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Analysis of Trimetazidine Hydrochloride and Piribedil using ion Selective Electrode

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Abstract—*The performance of two PVC membrane electrodes containing DOP & DBP are described two electrodes are based on the use of DOP & DBP association compounds Trimetazidine Hydrochloride is 1-[(2,3,4-Trimethorypheny l] Methyl 1]-Piperazine Dihydrochloride (TMH)and Piribedil is 1-(3,4 Methylenediorcybenzyl) – 4,2 –pyrimidyl) piperazine(P D)with TPB & PT.*
The developed electrodes were also analysis is some pharmaceutical formulations. The electrodes are characterized by a wide usable concentrations range of $1.01x10^{-5} - 1 \times 10^{-2}$ *M, Respectively for nearly all the studied electrodes at 25* ^{o}C *by the use of ion exchangers membrane method. That can be use for the direct and measurement of Ions and other species. The use of ion – selective electrodes and potentiometric techniques in the analysis of drugs. Substances are reviewed. Ion–exchangers membrane technologies used for the characterization of these membranes are their applications were also reviewed for the benefit of readers. So that they can get all Information about the Ion- exchanger membranes at one platform.*

KEYWORD: *ION EXCHANGER MEMBRANE BIOSENSORS , ELECTROCAMICAL DEVICES.*

INTRODUCTION

ION-SELECTIVE ELECTRODES

A CHEMICAL SENSOR IS A DEVICE THAT SELECTIVELY, CONTINUOUSLY AND REVERSIBLY TRANSFORMS CHEMICAL INFORMATION, RANGING FROM THE CONCENTRATION OF A SPECIFIC SAMPLE COMPOPNENT TO A TOTAL COMPOSITION, INTO A SINGLE OF A FORM THAT CAN BE PROCESSED BY AN INSTRUMENT **(SUCH AS VOLTAGE, CURRENT OR FREQUENCY)**. ION-SELECTIVE ELECTRODES (ISES) BELONG TO THE MOST WIDELY APPLIED CHEMICAL SENSORS.

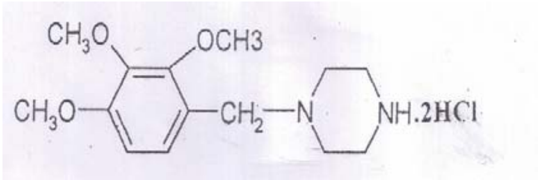
THEY HAVE TWO FUNCTION NAMELY SEELECTION AND TRANSDUCTION. THE FORMAR ASSURES THE REQUIRED SELECTIVITY BEHAVIOR OF THE ION SELECTIVE PART OF THE SENCER THROUGH CHEMICAL INTERATION WITH CHARGE SPECIES OF THE ANALYTE AND THE LATTER THE TRANSHFORMATION OF THESE INTERECATION INTO AN ELECTROCHEMICAL POTENTIAL OF THE MEASUREING (ISE) RELATIVE TO A REFERRNCE ELECTRODE SINCE THE SIGNAL IS PROPORTIONAL TO THE LOGARITHM OF THE ION MOST FRUITFUL EXCITING AND INRTEDISCIPLINARY ARESS OF RESEARCH IN ANALYTICAL CHEMISTRY HERE IN PRESENT STUDY , TWO NEW TRYMETAZIDINE HYDROCHLORIDE AND PIRIBEDIL COMPOUND USING ION SELECTIVE ELECTRODES HAVE BEEN ANALYZED.

METHOD & MATERIAL

There are Two compound have been Analyzed :

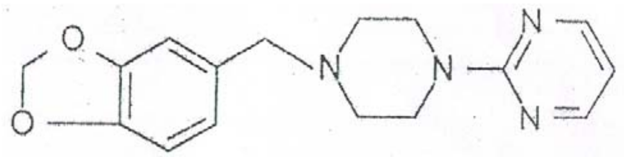
TRIMETAZIDINE HYDROCHLORIDE (TMH)

TRIMETAZIDINE HYDROCHLORIDE IS1-{(2,3,4Trimethoxypheny1)methy1}-piperazine dihydrochloride (TMH). It is used in angina pectoris and in ischaemia of neurosensorial tissues as in menier’s diseases. Trimetazidine hydrochloride with proprietary preparations vastarel, which has been given in divided doses of 40 to 60mg daily by mouth as anti -anginal vasodilator drug.



PIRIBEDIL (PD)

Piribedil is 1-(3, 4-methylenedioxybenzy1)-4-2-pyrimidy1)piperazine (PD) has been shown to be active as a peripheral vasodilator.



