# THE INTERACTION OF OXYTETRACYCLINE HYDROCHLORIDE WITH ETHYL CELLULOSE IN MICROCAPSULES

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Ethyl cellulose was used to prepare microcapsules of water soluble drugs by separation of the polymer from solution following cooling below its critical separation temperature (Fanger et al 1970).

In this investigation an attempt has been made to prepare prolonged release oxytetracycline hydrochloride by applying the above method.

Batches of microcapsules of core:wall ratios 2:1, 1:1,and 1:2 were prepared using 4 g of ethyl cellulose dissolved in cyclohexane. The appropriate amount of the core material, oxytetracycline hydrochloride, was first suspended in part of the solvent before adding to the viscous ethyl cellulose solution. Thus preventing the formation of aggregates of the starting material.

Samples of the obtained microcapsules equivalent to 50 mg of the drug were taken for the release rate study in vitro. The drug determination was carried out spectrophotometrically at 277 nm. Other details of the procedure of preparation, size separation and dissolution were the same as prescribed by Deasy et al (1980).

The effect of microcapsule size on the release rate of oxytetracycline hydrochloride from microcapsules was of the same pattern for different core:wall ratios. The smaller microcapsules released the drug faster as expected from the larger surface area subjected to dissolution.

As the core:wall ratio decreases it is reasonable to expect thicker walls and correspondingly greater delays in the release rate. (Jalsenjak et al 1976). This was the case with the studied microcapsules. However, in all batches and for different size fractions the release of the drug was incomplete, although it increases with decrease of wall thickness. The ratio between the amount of ethyl cellulose in the sample studied and the amount of the drug remaining after dissolution was calculated for each size fraction in each batch and it was found to be constant, the mean ratio $\pm$ S.D. was $2.97 \pm 0.1854$ .This means that a definit interaction takes place between the oxytetracycline hydrochloride and ethyl cellulose .

Infrared spectra were studied in potassium bromide. The NH stretching band at 3500-3000 $cm^{-1}$ in oxytetracycline hydrochloride spectrum disappeared in case of the complex. This suggests that the amide group is most probably involved in the reaction. The same band also represents OH stretching of intermolecular hydrogen bonded OH of oxytetracycline.

The numerous hydroxyl groups in ethyl cellulose molecule might be expected to take part in hydrogen bonding with the oxytetracycline molecule. Interaction would be expected to result in adsorption of isolated molecules of oxytetracycline on ethyl cellulose, thus reducing intermolecular hydrogen bonding between drug molecules and forming a complex between the hydroxyl groups of ethyl cellulose and the amide groups of oxytetracycline.

Deasy, P.B. et al (1980) J.Pharm.Pharmacol. 32: 15-20
Fanger, G.O. et al (1970) U.S.Patent 3,531,418
Jalsenjak, I. et al (1976) J.Pharm.Pharmacol. 28: 912-914