

|| Index ||

- 01) Study of Influence of Micro Strain, Porosity and Hopping Length of
R. B. Bhise, Pune || 09
- 02) Study of antifungal activity of 2-[(1-Naphthalen-1-yl-ethylimino)-
Sheetal V. Palande, Dr. Deelip K. Swamy, Nanded || 15
- 03) Some interesting aspects of interaction of 1-tetra-O-acetyl β
Dr. Mrs. Aruna R. Hardas, Nagpur || 19
- 04) SYNTHESIS AND STUDY OF ANTIMICROBIAL ACIVITY OF.....
SURYAKANT B. BORUL, Lonar, S.V. AGARKAR, Digras. || 22
- 05) FACILE AND SIMPLE MICROWAVE ASSISTED SYNTHESIS OF CURCUMIN
Mahesh Shioorkar, Milind Ubale, Aurangabad. || 25
- 06) SYNTHESIS OF PHARMACOLOGICALLY ACTIVITIVE 1-(7-NITRO
Meghasham N. Narule, Vibha Nikase, Wardha.. || 28
- 07) Choline-glycolate green and reusable ionic liquid; a novel efficient
Beg Nawaj Ali, Maqdoom Farooqui, Aurangabad. || 33
- 08) Synthesis of Schiff base from 3-Formylchromone and 4-Nitrosulphonamide
S.K. Ghumbre, S.M. Bhagat, S.S.Sagar, Khed, Dist. Ratnagiri || 37
- 09) Microwave assisted synthesis and characterization of some novel
Dr. Y.K. Meshram, Ku. Rupali M. Mahalle, Ku, Jyoti M. Laghe, Chandrapur || 40
- 10) Alum Catalyzed Microwave Irradiated Solvent Free Synthesis of
Omprakash S. Chavan, Jalna Mohammad A. Baseer, Nanded. || 42
- 11) Mixed ligand complexes of zinc metal ion with antibacterial drug
Shailendrasingh Thakur, S.A. Peerzade, A.J. Khan, R.L.Ware, Beed || 47
- 12) Capital Formation in Agriculture: Problems and Bankers Obligations
Ms. Snehal Bhosale, Vijaypur || 42
- 13) Triethylammonium Hydrogen Sulfate as an Efficient Ionic Liquid
Atul S. Renge, Karjat, Sushil K.Gumbre, Khed, || 54

14) Synthesis and Antimicrobial Activity of Various Pyrazoline From	58
Shrikant A. Patil, Mangesh V. Kadu, Malkapur- Dist. Buldana.	
15) MICROWAVE SYNTHESIS AND ANTIMICROBIAL STUDIES OF TRANSITION	60
K.K. Wavhal and S. B. Borul, Lonar, Dist Buldana.	
16) Estimation of Total flavonoid and antioxidant activity of Tradescantia	64
Pavan M. Kadam, Deulgaon Raja, Dr. D. R. Munde, Nanded.	
17) A Novel approach towards the Synthesis of Furoquinolines Strong	68
Ganesh B. Akat, Khultabad.	
18) Synthesis of some substituted Schiff bases and to study their addessive	73
Dr. Y. K. Meshram, Dr. Kirtiwardhan R. Dixit, J . M . Laghe, R. M . Mahalle	
19) Microbiological and Physicochemical Assessment of Drinking water	76
Mr. S.S. Anjanikar, Naigaon, Dr. S.S. Chandole, Purna	
20) Synthesis of pyran derivatives by using ferrite Nanoparticles	80
Sudarshan D. Tapsale, K. M. Jadhav, D. V. Mane, S. G. Patil	
21) An efficient synthesis of benzodiazepine derivatives under	82
Asghar Jafar khan, Mohammad Abdul Baseer, Mohammed Zamir Ahmed, S. V. Thakur	
22) Thermodynamic properties of binary liquid mixtures of 2- Butanone	85
S. B. Lomate, M. J. Bawa, M. K. Lande, B. R. Arbad, Shirur (Ka.).	
23) Phytochemical extraction and antimicrobial activity of Azadirachta	89
B. U. Kale, P. B. Pawar, R. T. Parihar, Deulgaon Raja	
24) Removal of Lead and Copper from aqueous solution using different	94
Rashmi R. Sharma, Dr. S. R. Warhate, Kelapur	
25) A Study of Electrical and Dielectric Properties of Binary Mixtures of	97
S B Shinde, R N Mathpati, M A Joshi, D N Rander, Y S Joshi, K S Kanse.	
26) PHYTOCHEMICAL ANALYSIS OF FENUGREEK SEED	101
Dr. Prerana P. Bhatkar, Anjangaon Surji	
27) Alum catalyzed one pot three component synthesis of Pyrano.....	103
Khandu D Warad, Chandrashekhar G Devkate, Ramkrushna P Pawar, Rajiv Khobre, AmitTayade	

