

### 1.4 References

- [1] P. Mishra, A. Mishra, A.K. Bahe, R. Atish, D. Ratnesh, "Synthesis of Isatin and its derivatives containing heterocyclic compounds," *Journal of the Turkish Chemical Society Section A: Chemistry*, **8** (2021) 1089-1098.
- [2] J.F. da Silva, S.J. Garden, A. Pinto, "The Chemistry of Isatins: A Review from 1975 to 1999," *Science Direct Working Paper*, (2000) 04.
- [3] G. Kumar, N.P. Singh, K. Kumar, "Recent advancement of synthesis of isatins as a versatile pharmacophore: A review," *Drug Research*, **71** (2021) 115-121.
- [4] J. Bergman, J.-O. Lindström, U. Tilstam, "The structure and properties of some indolic constituents in *Couroupita guianensis* aubl," *Tetrahedron*, **41** (1985) 2879-2881.
- [5] S. Kumar, A.S. Nair, M.A. Abdelgawad, B. Mathew, "Exploration of the Detailed Structure–Activity Relationships of Isatin and Their Isomers As Monoamine Oxidase Inhibitors," *ACS omega*, (2022).
- [6] O.L. Erdmann, "Untersuchungen über den Indigo," *J. Prakt. Chem*, **19** (1840) 321-362.
- [7] R. Kakkar, "Isatin and its derivatives: a survey of recent syntheses, reactions, and applications," *MedChemComm*, **10** (2019) 351-368.
- [8] A. Kekulé, "Ueber die Constitution des Isatins, der Isatinsäure und des Indols," *Berichte der deutschen chemischen Gesellschaft*, **2** (1869) 748-749.
- [9] P. Pakravan, S. Kashanian, M.M. Khodaei, F.J. Harding, "Biochemical and pharmacological characterization of isatin and its derivatives: from structure to activity," *Pharmacological Reports*, **65** (2013) 313-335.
- [10] W.C. Sumpter, "The chemistry of isatin," *Chemical reviews*, **34** (1944) 393-434.
- [11] P.D. Popp, "The chemistry of isatin," *Advances in heterocyclic chemistry*, **18** (1975) 1-58.
- [12] S.D. Pradeep, A.K. Gopalakrishnan, D.K. Manoharan, R.S. Soumya, R.K. Gopalan, P.V. Mohanan, "Isatin Derived Novel Schiff Bases: An Efficient Pharmacophore for Versatile Biological Applications," *Journal of Molecular Structure*, (2022) 134121.

- [13] R.E. Ferraz de Paiva, E.G. Vieira, D. Rodrigues da Silva, C.A. Wegermann, A.M. Costa Ferreira, "Anticancer compounds based on isatin-derivatives: Strategies to ameliorate selectivity and efficiency," *Frontiers in molecular biosciences*, **7** (2021) 627272.
- [14] H. Guo, "Isatin derivatives and their anti-bacterial activities," *European Journal of Medicinal Chemistry*, **164** (2019) 678-688.
- [15] M. Dawar, D. Utreja, R. Rani, K. Kaur, "Synthesis and evaluation of isatin derivatives as antifungal agents," *Letters in Organic Chemistry*, **17** (2020) 199-205.
- [16] M. Solangi, K.M. Khan, S. Chigurupati, F. Saleem, U. Qureshi, Z. Ul-Haq, A. Jabeen, S.G. Felemban, F. Zafar, S. Perveen, "Isatin thiazoles as antidiabetic: Synthesis, in vitro enzyme inhibitory activities, kinetics, and in silico studies," *Archiv der Pharmazie*, (2022) e2100481.
- [17] M.R. Khajouei, A. Mohammadi-Farani, A. Moradi, A. Aliabadi, "Synthesis and evaluation of anticonvulsant activity of (Z)-4-(2-oxoindolin-3-ylideneamino)-N-phenylbenzamide derivatives in mice," *Research in pharmaceutical sciences*, **13** (2018) 262.
- [18] R. Malhi, J.P. Jasinski, M. Kaur, K. Paul, R. Sharma, "Synthesis, Characterization and Antitubercular Activities of Heterocyclic Selenosemicarbazones," *Bioorganic Chemistry*, (2022) 105907.
- [19] D. Sriram, P. Yogeewari, K. Meena, "Synthesis, anti-HIV and antitubercular activities of isatin derivatives," *Die Pharmazie-An International Journal of Pharmaceutical Sciences*, **61** (2006) 274-277.
- [20] A. Andreani, S. Burnelli, M. Granaiola, A. Leoni, A. Locatelli, R. Morigi, M. Rambaldi, L. Varoli, M.A. Cremonini, G. Placucci, "New isatin derivatives with antioxidant activity," *European journal of medicinal chemistry*, **45** (2010) 1374-1378.
- [21] I. Chiyanzu, C. Clarkson, P.J. Smith, J. Lehman, J. Gut, P.J. Rosenthal, K. Chibale, "Design, synthesis and anti-plasmodial evaluation in vitro of new 4-aminoquinoline isatin derivatives," *Bioorganic & medicinal chemistry*, **13** (2005) 3249-3261.
- [22] P.K. Sharma, S. Balwani, D. Mathur, S. Malhotra, B.K. Singh, A.K. Prasad, C. Len, E.V. Van der Eycken, B. Ghosh, N.G. Richards, "Synthesis and anti-inflammatory activity

