

Synthesis of 2-(3-bromophenyl)-4-(4-methoxybenzylidene)-5-oxazolone

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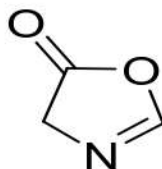
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Abstract:

Oxazolones are five membered heterocyclic entity containing oxygen and Nitrogen. It is important synthons for the synthesis of various biologically active compounds and is an important pharmacophore of synthesized drugs. Oxazolone is being synthesized in many ways since 1883. It shows marked pharmacological activity such as: antimicrobial, antifungal, anti-diabetic, anti-cancer, and anti-inflammatory. In present article we review the mechanism of oxazolone formation, its chemistry, diversity oriented synthesis of oxazolone.

INTRODUCTION

In the field of Medicinal chemistry, the family of heterocyclic compounds containing Nitrogen, sulphur and oxygen as hetero atoms in five and six membered ring structure plays an important role. Oxazolone are one of those five membered heterocyclic compounds which are in three isomeric forms, one according to the location of the carbonyl group and two according to the location of double bond containing.[1, 2]



Oxazolones are important intermediate for the synthesis of several compounds such as amino Alcohols, amides¹, amino acids²⁻³ dyes³⁻⁴, heterocyclic precursors, biological active compounds as well as biosensors coupling and photosensitive composition devices for proteins. Oxazolone is crucial for the manufacturing of various biologically active drugs. 6-β-Naltrexol is the major active metabolite of naltrexone, a potent μ-opioid receptor antagonist used in the treatment of alcohol dependence and opioid abuse. Chemical structure of the carbonate co drug, CB-NTXOL-BUPOH, consisting of 6-β-naltrexol covalently linked by carbonate ester linkage to modified form of hydroxybupropion (bupropion with oxazolone)⁵. Posizolid is an oxazolidinone antibiotic effective against phase 2 Tuberculosis is under investigation⁶, Deflazacort, contains oxazolone scaffold derived from prednisone, has anti-inflammatory and immunosuppressive effects⁷, ZHD-0501, is a metabolite of staurosporine(STA) an along with an oxazolone scaffold which inhibit the proliferation of several human and murine cancer cell lines⁸.

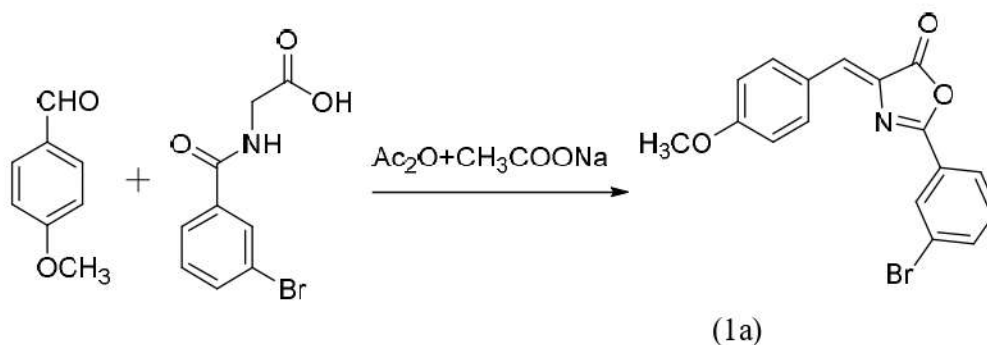
Preparation of 2-(3-bromophenyl)-4-(4-methoxybenzylidene)-5-oxazolone.

Method: 4-Methoxy benzaldehyde and 3-bromobenzoic acid were taken in equimolar (0.05mol) proportion and dissolved in acetic anhydride. To this solution, added 4.1gms of anhydrous sodium acetate. The reaction mixture was refluxed for two hours and kept overnight. The crystalline solid formed was washed with water-ethanol mixture and recrystallized from ethanol.

Yield: 60%

Melting point: 115°C

Reaction:



Properties and Constitution of the Compound (1a)

1. It is a yellow crystalline solid having melting point 115°C
2. It decolorized alkaline KMnO_4 indicating $\text{HC}=\text{C}$ linkage.
3. It gave positive test for nitrogen.
4. With 1% solution of *m*-dinitrobenzene, it gave red colour on addition of dilute NaOH solution indicating presence of carbonyl group ($\text{C}=\text{O}$).
5. From analytical data, the molecular formula of the compound was found to be $\text{C}_{17}\text{H}_{12}\text{NO}_3\text{Br}$, molecular weight 358.19.

Experiment No.	Compound	Melting point	Yield
1.	1a	115°C	60%

6. The IR spectrum³³⁵⁻³³⁷ of the compound (1a) (Spectrum No. 1) showed the following main absorption bands.

Absorption Observed (cm^{-1})	Assignment	Literature Value (cm^{-1})
3164	Ar-C-H str	3100-3000
1638	C=O str	1850-1630
1537	C=N str	1600-1500
1250	C-N str	1360-1200
692	C-Br str	800-600

7. The ^1H NMR spectrum³³⁵⁻³³⁷ of the compound (1a) (Spectrum No. 2) showed the chemical shifts which can be correlated as given below.

