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Modulating drug release from sustained release polyethylene oxides: effect of vitamin E, mannitol and dicalcium phosphate

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Introduction & Objective: Different molecular weight forms of polyethylene oxide can be used successfully in controlled release drug delivery due to their excellent matrix forming properties. The objective of this study is to investigate the effect of vitamin E succinate and different fillers on release rate stability of highly soluble drug diltiazem HCl containing polyethylene oxides.

Results & Discussion: The effect of storage conditions showed that the release rate of the drug was significantly increased from tablets that were stored for longer periods at 40°C. That is to say, drug release was faster at longer storage times (8>4>2>0 weeks).The increase in drug release is expected to be due to oxidative degradation primarily in the amorphous region of the polymers that there was significant decrease in the drug release rate of the formulations that contained mannitol and DCP. The results in indicated the use of vitamin E stabilized PEO and decreased the rapid drug release occurring as a result of the storage time (2, 4, 8 weeks) at 40°C. The reason behind this phenomenon could be when vitamin E was dispersed in the PEO containing drug; it delayed the penetration of oxygen into the PEO matrix during the storage time.

Conclusion: The results indicated that PEO can successfully be used in controlled release drug delivery; vitamin E and fillers stabilized drug release from aged matrices containing PEO.

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