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Synthesis and antiviral activity of 2-3,5 dinitropheny1-5-substituted phenyl 1,3,4-oxadiazoles

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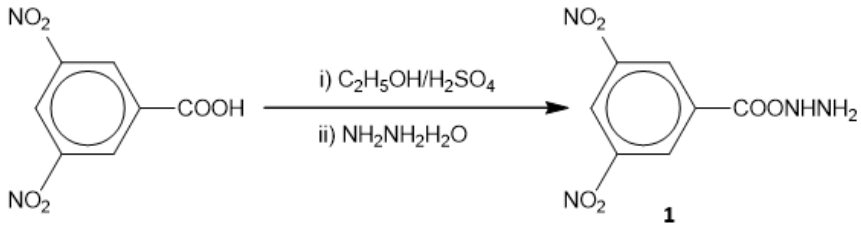
Abstract
3, 5 dinitro benzoic acid hydrazide was prepared by the hydrazinolysis of the corresponding ethyl ester. Condensation of this hydrazide with different aromatic acids in presence of $POCl_3$ gave 2-3, 5 dinitropheny1-5-substituted pheny1 1, 3, 4-oxadiazoles. All the final compounds were tested against Ranikhet Disease Virus (RDV). However no compound showed antiviral activity against RDV.

Keywords: oxadiazoles, 3, 5 dinitro benzoic acid, ranikhet disease virus

Introduction
Different oxadiazoles have been found to be associated with varying antiviral activity [1-4] Some oxadizoles have been found to be virucidal against Ranikhet Disease Virus (RDV) [5]. Based on these observations the synthesis of 2-3, 5 dinitropheny1-5-substituted pheny1 1, 3, 4-oxadiazoles was carried out and all compounds were tested against Ranikhet Disease Virus (RDV). Certain viruses may cause cancer[6] and it is possible to reactivate the tumor suppressor genes [7].

Scheme



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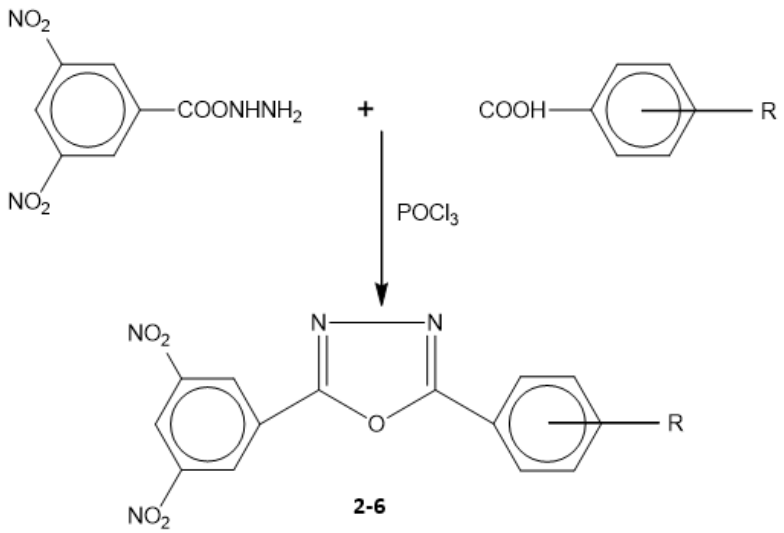

2-6

Methodology

3, 5 dinitrobezoic acid hydrazide (1)

It was prepared by the method reported earlier [8].

A mixture of 3, 5 dinitro benzoic acid (10.6 gm), absolute ethanol (4.6ml), conc. H_2SO_4 (1.5 ml) and sodium dried benzene (12 ml) was refluxed for 16 hrs. Ether (20ml) was added to the cold reaction mixture and the ethereal extract was washed successively with $NaHCO_3$ solution followed by water. It was dried over $MgSO_4$ and the solvent distilled off on a water bath. The last traces of benzene were removed by heating in an open evaporating dish on a water bath to get the solid 3, 5 dinitrobenzoate.

3, 5 dinitrobenzoate (0.1 mole) thus obtained was dissolved in 100ml of absolute methanol and refluxed with hydrazine hydrate (0.15 mole) on a water bath for 10 hrs. The excess solvent was distilled off under reduced pressure and the crude hydrazide thus obtained was filtered and recrystallised from ethanol.

1. R= 3, 5 dinitro. m.p. 157^0 C [158^0C][6], yield 70%

2-3,5 dinitropheny1-5-substituted-phenyl 1,3,4 oxadiazoles (2-6)

A mixture of 3, 5-dinitro benzoic acid hydrazide (33) (0.015 mole) and an aromatic acid (0.91 mole) in $POCl_3$ (15 ml) was refluxed for 5 hrs. on a wire gauze. The cooled reaction mixture was poured in ice cooled water made basic by $NaHCO_3$ solution. The resulting product was filtered, dried and recrystallised from methanol or chloroform. Compounds thus synthesised are recorded in Table-1.

