Phytochemical study and biological activity of leaves and flowers of *Ipomoea carnea* J. grown in Egypt

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*Ipomoea carnea* was recorded along canals, drains, road sides, railways, waste lands and fluid edges in the Nile Delta. GC/MS was used for qualitative and quantitative analyses of lipoidal content of the leaves and flowers of *I. carnea*. 32 components representing 83.548% were identified in the fatty acid methyl esters of the leaves of *I. carnea* while 23 components representing 84.424% were identified in the fatty acid methyl esters of the flowers. On the other hand, 22 components were identified in the un-saponifiable matter of the leaves representing 83.398%, while 25 components were identified in the un-saponifiable matter of the flowers representing 91.069 %. HPLC was used for assay of rutin in leaves and flowers ethanol extract of *I. carnea*. The leaves ethanol extract showed higher concentration of rutin (8.85 mg/g dry wt.) than flower ethanol extract (2.72 mg/g dry wt.). The total phenolic compounds, the in vitro and in vivo antioxidant properties and the antimicrobial activity against gram-positive and gram-negative bacteria, fungi and their Minimum Inhibitory Concentration (MIC) were evaluated. The results showed that the ethanol extract of flower contained higher phenolic compounds than ethanol extract of leaves (9.331 and 6.6348 mg (GAE)/g dry wt., respectively). The ethanol extract of leaves possessed higher DPPH radical scavenging activity than ethanol extract of flowers (IC$_{50}$=1.608 and 4.861 mg/ml, respectively). The leaves ethanol extract showed higher antioxidant activity in comparison with gentamicin and ampicillin against *Eschirechia coli*, *Streptococcus pneumonia* and *Bacillis subtilis* with MIC values 3.9 µg/ml, 3.9 µg/ml and 0.98 µg/ml, respectively. The leaves ethanol extract showed mild potent antifungal activity compared with amphotericin B against *Aspergillus fumigatus* with MIC value 7.81 µg/ml. The extracts were tested for cytotoxic activity against liver, breast and colon carcinoma cell lines; leaves extract showed potent cytotoxic activity against breast carcinoma cell lines (IC$_{50}$=7.4 µg/ml) while it showed mild cytotoxic effect on liver and colon carcinoma cell lines (IC$_{50}$=23 and 35 µg/ml, respectively) comparing with doxorubicin while the flower extract showed only cytotoxic activity against breast carcinoma cell lines (IC$_{50}$=44.2 µg/ml).

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Designing development and evaluation of floating gastro-retentive microspheres of acyclovir with piperine as a bio-enhancer

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**Introduction:** Acyclovir is an effective antiviral drug for the treatment of Herpes simplex virus. Oral bioavailability of acyclovir is poor (15-20%) because of low solubility and short half-life. Piperine enhances the bioavailability of acyclovir by increasing the absorption and by delaying the metabolism of the drug. Floating microspheres are prepared to retain the dosage form at the site of absorption and thus enhance the bioavailability. These are low-density system, which are having a sufficient buoyancy to float over the gastric contents and remain in the stomach for a prolonged period. While the system floats over the gastric content, the drug is released slowly at the desired rate. It results in increased gastro-retentive time and reduces fluctuation in the plasma drug concentration.

**Methods:** Ethyl cellulose and HPMCK4M were used as polymers for preparing microspheres and piperine was added as a bio-enhancer to increase the bioavailability. The microspheres were characterized with respect to their morphology, particle size, encapsulation efficiency, production yield, in vitro release and pharmacokinetic studies in rats.

**Result & Discussion:** The mean particle size was within range and showed spherical shape. Microspheres were having sufficient entrapment efficiency and floating ability and were directly proportional to the polymer concentration. Pharmacokinetic study in rats showed nearly two times higher AUC value of acyclovir for the microspheres with piperine (15614.13±6953.13 ng.h/ml) as compared to drug solution (7552.33±3219.09 ng.h/ml). In addition, acyclovir microspheres showed the ability to maintain the acyclovir plasma concentration through 24 h.

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