# Mitigating Impaired Drug Absorption To Shorten Medical Treatment and Enable Pharmaceutical Product Development: Critical Evaluation of Human Oral Bioavailability for Pharmaceutical Drug Paracetamol

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Paracetamol is a widely used drug due to its analgesic and antipyretic properties, however, intramolecular bonding that occurs between the drug's chemical groups make it susceptible to a heavy first-pass metabolism effect. This project investigated drug bioavailability and dissolution, by studying gastric pH's influence on paracetamol's state of dissociation and presence of unionized/undissociated molecules, that best permits the conditions for first-pass metabolism, ensuring the highest presence of a selected drug in the gastrointestinal fluid when entering the hepatic system; it offers practical implementation strategies to quicken recovery rate & enable pharmaceutical product development. Two formulations were sampled over a 30-minute absorption period: an effervescent regular uncoated chalk tablet group and a paediatric syrup group. The regular uncoated tablet formulation produced a positively correlated, with unionization of paracetamol macromolecules at lower pH levels and polarization at more alkaline levels of the gastric pH range. The regular uncoated tablet formulation reached an aggregated 46.67% decomposition potential. The paediatric syrup formulation produced an inverse proportion relationship, undergoing an increased [H+] ion concentration in the more acidic regions of the stomach acid, as a result of an acid-base reaction, and an increased presence of [OH-] ions in alkaline regions, due to an ion-dipole reaction. Strategies for an application of data results for individuals include co-administration with an acidic beverage, pre-treatment with an organic acid, and acidic salts of weak bases. Contemporary research on the bioavailability of paracetamol appears to align itself with emerging active carbon, as well as collaborative multispecies study.

**Awards Won:**