evaluation of novel triazolyl-isatin hybrids," *Journal of Enzyme Inhibition and Medicinal Chemistry*, **31** (2016) 1520-1526.

[23] C.R. Prakash, S. Raja, G. Saravanan, "Design and synthesis of 4-(1-(4-chlorobenzyl)-2,3-dioxindolin-5-yl)-1-(4-substituted/unsubstituted benzylidene) semicarbazide: Novel agents with analgesic, anti-inflammatory and ulcerogenic properties," *Chinese Chemical Letters*, **23** (2012) 541-544.

[24] A. Medvedev, N. Igosheva, M. Crumeyrolle-Arias, V. Glover, "Isatin: role in stress and anxiety," *Stress*, **8** (2005) 175-183.

[25] M.M. Ismail, M.M. Kamel, L.W. Mohamed, S.I. Faggal, "Synthesis of new indole derivatives structurally related to donepezil and their biological evaluation as acetylcholinesterase inhibitors," *Molecules*, **17** (2012) 4811-4823.

[26] S.N. Pandeya, A.S. Raja, J.P. Stables, "Synthesis of isatin semicarbazones as novel anticonvulsants-role of hydrogen bonding," *J Pharm Pharm Sci*, **5** (2002) 266-271.

[27] S. Pandeya, D. Sriram, P. Yogeeswari, S. Ananthan, "Antituberculous activity of norfloxacin mannich bases with isatin derivatives," *Chemotherapy*, **47** (2001) 266-269.

[28] T. Sandmeyer, "Über isonitrosoacetanilide und deren Kondensation zu Isatinen," *Helvetica Chimica Acta*, **2** (1919) 234-242.

[29] K.A. Al Maamari, "Isatin derivatives: Synthesis, Reactivity and anti corrosion properties," (2013).

[30] G. Mathur, S. Nain, "Recent advancement in synthesis of isatin as anticonvulsant agents: a review," *Medicinal Chemistry*, **4** (2014) 417-427.

[31] A.V. Kurkin, A.A. Bernovskaya, M.A. Yurovskaya, "Synthesis of isatins with a chiral substituent at the nitrogen atom," *Tetrahedron: Asymmetry*, **20** (2009) 1500-1505.

[32] Y. Fukuda, Y. Itoh, K. Nakatani, T. Shiro, "Synthetic studies on duocarmycin. 1. Total synthesis of dl-duocarmycin A and its 2-epimer," *Tetrahedron*, **50** (1994) 2793-2808.

[33] L.L. Klein, M.D. Tufano, "Synthesis of substituted isatins," *Tetrahedron letters*, **54** (2013) 1008-1011.

- [34] W.M. Bryant III, G.F. Huhn, J.H. Jensen, M.E. Pierce, C. Stambach, "A large scale preparation of the cognitive enhancer linopirdine," *Synthetic communications*, **23** (1993) 1617-1625.
- [35] G. Satish, A. Polu, T. Ramar, A. Ilangovan, "Iodine-mediated C–H functionalization of sp, sp<sup>2</sup>, and sp<sup>3</sup> carbon: a unified multisubstrate domino approach for isatin synthesis," *The Journal of Organic Chemistry*, **80** (2015) 5167-5175.
- [36] W.J. Welstead Jr, H.W. