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# Improving Oral Bioavailability of Metformin Using Water-In-Oil Microemulsion

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## ABSTRACT

**Background and Aims:** Microemulsion is an effective formulation for enhancing the oral bioavailability of poorly soluble drugs in water. Metformin is a vital component of diabetes management drugs, both as a monotherapy in primary stages of type 2 diabetes and as adjunct therapy to effectively every other antihyperglycemic drugs available today in the market. Microemulsions show promise as drug carriers because they can increase the solubility of many drugs, improve bioavailability with help of self emulsifying agents under microemulsion technique. They help in promoting drug solubility, forming mixed micelles, release tight junctions, and promoting lymphatic delivery. BCS class III have high solubility and low permeability. But only few studies target to improve bioavailability of BCS III drug like metformin hydrochloride. We inspected the ways of the stage of microemulsions after dilution and tried to link these behaviour to oral bioavailability. It gave two phases; first one ME-A and another ME-B. Microemulsion-A, containing (35%) surfactant endure a transfer of W/O microemulsion to O/W microemulsion with light milky occurrence. In contrast Microemulsion-B containing surfactants (45%), was still transparent or semi-transparent upon dilution. Unexpectedly, Microemulsion-A gives significantly higher oral bioavailability, it can be reducing by closed the lymphatic absorption Conway. Its AUC and bioavailability is lower compared to Microemulsion-B. Both microemulsions performed better in the intestinal perfusion test due to pre-perfusion dilution, and lacked the important transitional phase of Water- in Oil microemulsion.

**Method:** Cross-linking method was used for formulation.

**Result and Conclusions:** These results indicate that Water/Oil microemulsions improve the oral bioavailability of BCS class III drugs by enhancing Lymphatic absorption. Analyzing the stage behavior of microemulsions after dilution may help in predicting oral bioavailability and improving efficiency and compliance.



### Aims & Scope

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