28) Study of Physico chemical Analysis of Terna River Water at the Polluted Shoeb Peerzade, S. V. Thakur, Mazhar Farooqui, Sayed Abed, Beed.	106
29) The Physico-Chemical Properties of binary liquids mixtures of M.Bawa, S. Lomte, M. Lande, B. Arbad, Deulgaon Raja.	109
30) Study of antimicrobial activity of 2-Methoxy-6-[(1-naphthalen-1-yl-ethyl)imino]..... Sheetal V. Palande, Dr. Deelip K. Swamy, Nanded.	112
31) Assessment of Heavy metals in Drinking water and ground water sources..... Moharir S. P., Sinkar S. N., Jalna	116
32) Nanotoxicity : A Hazardous Approach Towards A Nanoworld Sunil M. Chore, Kelapur	119
33) Synthetic Study and Interaction of Cobat (II) Complexes with Different types Ganesh Babasaheb Akat, Khultabad.	122
34) A THERMODYNAMIC STUDY OF ACRYLATES AND 2-HEXANOL SUJATA S. PATIL, JALNA	128
35) A Mathematical Insight into Chemical Sciences: With Special Vishakha Walia	131
36) Ethanol sensing properties of Ga doped ZnO Thin Films E. U. Masumdar, Latur, M. A. Barote, Ausa	134
37) EFFECT OF CHELATING AGENT AND ITS METAL COMPLEXs ON SEED Bhagat. T. M., Umarkhed.	137
38) Molecular Interaction Study of Binary mixtures of DMSO with Water M A Joshi, S B Shinde, R N Mathpati, D N Rander, K S Kanse, Y S Joshi	142
39) "NONCONVENTIONAL METHODOLOGIES ARE EXCELLENT TOOLS FOR C.S. Patil, Aurangabad, Sonali S. Chine, Kopargaon.	146
40) Review on Recent Developments and Applications in Green Nanocomposites Dr. Prashant R. Mahalle, Sakharkherda	152
41) Thiamine Hydrochloride Catalyzed Green Synthesis of Benzoin PAWAN P. KALBENDE, NILESH B. JADHAV, ACHALPUR	155

- 42) Synthesis and study of Biological active ligands and Zinc (II) metal complexes
Mr. S.S. Anjanikar, Naigaon. || 159
- 43) Thiadiazoles and its biological activities: A review
Bharat K. Dhotre, Mantha. || 160
- 44) ANTI-MICROBIAL STUDY OF SUBSTITUTED FLAVONES
S. L. Sayre, P. B. Raghuvanshi, Amravati. || 160
- 45) Antimicrobial Study of Ligands and their metal complexes of Mn(II) and Co(II)
S. S. Chandole, Purna Jn.. || 161
- 46) Synthesis of Chalcone from Schiff Base derived from 3-Amino Acetophenone
A. R. Mehetre, S. R. Deshmukh, V. N. Bhosale, Kannad. || 161
- 47) Highly regio-selective hydroformylation of biomass derived eugenol using aqueous
Samadhan A. Jagtap, Eric Monflier, Anne Ponchel, Bhalchandra M. Bhanage. || 162
- 48) "An Efficient One-pot Synthesis of Naphthooxazine Derivatives"
Suresh C. Jadhavar, Ambajogai || 163
- 49) Kinetics of Permagnetic oxidation of 4-amino Acetophenone and 4-hydroxy
Bhagwansing Dobhal, Ravindra Shimpi, Rajesh Fadat, Jalna. || 163
- 50) Comparative kinetic and mechanistic study of oxidation of Antibiotics by
Ravindra Shimpi, Rajesh Fadat, Bhagwansing Dobhal, D M Janrao,
Mazahar Farooqui, Jalna. || 165
- 51) Bioinformatics study of Operational Taxonomic Units of fish Anabas
Kendre T. U., Pagare S. D., Rankhamb S. V., Kalyankar V. B. || 166
- 52) Mixed ligand complexes of zinc metal ion with antibacterial drug
S. V. Thakur, M. A. Sakhare, S. N. Sampal, H.U. Joshi, Beed || 169
- 53) "An Efficient Synthesis of Naphtho-oxazine derivatives using Zinc
Virbhadra G. Kalalawe, Dashrath R. Munde, Raoji D. Gutte || 173

An efficient synthesis of benzodiazepine derivatives under environmentally benign conditions

Asghar Jafar khan,

S. V. Thakur

Organic Chemistry Research Laboratory,
Milliya College, Beed.