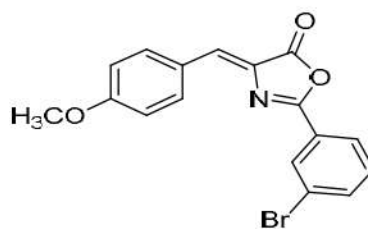
Chemical Shifts (δ)	Multiplicity	Assignment
8.17-8.05	d	2H, Ar-H
7.89-7.88	d	2H, Ar-H
7.85-7.83	d	1H, Ar-H
7.62-7.60	d	2H, Ar-H

7.29	s	1H, Ph-CH
6.94-6.93	t	1H, Ar-H
3.88	s	3H, Ar-OCH ₃

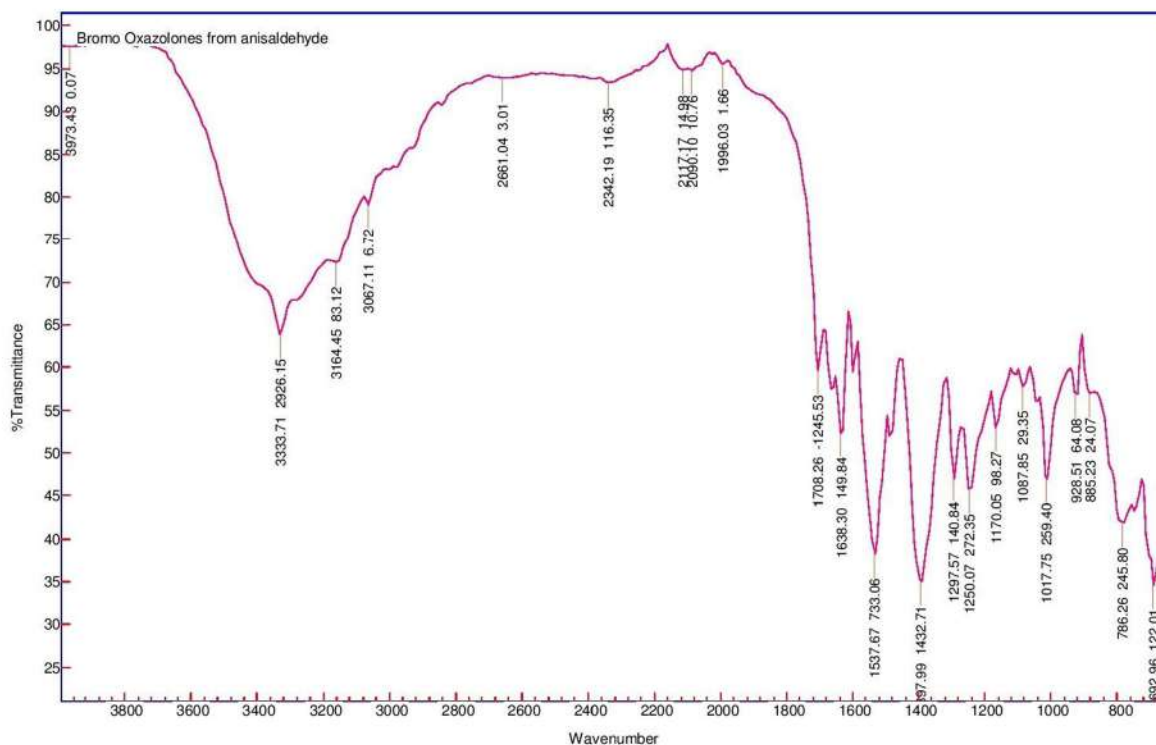
8. Elemental Analysis for C₁₇H₁₂NO₃Br (358.19)

Element (%)	C	H	N	Br
Calculated	57.01	3.38	3.91	22.31
Found	56.90	3.30	3.88	22.20

On the basis of chemical properties, elemental and spectral analysis of the compound 1a was assigned the structure as 2-(3-bromophenyl)-4-(4-methoxybenzylidene)-5-oxazolone.

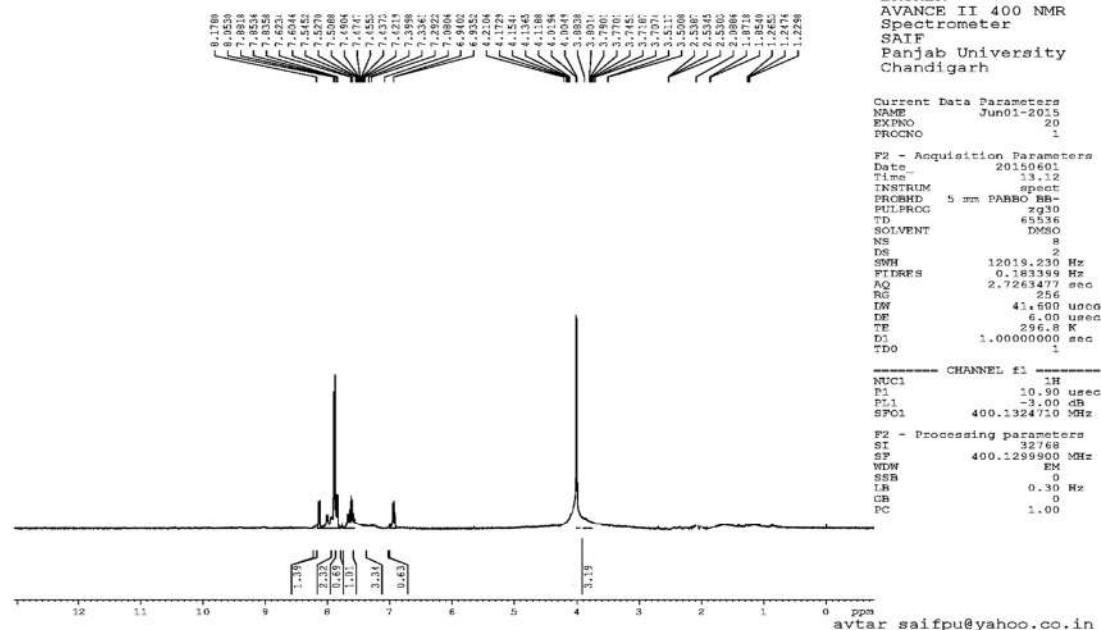


(1a)



SPECTRUM NO. 1

Br (01)



SPECTRUM NO. 2

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