"EFFECT OF THE NATURE OF MEDIUM ON THE SOLUBILIZATION PERIOD OF SOME SELECTED DRUGS"

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The solubilization period of a drug is an important pharmaceutical drug characteristic which decides its vitality and medical significance. The drug action is highly improved by reducing the solubilization period. The solubilization period affects the drug efficiency and its effectivity. Moreover, the solubilization period is a function of pH, temperature and particle size of drugs which has been extensively studied by the author and the lab mates.

In the present dissertation, study has been made on the effect of the medium especially focusing on pH, aqueous and non-aqueous nature of the medium on the solubilization period of some selected drugs. It has been observed that in cases of busulphan and cyclophosphamide the effect of pH is different. For aqueous and non-aqueous medium the solubilization period of busulphan and cyclophosphamide differ qualitatively and quantitatively.

INTRODUCTION

The ability of a cell to produce exact replicas of itself is an essential component of cellular life and lack of fidelity in this cellular reproduction is responsible for malignant cells in animals [1, 2, 3]. The ultimate goal of chemotherapy is a cure, that is long-term, disease-free survival. If cure is not attainable, then the goal becomes palliation. A proper combination of medicines as alkylating agent [4], antimetabolites [5], microtubule inhibitor [6], some platinum compounds [7], isothiocyanate [8] give prolonged remission or regression of disease. Cyclophasphamide and busulphon are alkylating agents. They act by alkylation of DNA. Cyclophosphamide and busulphan have active moiety phosphoramide mustard and methan sulphonate.

The bioavailability of drug depends on the slowest step of following sequence:

$$\text{Dosage form} \xrightarrow{\text{dissolution}} \text{Drug in solution form}$$

$$\xrightarrow{\text{absorption}} \text{Drug in circulation (bioavailability)}$$

The slowest step of above sequence is dissolution of drug. When the dissolution is controlling step, any factor that affects the rate of dissolution must influence the rate of absorption. These factors include solubility of drug, particle size, pH of solvent and medium.

Thus the solubilization behaviour of a drug governs its effectiveness which indeed may be a function of pH and medium of solvent.

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EXPERIMENTAL

The experimental procedure undertaken by the author are the determination of solubilization period is the same as usually adopted[9].

Table-1: Effect of pH on solubilization period of cyclophosphamide in aqueous medium

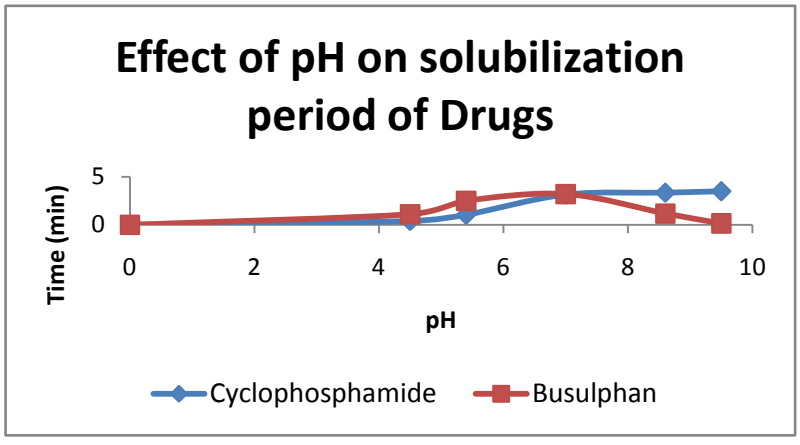
S.No.	pH	Solubilization period (min/100 mg)	pH gradient (min)
1	4.5	0'40"	0.20
2	5.7	1'05"	1.61
3	7.0	3'15"	0.11
4	8.8	3'35"	0.375
5	9.2	3'50"	

Table-2: Effect of pH on solubilization period of Busulphan in aqueous medium

S.No.	pH	Solubilization period (min/100 mg)	pH gradient (min)
1	4.5	1'10"	0.61
2	5.4	2'05"	0.71
3	7.0	3'20"	1.26
4	8.6	1'18"	1.14
5	9.5	0'15"	

RESULT AND DISCUSSION

The solubilization period of cyclophasphamide for per 100 mg tablet at 4.5, 5.7, 7.0, 8.8 and 9.2 pH was found 0'40", 1'05", 3'15", 3'35" and 3'50" respectively. Thus it may be concluded that the solubilization period increases as pH increases. The pH gradient at successively increasing pH was found 0.20, 1.61, 0.11 and 0.37 min respectively.



In case of busulphan the solubilization period at 4.5, 5.4, 7.0, 8.6 and 9.5 pH was 1'10", 2'05", 3'20", 1'18" and 0'15" respectively. The solubilization period firstly increases with increase of pH and attains the highest value at pH 7.0. After attaining highest value with

increase of pH, solubilization period decreases. pH gradient at these pH is calculated 0.61, 0.71, 1.26 and 1.14 min which refers that with increase of pH, pH gradient increases. On comparison it is revealed that in pure water solubilization period of cyclophosphamide is longer than busulphan. The difference in solubilization period of these drugs may be attributed to chemical constitution of the compounds and their salt formed at different pH.

The aqueous and alcoholic medium significantly affect the solubilization period of the drugs with a marked difference in the quality and the quantity [10].

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