Piribedil (PD)

Piribedil is a non-ergot dopamine agonist that has been given by mouth in the treatment of parkinsonism and in circulatory disorders. Piribedil is a dopamine Dragonist while its metabolite is reported to act on D1 receptors. It has been mainly used as an adjunct to levodopa therapy and appears to act more on termor than on other symptoms of Parkinson's disease, althought it was noted that most of the evidence for this came from uncontrolled studies. Piribedil has been tried in the treatment of depression, its adverse effects reported include nausea and vomiting, dizziness, confusion, drawsiness, hypothermia, dyskinesias and occasional change in liver function. The proprietary preparation is Trivastal tablets**.**

Experimental;-

The conventional sensitive electrodes were prepared as described previously. Trials make to attain the optimum membrane composition, result in selecting membranes contained the optimum percentages (in wt %) ion-pairs or ion- associates, PVC and DOP or DBP. The membrane components (totaling 350 mg) were dissolved in THF (10.00) and poured into a 7.5 cm Petridish. Overnight evaporation of the solvent yielded a membrane 0.1 mm thickness, as visually determined by an optical microscope. For each electrode, a disk with 14 mm diameter was punched from the membrane and glued to the polished end of a 2 cm plastic cap attached to one end of a 10 cm glass tube. The electrodes were than filled with 0.1 **M** Nacl + 10^{-3} **M** drug solution and Ag/AgCl wire was immersed in this solution. The resulting electrodes were preconditioned by soaking them for appropriate time in 10^{-3} **M** drug solution.

RESULT AND DISCUSSION;-

The Four electrodes have been prepared and investigated in the present study. The electrodes were based on the incorporation of the ion-exchangers in PVC matrix using DOP or DBP as a platicizer. The optimum composition of membrane were : (5.0% TMH-TPB, 47.5% DOP and 47.5% PVC) and (10.0 % TMH - PT, 45.0 % DBP and 45.0 % PVC), (5.0% PD -TBP, 47.5% DBP and 47.5% PVC) ,(5.0 % PD - PT, 47.5.0DOP and 47.5 % PVC), respectively with slopes ^ 56.5, 57.8, 60.2 and 59.1, mV per concentration decade for TMH - TPB, TMH - PT, PD – TPB, PD – PT respectively. These compositions have been used to carry out all the subsequent studies.

The electrodes are characterised by a wide usuable concentration range of 1.01 x 10^{-5}-1.0 x10^{-2} M, respectively for nearly all the studied electrodes at 25°C.

A method for regeneration of the exhausted electrodes was applied successfully in case of all electrodes.

The change of P^{H} does not affect the potential readings of the studied electrodes within the P^{H} ranges, 3.9-9.0,3.5-10.0, 4.0 - 11.0 and 3.3 – 9.6 for TMH -TPB, TMH - PT, PD - TPB, PD - PT, electrodes, respectively.

The study of the effect of temperature change on the potential response of the electrodes showed that they are thermally stable over a wide range of temperature (20-60°C). The thermal coefficient of the electrodes are 0.00052, 0.00113, 0.00101 and 0.00126V/°C for KTMH-TPB, TMH - PT, PD - TPB, PD -PT, respectively. This reveals that the electrodes have high thermal stability within the usable temperature range.

The investigated drugs were also determined in aqueous solution, using potentiometric titrations, conductimetric titrations and by applying the standard additions method. The study showed that the electrodes under investigation are highly selective even in the presence of some in organic cations, sugars, amino acids and component of the drug formation.

References

[1] A. Hulanicki, S. Glab, F. Ingman, *Pure Appl. Chem.*, **63**, 1247 (1991).

[2] W.E. Morf, The Principles of Ion-Selective Electrodes and of Membrane Transport, Elsevier Science Publishing Company: Amsterdam, Oxford, New York, 1981.

[3] C. K. Knupp, C. Brater, J. Relue and R. H. Barbhaiya, *J. Clin. Pharmacol.*, **33**, 912 (1993).

[4] N. Sonino, J. Endocrinol. *Invest.*, **9**, 341 (1986).

[5] J. Trachtenberg and A. Pont, *Lancet*, **2**, 433 (1984).

[6] T. K. Daneshmend and D. W. Warnock, *Clin. Pharmacokinet.*, **14**, 13 (1988).

[7] E. W. Gascoigne, G. J. Bartone, M. Micheals, W. Meuledermans and J. Heykants, *Clin. Rev.*, **1**, 177 (1981).

[8] A. L. Hume and T. M. Kerkering, *Drug Intelligence and Clin. Pharma.*, 17, 169 (1983).

[9] H. Corrodi, K. Fuxe and V. Ungersted, *J. Pharmacol.*, **23**, 989 (1971).

