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Comparative studies of elemental composition in leaves and flowers of *Catharanthus roseus* growing in Bangladesh

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Objective: During present study, we selected the leaves and flowers of *Catharanthus roseus* to investigate their elemental composition due to the plant's wide application in the indigenous medicinal system and its chemical constituents' importance.

Methods: The atomic absorption spectrophotometer (AAS) was used for quantitative analysis of various elements.

Results: Total 13 important elements were analyzed in leaves and flowers of *Catharanthus roseus*. Results indicated the presence of Na, K, Ca, Mg, Cr, Fe, Zn, Al, Cu, Ni, Pb, Cd and Mn in both leaves and flowers. The most important finding of the work is that, leaves of *Catharanthus roseus* showed high concentration of all elements except K and Zn while flowers of *Catharanthus roseus* showed higher concentration of K and Zn.

Conclusions: The elemental composition in both leaves and flowers of *Catharanthus roseus* were found to be different. Therefore, different parts of this medicinal plant are enriched in some micro and macro nutrients like Fe, Ca, Na, K, Zn, which are very important for biological metabolic system as well as human health.

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Evaluation of chitosan-hydroxy propyl methyl cellulose as a single unit hydrodynamically balanced sustained release matrices for stomach specific delivery of Piroxicam

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The purpose of investigation is to find out the potential of chitosan (CH) and hydroxy propyl methyl cellulose (HPMC) derivatives loaded with piroxicam (PRX) for delivering into the stomach by using gastroretention technology. These single unit hydrodynamically balanced system capsules (HBS capsules) were prepared by manual hand shaking method followed by filling in empty hard gelatin capsule shell. The formulations were evaluated for drug-excipient interaction by using Fourier transform infrared spectroscopy (FTIR), and by thermogravimetric analysis (TGA), differential thermal analysis (DTA) and derivative thermogravimetric analysis (DTG). *In vitro* buoyancy studies, *in vitro* characteristics, long term stability studies and curve fitting analysis were also performed. FTIR and TGA/DTA/DTG thermograms represents that there is no drug excipient interactions. All the formulations (F1-F12) remained buoyant till the time of drug release without any lag time. Release profile of formulations in HCl; 0.1 mol L⁻¹ shows the release up to 90% without sinking in the dissolution media. Long term stability studies for formulations (F5, F6 and F12) period of 12 months are stable through the period when compared with normal (F5, F6 and F12) without showing any significant difference. The similarity factor value (f₂) was found to be 85.45, 88.98, and 86.78 respectively for F5, F6 and F12 formulations. Curve fitting analysis represents the formulation (F1-F5) shows the zero order kinetics while formulation (F6- F12) followed the Higuchi model on the basis of their r² value. Our obtained result suggests that CH, HPMC and in combination of HPMC and CH loaded with PRX is an excellent biopolymer for sustained delivery of drug from single unit hydrodynamically balanced system capsule.

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