Mohammad Abdul Baseer,

Organic Chemistry Research Laboratory,
Yeshwant Mahavidyalaya, Nanded.

Mohammed Zamir Ahmed,

Organic Chemistry Research Laboratory,
Poona College, Camp Pune.

Abstract:

An efficient and clean synthesis of benzodiazepines is described by the reaction of o-phenylenediamine with various types of Chalcones in the presence of catalytic amounts of Lanthanum Nitrate under mild conditions at room temperature in excellent yields, the products were tested for purity by TLC and characterized by M.P, IR and ¹H NMR spectral studies.

Keywords : La (NO₃)₃. 6H₂O, o-Phenylenediamine, Chalcones, mild conditions.

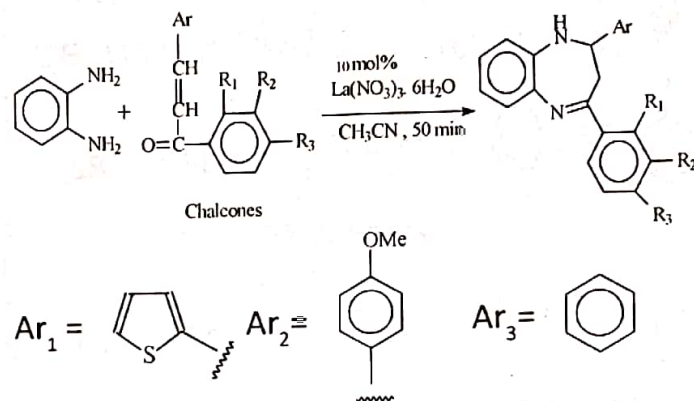
INTRODUCTIONS:

The organic transformation using reusable and water tolerant catalyst in recent years received much attention. Use of water tolerant catalyst is an ideal methodology since they can conveniently be handled and make the experimental procedure simple and ecofriendly [1]. The synthesis of benzodiazepine derivatives

have received a great deal of interest as they are widely used class of bioactive compounds due to their remarkable biological and pharmacological properties. [2,3] such as antianxiety, hypnotic, tranquilizing, anti-inflammatory, anticonvulsant, antifeedant, antibacterial, analgesic, sedative and anti-depressive properties. [2]. The benzodiazepine derivatives also used as valuable precursors in the synthesis of various fused heterocyclic systems [4] such as triazolo-, oxazino-, oxadiazolo- and furano-benzodiazepines. In addition to this some benzodiazepines are used in fine chemical industries such as photographic dyes for acrylic fibers [5]. In view of their biological and pharmacological importance in the literature few methods for their preparation have been reported. These include condensation of *o*-phenylenediamine with α,β -unsaturated compounds [6], α -haloketones or ketones in the presence of catalyst such as Yb (OTf)₃ [7], InBr₃ [8], BF₃-etherate [9], Amberlyst-15, [10] ionic liquid, [11] SbCl₃-Al₂O₃, [12] and Zn[L-Proline]₂, [13], TBAB [14], SiO₂ [15], Citric Acid [16], Acetic Acid –under MWI, [17], [18], Zirconium Oxychloride [19], Ag₃PW₁₂O₄₀, [20] AgNO₃ [21], Cu-bronze [22], Zirconia solid acid, [23], Chloroacetic acid [24], Silica gel using ultrasound [25] but unfortunately, few of the reported processes suffer from major or minor limitations. In view of current interest in catalytic processes, there is a advantage in developing synthesis of benzodiazepines using inexpensive, mild and non-polluting reagent. To contribute our efforts, we investigated the synthesis of 2, 3-dihydro-1, 5-benzodiazepines catalyzed by La (NO₃)₃ · 6H₂O though it is reported [26] in the literature for the synthesis of 1, 5-benzodiazepines, but it is for their synthesis from ketones. The present work involves novel chalcones as starting material for the synthesis of new 1, 5-benzodiazepine derivatives using La (NO₃)₃ · 6H₂O as a catalyst. In conclusion the present procedure for the

synthesis of benzodiazepines in presence of catalytic amount of La (NO₃)₃ · 6H₂O has the advantage of mild reaction conditions, inexpensive catalyst with high yields of products and simple experimental work-up which makes it is a useful and important addition to the present existing methods.

