

## Formulation of Effervescent and Non-Effervescent Floating Matrix Tablets of Metronidazole using Azadirachta indica Gum

Michael Uhumwangho  
University of Benin, Nigeria.



### Abstract

#### Purpose:

This study was carried out to formulate effervescent and non-effervescent gastro-floating matrix tablets (GFMTs) of metronidazole using Azadirachta indica (Neem) gum (AIG).

#### Method:

Neem gum was extracted by method previously described. Granules were prepared by wet granulation technique using the extracted neemgum at varying concentrations (2, 4, 6 and 8% w/w). The granules were compressed at an optimized compression pressure of 30 arbitrary unit on the tableting machine load scale. Tablets were evaluated for hardness, friability, floating lag time, in vitro buoyancy test and drug release profiles. Drug-excipient compatibility study was done using Fourier Transform Infra-red Spectroscopy (FTIR) and Differential Scanning Calorimetry (DSC). Scanning Electron Microscope (SEM) was used to analyze the pores and morphology of the tablets.

#### Results:

All formulated floating matrix granules were free flowing with angle of repose and Carr's index  $\leq 33.2^\circ$  and  $\leq 15.5\%$  respectively. All floating matrix granules were compressible with tablet hardness  $\leq 9.0$  Kg/cm<sup>2</sup>. Generally, GFMTs percentage friability decreased with increase in binder concentration ( $\leq 0.99\%$ ). The floating lag time for the effervescent FMTs tablets ranged from 2-7 min while the non-effervescent FMTs had zero floating lag time. FTIR and DSC studies showed that the excipients and the Active Pharmaceutical Ingredient (API) i.e. metronidazole were compatible. SEM reveals the presence of pores and rough surface on the non-effervescent GFMTs while smooth surface with no pores was revealed in the effervescent formulations.

#### Conclusion:

Gastro-floating matrix tablets of metronidazole were successfully formulated in this study using the effervescent

and non-effervescent techniques and Azadirachta indica gum as a natural polymer. There was significant difference in the floating lag times ( $P > 0.05$ ) while there was no significant difference in the in vitro buoyancy studies of the tablets formulated using both the effervescent and non-effervescent methods ( $P < 0.05$ ).



### Biography:

Dr. Michael U. Uhumwangho is currently working as Associate Professor at Department of Pharmaceutics and Pharmaceutical Technology, Faculty of Pharmacy, University of Benin, Nigeria. He has completed his Ph.D. in Pharmaceutics and Pharmaceutical Technology from same University. His main area of expertise includes Tableting, Controlled Drug Delivery System, Floating Drug Delivery Systems, Novel Drug Delivery Systems, and Pharmaceutical Formulations. He has published 70 research articles in journals as author/co-author.

### Speaker Publications:

1 Orakwe, C., C.O. Airemwen and M.U. Uhumwangho, 2015. Formulation and evaluation of gastroretentive floating matrix tablets of metronidazole using Khaya ivorensis gum. Asian J. Pharmaceut. Technol. Innov., 3: 1-9.

2. Mustapha, M.A., M.U. Uhumwangho and M.A. Iwuagwu, 2015. Quality by design-based formulation and optimization of artemether-lumefantrine fixed dose combination: Tablets evaluation. Panacea J. Pharm. Pharmaceut. Sci., 4: 108-120.

3. Mustapha, M.A., M.U. Uhumwangho and M.A. Iwuagwu, 2015. Quality by design-based formulation and optimization of artemether-lumefantrine fixed dose combination I: Granulates assessment. Panacea J.. Pharm. Pharmaceut. Sci., 4: 121-131.

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5. Latha, K., V.V. Srikanth, S.A. Sunil, N.R. Srinivasa, M.U. Uhumwangho, N.B. Shaik and K.V.R. Murthy, 2015. Applicability of gum karaya in the preparation and in vitro evaluation of losartan potassium as chronotherapeutic drug delivery system. J. Scient. Res., 7: 65-74.

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