TABLE 1: PERFORMANCE CHARACTERISTICS OF TMH - ELECTRODES AT DIFFERENT MEMBRANE COMPOSITION

Ion Exchanger	Membrane Composition(%)(W/W)				Slope (mV/decade)	Usable concentration range (mol/L)	RDS* (%)
		DO	DBP	PVC			
TMH-TPB	1.0		--		50.0	2.01x10^{-4}-1.00 x 10^{-3}	0.58
	2.0	49.00	--	49.00	53.0	5.01x10^{-5}-1.00x10^{-3}	0.71
	3.0	48.50	--	48.50	55.8	1.00x10^{-5}-4.7x10^{-3}	0.66
**	5.0	47.50	--	47.50	56.5	1.00x10^{-5}-1.26x10^{-3}	0.75
	7.0	46.50	--	46.50	55.2	2.00x10^{-5}-1.26x10^{-3}	0.63
	10.0	45.50		45.50	53.4	4.90x10^{-5}-5.25x10^{-3}	0.54
	2.0	-	49.00	49.00	51.0	1.00x10^{-5}-1.00x10^{-3}	0.89
	3.0	-	48.50	48.50	52.0	1.00x10^{-5}-1.00x10^{-3}	1.12
	5.0	--	47.50	47.50	54.2	2.00x10^{-5}-1.00x10^{-3}	0.93
	7.0	--	46.50	46.50	53.0	2.00x10^{-5}-1.58x10^{-3}	0.76
	10.0		45.00	45.00	53.0	2.00x10^{-5}-2.51x10^{-3}	0.62
	13.0		43.50	43.50	50.6	3.16x10^{-5}-2.82x10^{-3}	0.79
TMH – PT	3.0	48.50	--	48.50	54.2	1.00x10^{-5}-2.39x10^{-3}	0.95
	5.0	47.50	--	47.50	54.0	1.00x10^{-5}-4.57x10^{-3}	1.12
	7.0	46.25	--	46.25	57.3	5.01x10^{-6}-4.57x10^{-3}	0.83
	10.0	45.00	--	45.00	55.1	2.00x10^{-5}-4.57x10^{-3}	0.62
	12.0	44.00		44.00	52.0	5.01x10^{-6}-4.57x10^{-3}	0.81
	15.0	42.50		42.50	49.6	5.01x10^{-6}-4.57x10^{-3}	0.97
	3.0	--	48.50	48.50	53.5	5.01x10^{-6}-2.40x10^{-3}	0.86
	5.0	--	47.50	47.50	56.2	5.01x10^{-6}-2.40x10^{-3}	0.74
	7.0	--	46.25	46.25	57.1	1.00x10^{-5}-3.16x10^{-3}	0.51
**	10.0	--	45.00	45.00	57.8	1.00x10^{-5}-4.57x10^{-3}	0.46
	13.0	--	43.50	43.50	52.3	2.00x10^{-5}-4.57x10^{-3}	0.72
	15.0	--	42.50	42.50	50.9	2.00x10^{-5}-2.40x10^{-3}	0.84

*Relative standard deviation (Five determination)

*Optimum Composition

TABLE 2: PERFORMANCE CHARACTERISTICS OF TMH - ELECTRODES AT DIFFERENT MEMBRANE COMPOSITION

Ion Exchanger	Membrane Composition(%)(W/W)				Slope (mV/decade)	Usable concentration range (mol/L)	RDS* (%)
		DO	DBP	PVC			
PD-TPB	2.0	49.00	--	49.00	36.7	5.01x10^{-6}-5.01 x 10^{-4}	1.14
	3.0	48.50	--	48.50	42.5	1.00x10^{-5}-6.31x10^{-3}	0.81
	5.0	47.50	--	47.50	45.0	2.16x10^{-5}- 1.01x10^{-2}	0.70
	7.0	46.50	--	46.50	44.2	2.00x10^{-5}-1.74 x10^{-2}	1.25
	10.0	45.50	--	45.00	35.4	2.00x10^{-5}-1.00x10^{-2}	1.31

	2.0	--	49.00	49.00	50.3	$3.15x10^{-5}$-$5.01x10^{-3}$	0.83
	3.0	--	48.50	48.50	52.3	$2.00x10^{-5}$-$5.01x10^{-2}$	0.57
**	5.0	-	47.50	47.50	57.1	$2.00x10^{-5}$-$1.00x10^{-2}$	0.49
	7.0	--	46.50	46.50	50.0	$1.00x10^{-5}$-$3.98x10^{-2}$	0.74
	10.0	--	45.50	45.00	46.7	$6.31x10^{-5}$-$1.00x10^{-2}$	0.92
PD - PT	1.0	49.50	--	49.50	53.2	$2.00x10^{-5}$- $4.47x10^{-2}$	0.68
	3.0	48.50	--	48.50	57.0	$1.00x10^{-5}$- $6.03x10^{-3}$	0.46
	5.0	47.50	--	47.50	60.0	$1.02x10^{-5}$- $1.00x10^{-2}$	0.76