability and injectability of abuse-deterrent dosage forms

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Tampering with drug products to enhance desired euphoric effects or manipulating them to become suitable for alternate routes of administration (nasal insufflation or intravenous administration) is common. Abusers may also use aqueous solvents to extract the active ingredient from the dosage form. The abused medication is often reduced in particle size before being mixed with a solvent to speed drug dissolution. If the abuse is then intended for injection, the resultant mixture may be heated, filtered, and eventually drawn up into a syringe. In this study, we discuss methods that can evaluate and assess the resilience capacity of an abuse-deterrent dosage form to the aqueous manipulation. Since thickening agents are commonly used in such dosage forms to hinder abuse after aqueous manipulation, we studied the most effective in-vitro approaches that can define the deterrence potential of these dosage forms. Among those, syringeability and injectability of the extract solution were found most relevant. For such study, the crushed dosage forms were mixed with an upper limit injection volume of 10 mL and then characterized for ease of drawing into and out of a syringe using a mechanical tester equipped with a syringeability accessory. The amount of force needed to withdraw the extract solution was found to be correlated to the viscosity of the extract medium. In conclusion, higher syringeability force was found associated with less injectability, and hence the dosage form would be less favorable to abuse by aqueous manipulation.

Biography

David Mastropietro received his B.S. in Pharmacy from Massachusetts College of Pharmacy in 1999. He is completing his Ph.D. in Pharmaceutics at Nova Southeastern University (NSU) with dissertation work focused on abuse-deterrent dosage-forms.

Srinath Muppalaneni earned a B.S. in Pharmacy from Andhra University (2008) and a M.S. in Pharmaceutical Sciences from Campbell University (2010). Srinath is currently a second year Ph.D. student at NSU in Pharmaceutics.

Hossein Omidian has a M.Sc. in Chemical Engineering and a Ph.D. in Polymer Science. He is currently an Associate Professor at NSU where David and Srinath are both part of his research group.

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