ANTI OXIDANT ACTIVITY OF NEW INDOLE DERIVATIVES

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ABSTRACT

Forty two New 2-[(benzalamino-4-hydroxybenzyl) (1,3,4)-oxadiazino[6,5-b]] Indole derivatives (V) have been synthesized by condensing 2-Amino-4-[(1,3,4)oxadiazino[6,5-b]indole-3-yl]-phenol (IV) with various aromatic aldehydes. The intermediates, on the other hand, have been synthesized by the cyclization of 3-Amino-4-hydroxy-benzoic acid (2-oxo-1,2-dihydro-indol-3-ylidene)-hydrazide (III) in presence of Concentrated H_2SO_4. The title compounds have been purified and characterized by their analytical and spectral data. They have screened for their antioxidant activity and all the forty two compounds showed very good antioxidant activity with IC_{50} values in the range 7.45 to 12.89 µM. Most significant of them was found to be compound V(10) showed the highest percentage of free radical scavenging activity with IC_{50} value of 7.45 µM, which nearest to the IC_{50} value of standard Ascorbic acid (IC_{50} 5.87 µM).

KEY WORDS: (1,3,4)-oxadiazino-[6,5-b]indole, Isatin derivatives, Antioxidant Activity.

1.INTRODUCTION

It is known from the literature that indole derivatives exhibit varied biological and pharmacological properties(Sarangapani,2001;Pandeya,2003; Sarangapani,1998;Khan, 2003;Singh,1983;Anku patel,2006;Bari,2008) viz. antimicrobial, antiviral, anti neoplastic, analgesic, CNS activities. In view of theses observations the synthesis of new (1,3,4)oxadiazino-[6,5-b]- indole derivatives(V) has been carried out.

For this purpose the required indole-2,3-diones (I) were prepared and condensed with 3-amino-4-hydroxybenzoicacidhydrazide(II) in ethanol to get the respective 3-Amino-4-hydroxy-benzoic acid (2-oxo-1,2-dihydro-indol-3-ylidene)-hydrazide (III). These compounds were cyclized using concentrated sulfuric acid to get respective 2-Amino-4-[(1,3,4) oxadiazino[6,5-b]indole-3-yl]-phenol (IV)These compounds were refluxed with aromatic aldehyde, ethanol and few drops of acetic acid to get the title compounds. The compounds were characterized by their physical, analytical and spectral data (IR and PMR,MASS). The data on Anti Oxidant activity is presented in Table.

2.METHODS

Experimental Antioxidant activity

Antioxidant activity was carried out by using DPPH method(Blois,1958), which is based on the decrease in absorbance of DPPH radical due to the donation of hydrogen by the test compound. It is visually noticeable as a discoloration from purple to yellow colour. 0.2 ml of DPPH (0.05mM) solution was added to 2.8 ml of test compounds in a test tube wrapped with aluminium foil and its absorbance was read at 517 nm using UV-Visible double beam spectrophotometer. The results were plotted on a graph and IC_{50} values of the test compounds were determined. Ascorbic acid was used as reference compound (IC_{50} 5.87 µM).The results are presented in Table .

3.RESULTS AND DISCUSSION:

All the forty two compounds showed very good antioxidant activity with IC_{50} values in the range 7.45 to 12.89 µM. Most significant of them was found to be compound V(10) showed the highest percentage of free radical scavenging activity with IC_{50} value of 7.45 µM, which nearest to the IC_{50} value of standard Ascorbic acid (IC_{50} 5.87 µM).But, however, it is interesting to note that a few of this series of compounds V(13), V(3), V(9), V(12) and V(8) showed relatively high percentage inhibition with IC_{50} values of 7.76, 7.78, 7.87, 7.88, 7.94 µM, respectively and the rest of the compounds showed moderate percentage of free radical scavenging activity.

4.ACKNOWLEDGEMENTS

The authors are thankful to the Prof.Dr.B.Agaiah,Principal,SRR.College of Pharmaceutical Sciences for providing necessary facilities to carry out this Research Work

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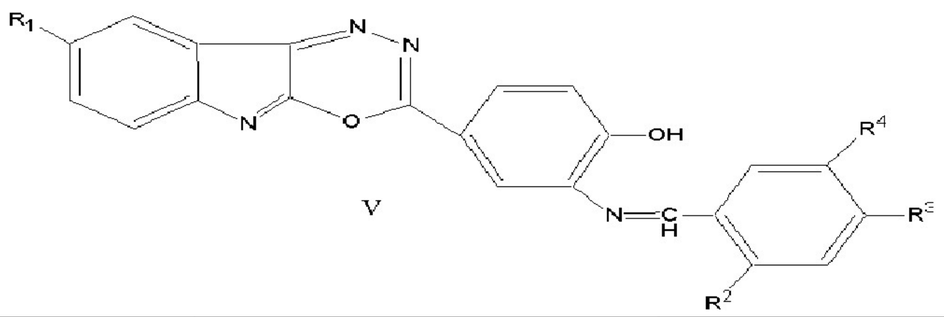
Table : Data on Anti-oxidant Activity of New [1,3,4]oxadiazino-[6,5-b]indole derivatives



V

Compound	Substituents				IC_{50} Value (µM)
	R^1	R^2	R^3	R^4	
V(1)	H	H	H	H	10.44
V(2)	H	H	Cl	H	8.21
V(3)	H	OH	H	H	7.78
V(4)	H	H	OCH_3	H	11.00
V(5)	H	H	OCH_3	OCH_3	9.45
V(6)	H	H	$N(CH_3)_2$	H	10.45
V(7)	H	H	OH	OCH_3	10.22
V(8)	Br	H	H	H	7.94
V(9)	Br	H	Cl	H	7.87
V(10)	Br	OH	H	H	7.45
V(11)	Br	H	OCH_3	H	7.79
V(12)	Br	H	OCH_3	OCH_3	7.88
V(13)	Br	H	$N(CH_3)_2$	H	7.76
V(14)	Br	H	OH	OCH_3	7.99
V(15)	NO_2	H	H	H	11.77
V(16)	NO_2	H	Cl	H	11.66
V(17)	NO_2	OH	H	H	10.58
V(18)	NO_2	H	OCH_3	H	10.75
V(19)	NO_2	H	OCH_3	OCH_3	9.25
V(20)	NO_2	H	$N(CH_3)_2$	H	12.45
V(21)	NO_2	H	OH	OCH_3	9.88
V(22)	F	H	H	H	8.45
V(23)	F	H	Cl	H	8.87
V(24)	F	OH	H	H	7.55
V(25)	F	H	OCH_3	H	8.05
V(26)	F	H	OCH_3	OCH_3	8.00
V(27)	F	H	$N(CH_3)_2$	H	7.99
V(28)	F	H	OH	OCH_3	8.60
V(29)	Cl	H	H	H	9.01
V(30)	Cl	H	Cl	H	9.20
V(31)	Cl	OH	H	H	8.65
V(32)	Cl	H	OCH_3	H	9.10
V(33)	Cl	H	OCH_3	OCH_3	9.99
V(34)	Cl	H	$N(CH_3)_2$	H	9.24
V(35)	Cl	H	OH	OCH_3	9.87
V(36)	CH_3	H	H	H	12.45
V(37)	CH_3	H	Cl	H	12.89
V(38)	CH_3	OH	H	H	8.65
V(39)	CH_3	H	OCH_3	H	10.00
V(40)	CH_3	H	OCH_3	OCH_3	12.65
V(41)	CH_3	H	$N(CH_3)_2$	H	10.56
V(42)	CH_3	H	OH	OCH_3	9.55
ASCORBIC ACID					5.87

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