Scheme-I

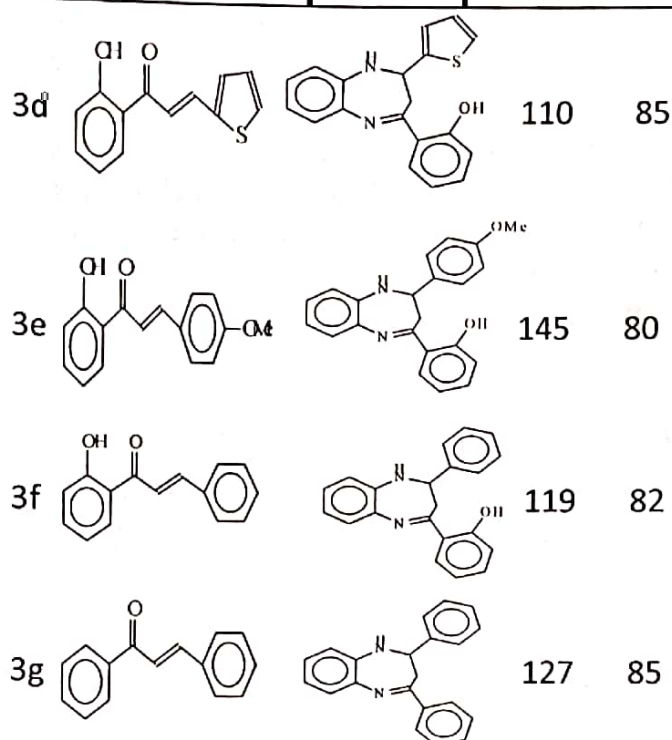


Entry	R ₁	R ₂	R ₃	Ar
3a	H	H	OH	Ar ₁
3b	OH	Cl	H	Ar ₁
3c	OH	Cl	Me	Ar ₁
3d	OH	H	H	Ar ₁
3e	OH	H	H	Ar ₂
3f	OH	H	H	Ar ₃
3g	H	H	H	Ar ₃

Table-I: Synthesis of benzodiazepines(3a-g) using lanthanum Nitrate as an efficient and mild Catalyst.

Entry Chalcones Products M.P (°C) Yield (%)

3a			138	80
3b			190	85
3c			155	84

**Experimental Procedure:**

A mixture of o-Phenylenediamine (1 mmol), Chalcones (1 mmol), and $\text{La}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$ (10 mol %) in 10 mL of MeCN was stirred at 50°C for 50 min. After completion of the reaction as monitored by TLC [eluent: ethyl acetate: pet. ether (3:7)], the crude product washed with water and extracted into ethyl acetate and purified by column chromatography to afford pure 2, 4-disubstituted-1, 5-benzodiazepines (3a-g) in 80-85% yield [Scheme-I]. The formation of 1,5-benzodiazepine derivatives was ascertained by their M.P and spectral analysis (IR, ^1H -NMR and Mass). Their M.P and Yields are Shown in Table-I.

The catalyst was recovered from the aqueous layer by evaporation under reduced pressure and can be reuse. From the results (Table -I) it is clear that $\text{La}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$ is an efficient catalyst for the synthesis of 1, 5-benzodiazepines under environmentally benign conditions.

Characterizations

All ^1H NMR spectra were recorded in CDCl_3 / DMSO-d_6 on a Bruker AC 200 and Bruker MSL 300 spectrometers and chemical shift were reported in ppm downfield from tetramethylsilane. Infrared spectra were recorded on a PerkinElmer infra-red spectrophotometer

using KBr discs, TLC was performed on silica gel coated aluminum plates using ethyl acetate and pet ether (3:7 v/v) as eluent, melting points were determined on an electronic melting point apparatus and were uncorrected.

Compound 3a :

^1H NMR (CDCl_3) : δ = 3.70(t, 1H, $J=12.2\text{Hz}$), 3.4 (dd, 1H, $J=12.2\text{Hz}$, 4.4Hz), 4.46(s, 1H), 5.0(dd, 1H, $J=12.2\text{Hz}$, 4.4Hz), 6.2-7.2 (m, 11H). MS [m/z] : 321 (M^+)

Compound 3b:

^1H NMR (DMSO-d_6) : δ = 3.4(s, 1H, NH), 3.75(t, 1H, $J=12.2\text{Hz}$), 4.35 (dd, 1H, $J=12.2\text{Hz}$, 4.4Hz), 5.1(dd, 1H, $J=12.2\text{Hz}$, 4.4Hz), 6.2-7.2 (m, 10H).

