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Okra Gum as a Pharmaceutical Excipient

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Polymeric drug delivery systems, especially those fabricated from hydrophilic polymers are important in the development of desirable pharmaceutical dosage forms. Drug release from such systems involves the uptake of liquid by the glassy polymer which results in a subsequent swelling to form a gel layer, which controls the drug release. Water soluble drugs are usually released through a diffusion mechanism and show linear dependency on the square root of time. Additionally, these systems may undergo erosion, which introduces another mechanism of drug release [1]. Okra gum is an inexpensive, non-toxic and hydrophilic polymer. It has potential to be used in foods and pharmaceutical industries due to its gel forming properties [2]. The aim of this study was to investigate the electrostatic, adhesion, swelling and dissolution properties of okra gum based hydrophilic matrices. Theophylline (freely soluble) and flurbiprofen (poorly soluble) were used as a model drugs. Flurbiprofen (Aesica, UK) and theophylline (TCI, UK) was mixed with okra gum (OG and ATOG) which was extracted from the fresh okra pods at varying concentrations (25% and 50 % w/w) of each grade and subjected to compression at 2 tonnes pressure for 30 seconds. Resulting 13 mm compacts were subjected to dissolution studies which was carried out using USP apparatus II in sodium phosphate buffer (900 ml, pH 7.2) at 75 rpm and 37 °C. Swelling index was measured gravimetrically over time by using bespoke small mesh holders in phosphate buffer (10 ml, 7.2 pH). The tribo-electric charge experiments on the formulations were done by shaking the powder blend in Retsch MW 4000 and electrostatic charge was measured using Keithley Model 6514 electrometer as described by Šupuk et al., [3]. Both the grades of okra gum, shows a very low electrostatic charge while the liquid hydration rate is higher in ATOG grade. The powder blends of okra gum with drugs shows a significant reduction in the tribo-electric charge and improvement of adhesion properties especially in the case of flurbiprofen which might be due the difference in work function between drug and okra gum. While the 25- 50% of okra in hydrophilic matrix tablet was sufficient to control the drug release up to 4-7 hours, depending on the grade and concentration of okra gum. The release exponent (n) of Korsmeyer-Peppas model, was used to be determined the release mechanism which shown an anomalous (non-fickian) drug release behaviour. However, when the okra gum contents were increased from 25 to 50 % the diffusion was more dominant than erosion. The release rate can be further modify by using a combination of okra gum and other polymers. So, this study suggests that okra gum can be a good choice for the fabrication of modified released matrix tablets and conceivable to be a good pharmaceutical excipient.

References;

1- V. D. Kalu, M. A. Odenlyi and K. T. Jaiyeoba, 'Matrix properties of a new plant gum in controlled drug delivery', *Archives of Pharmacal Research,* 2007, **30**, 884-889.

2- V. D. Prajapati, G. K. Jani, N. G. Moradiya and N. P. Randeria, 'Pharmaceutical applications of various natural gums, mucilages and their modified forms', *Carbohydrate Polymers,* 2013, **92**, 1685-1699.

3- Šupuk, E., Seiler, C., Ghadiri, M. " Analysis of a simple test device for tribo-electric chargeing of bulk powders, *Particle and Particle Systems Characterization,* 26 (1-2),. 7-16 (2009)