

ABSTRACT

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Title of thesis: Effect of the composition of an emulsion with immunosuppressant on the rheological properties of the emulsion

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This thesis evaluates rheological properties of the emulsion created after mixing the drug product Cyclosporine Oral Solution, USP /MODIFIED/ 100 mg/ml with water in different ratios. The theoretical part describes general characteristics, stability and viscosity of emulsions. It also describes self-emulsifying systems and the tested product Cyclosporine Oral Solution, USP /MODIFIED/ 100 mg/ml. In the experimental part of the work, the type of emulsion created, its flow properties and the effect of homogenization intensity were characterized. It was experimentally verified that as the amount of water in the mixture increases, first a w/o emulsion is formed and then the emulsion turns to an o/w emulsion type. In terms of flow properties, the medicinal product exhibits Newtonian behavior. By gradually adding water, the behavior changes to non-Newtonian up to a water:product ratio of 70:30, where the minimum value of the flow behavior index is found. As water is further added, the properties change back to Newtonian behavior. By gradually adding water, the viscosity of the emulsion increases up to a maximum at ratios of 60:40 and 70:30. As more water is added, the viscosity decreases.

The results show that changing the water:product ratio leads to a change in the type of emulsion as well as to a change in the flow properties of the emulsion. The testing also revealed that the intensity of homogenization during sample preparation does not affect the flow properties of the emulsion system with aqueous and oily phase ratio 60:40.

Key words: emulsion, viscosity, self-emulsifying systems, cyclosporine, Cyclosporine Oral Solution