Compound 3c :

^1H NMR(DMSO-d_6) : δ = 3.44(s, 1H, NH), 4.20(t, 1H, $J=12.2\text{Hz}$), 4.6 (dd, 1H, $J=12.2\text{Hz}$, 4.4Hz), 4.8 (dd, 1H, $J=12.2\text{Hz}$, 4.4Hz), 6.4-7.4 (m, 9H).

Acknowledgements:

The author, Asghar Jafar Khan is thankful to University Grants Commission, New Delhi. Authors are also thankful to Principal, Milliia College, Beed and Principal Yeshwant College, Nanded for providing all research facilities.

References:

- [1] K. Tanaka, F. Toda, Chem. Rev. 100 (2000), 1025.
- [2] (a) Schutz H, *Benzodiazepines*, Springer, Heidelberg, 2(1982), 240 (b) Smalley R K, In *Comprehensive Organic Chemistry*, Barton D and Ollis W D, Eds, Pergamon, Oxford, 4 (1979), 600. (c) Landquist J K, In *Comprehensive Heterocyclic Chemistry*, Katritzky A R and Rees C W, Eds, Pergamon, Oxford, 1(1984), 166.
- [3] Randall L O, Kappel B, In *Benzodiazepines*, Garattini S, Mussini E and Randall LO, Eds, Raven Press, New York, 1973, 27 and references cited therein.
- [4] (a) M. Essaber, A. Baouid, A. Hasnaoui, A. Benharref, J.P. Laverne, Synth. Commun. 28 (1998) 4097; (b) A.M. El-Sayed, H. Abdel-Ghany, A.M. M El-Saghier, Synth. Commun. 29 (1999), 3561.

[5] Harris R C and Straley J M, US Patent

1,537, 753,757(1968), Chem. Abstract, (1970), 73,100,054W.

[6] Stahlofen P, Ried W, *ChemBer*, 90(1957), 815.

[7] M. Curini, F. Epifano, M.C. Marcotullio, O. Rosati, *Tetrahedron Lett.* 42 (2001), 3193.

[8] J. S Yadav, B.V.S. Reddy, S. Praveen Kumar, K. Nagaiah, *Synthesis*(2005), 480.

[9] J.A.L. Herbert, H. Suschitzky, *J. Chem. Soc. Perkin Trans. 1* (1974), 2657.

[10] Yadav J S, Reddy B V S, Eshwaraian B, Anuradha K, *Green Chem*,4, 2002,592.

[11] Jarikote D V, Siddiqui S A, Rajagopal R, Daniel T, Lahoti R J, Srinivasan K V, *Tetrahedron Lett*,44(2003), 1835.

[12] Bilal A Ganai, Satish Kumar, Charanjeet S Andotra and Kamal K Kapoor, *Synth Commun*, 36(2006),803-807.

[13] Srivamurugan V, Deepa k, Palanichamy M, Murugesan V, *SynthCommun*,34(2004),3833.

[14] A J Khan, M A Baseer, *E-Journal of Chemistry* 9 (2012), 407-414.

[15] D.I. Jung, T.W. Choi, Y.Y. Kim, I.S. Kim, Y.M. Park, Y.G. Lee, D.H. Jung, *Synth. Commun.* 29 (1999), 1941.

[16] A J Khan, M A Baseer, *Recent Research in Science and Technology*, 3(2011), 101-103.

[17] Pozarentzi M, Stephanatou J S, Tsoleridis C A, *Tetrahedron Lett*, 43,2002, 1755.

[18] W.Y. Chen, J. Lu, *Synlett* (2005) 1337.

[19] M A Baseer, A J Khan, *J. of Der Chemica Sinica*, 2011, 2 (2): 84-87

[20] Yadav J S, Reddy B V S, Praveen Kumar S, Nagaiah K, Lingaiah N, Saiprasad P S, *Synthesis*, 6,2004,901.

[21] R. Kumar, P. Choudhary, S. Nimesh, A.K. Verma, R. Chandra, *Green Chem.* 8 (2006) 519.

[22] M A Baseer, A J Khan, *ChemSci Trans.*, 2015, 4(1), 194-198.

[23] Benjaram M R, Sreekanth P M, Vangala R R, *J mol Catal Commun A:Chem*,225, 2005,71.

[24] Sandhar A, Singh RK, *ChemSci Tran* 2(2013); 176-180.

[25] Chikhale VR, Khedekar BP, *Current Catalysis* 3 (2014), 111-115.

[26] N. Suryakiran, K. Rajesh, P. Prabhakar, J. Jon Paul Selvam, Y. Venkateswarlu, *J. of Catalysis Communications* 8 (2007) 1635-1640.