Table 1: Characterisation data of 2-3,5 dinitropheny1-5-substituted phenyl 1,3,4-oxadiazoles

Compound No.	R	Molecular Formula	M.P. (^{0}C)	Analysis (%) (calculated)			Analysis (%) (found)		
				C	H	N	C	H	N
2	4-NH_2	$C_{14}H_9N_5O_5$	260	51.38	2.75	21.41	51.20	2.52	21.30
3	4-NO_2	$C_{14}H_7N_5O_7$	200	47.06	1.96	19.61	47.02	1.82	19.31
4	4-Cl	$C_{14}H_7N_4O_5Cl$	210	48.48	2.02	16.16	48.32	2.00	16.09
5	2-Cl	$C_{14}H_7N_4O_5Cl$	190	48.48	2.02	16.16	48.20	2.02	16.09
6	2-NH_2	$C_{14}H_9N_5O_5$	220	51.38	2.75	21.41	51.00	2.50	21.00

IR (KBr)

Compounds showed IR spectral bands at 1610-1600 (C=N), 1280-1270 (C-O), 1530-1330 and 1315-1310 (NO_2).

PMR ($CDCl_3$)

Compound 5: 7.06-7.80 (m, 7H, Ar-H)

Antiviral activity against RDV

Compounds were tested against RDV in a stationary culture of minced chorioallantoic membrane of chick embryo. The strain of the Ranikhet Disease Virus was the same as employed by Babber and Dhar [9]. Chorioallantoic membrane (CAM) of 10 days old chick embryos were taken and the culture prepared according to the method of Babbar [10, 11]. The soluble compounds were dissolved in a nutrient fluid and the insoluble compounds were suspended in it in the presence of Tween 80 and the pH adjusted to 7.2 before sterilization. The solutions were then sterilized by autoclaving at 15 lbs pressure for 15 min. Two fold serial dilutions were then made and 1 ml of each dilution added to each of the test tubes containing the CAM culture. The dilution of a compound causing toxic symptoms in 50% of the CAM culture was taken as the end point. The highest nontoxic dose was given to each culture along with the virus (0.64 HA units/ml). Virus multiplication was measured by the haemagglutination (HA) titre (mean of $\log_2$) of the culture collected after 48 hrs of incubation at 37 °C. Inhibition in virus multiplication was obtained by subtracting this titre from that of the control. The mean difference (d) of 2 $\log_2$ HA units is significant at 50% or more than 50% level.

Table 2: Antiviral activity of compounds (2-6) against rdv

Compound No.	Percent inhibition against RDV
2	0
3	0
4	0
5	0
6	0

Compounds were tested at the dose of 0.1 mg/ml. against 0.064 units/ml of virus

Results and discussion

Compounds 2-6 (Table-1) were tested against RDV. The results of activity mentioned in Table-2 show that no compound was found to be active against the virus

References

1. Tashfeen Akhtar, Shahid Hameed, Najim Al-Masoudi. Roberta Loddo and Polo Colla Acta Pharmaceutica, 2008, 58(2).
2. Li Z, Zhan P, Liu X. Mini Reviews in Medicinal Chemistry, 2011.
3. El Eman AA, Al-Deeb OA, Al-Qmar M. Bioorganic and Medicinal Chemistry. 2004; 12:5107-5113.
4. Hennen William J, Robins Roland K. J Heterocycl. Chem. 1985; 22(6):1747-8.
5. Nigam R, Swarup S, Saxena VK, Singh HK. Cheminform, March, 2010.
6. Masroor MS, Parween S, Salim M, Prajapati IP. A note on hepatitis viruses causing cancer in human. Int. J Biol. Innovations. 2020; 2(2):126-28.
7. Saha D, Vaishnav N, Ahsan Z, Rani N, Mathur R, Jha AK. Reversal of hypermethylation and reactivation of Tumor Suppressor Genes due to natural compounds in Breast Cancer Cells. International Journal of Biological Innovations. 2020; 2(1):63-75.
8. Beilstein Handbuch Der Organischen, Chemie. 1926; 9:414.
9. Babbar OP, Dhar MM. J Sci. Ind. Res. 1956; 15c:249.
10. Babbar OP, J Sci. Ind. Res. 1961; 20c:216.
11. Babbar OP, J Sci. Ind. Res. 1961; 20c:232.