



# University of HUDDERSFIELD

## University of Huddersfield Repository

Ghori, Muhammad U., Charlotte, Green, Sŭpuk, Enes, Smith, Alan M. and Conway, Barbara R

Okra Gum as a Pharmaceutical Excipient

### Original Citation

Ghori, Muhammad U., Charlotte, Green, Sŭpuk, Enes, Smith, Alan M. and Conway, Barbara R (2013) Okra Gum as a Pharmaceutical Excipient. In: 1st UK Hydrocolloids Symposium, 10th September 2013, University of Huddersfield. (Unpublished)

This version is available at <http://eprints.hud.ac.uk/30873/>

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

- The authors, title and full bibliographic details is credited in any copy;
- A hyperlink and/or URL is included for the original metadata page; and
- The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: [E.mailbox@hud.ac.uk](mailto:E.mailbox@hud.ac.uk).

<http://eprints.hud.ac.uk/>

## ***Okra Gum as a Pharmaceutical Excipient***

Muhammad U. Ghor, Charlotte Green, Enes Supuk, Alan M. Smith, Barbara R. Conway

*Department of Pharmacy, university of Huddersfield, Huddersfield, UK*

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 charging of bulk powders, *Particle and Particle Systems Characterization*, 26 (1-2),. 7-16 (2009)