Conclusion

Fluoroquinolones are family of antibiotics which are actively killing bacteria by inhibit the bacterial DNA gyrase or the topoisomerase IV enzyme, thereby inhibiting DNA replication and transcription. For many gram-negative bacteria DNA gyrase is the target, whereas topoisomerase IV is the target for many gram-positive bacteria, presently, four generations of fluoroquinolone antibiotics exist. Ciprofloxacin HCl (CIP), Levofloxacin (LEV), Norfloxacin (NOR) and Enrofloxacin (ENR) are second generation of this Fluoroquinolones.

Several methods have been described for the determination of the drugs under investigation in pure form and pharmaceutical preparations. We develop simple, rapid, accurate, sensitive, suitable for the micro determination of these drugs in pure and pharmaceutical formulations possibility of using acid dyes derivatives (rose bengal RB and erythrosine ERY) and (bromocresol purple BCP) as reagents, transition metals (ferric chloride $FeCl_3$) and (uranium nitrate $UO_2(NO_3)_2$) for quantitative determinations of these drugs spectrophotometrically under the optimized conditions. Complexes formed are studied as well as in the solid forms as their stability constant are determined.

Systematic spectrophotometric studies of ion pair complexes in solution within the concentataion ranges:

- With RB is 2-23 µg ml^{-1} for all drugs.
- With BCP is 1-14 with CIP and LEV, 1-17 with NOR and 1-5 with ENR.
- With ERY is 2-13 with CIP, 2-18 with LEV, 2-12 with NOR and 2-11.5 with ENR.

- With $FeCl_3$ is 60-276 with CIP, 20-180 with LEV, 40-210 with NOR and 40-160 with ENR.

Solid state study of the ion – pair complexes occurred using elementary analysis, thermogravemetric analysis and infrared spectral analysis, the drugs under study (D) is in the deprotonated mode and acts as a bidentate ligand bound to Fe(III) or U(VI) through the pyridine oxygen and one carboxylate oxygen. The complexes of Fe(III) should have a formula as $[Fe(D)_2(H_2O)_2]Cl_2 \cdot 6H_2O$, the comon coordination number is 6, with an octahedron geometry, so there were two water molecules in the inner sphere (the first coordination sphere). Also for the complexes of U(IV) should have the formula as $UO_2(D)_2$, The uranium(VI) atom is six-coordinate and the environment around it could be described as a distorted octahedron same as Fe(III).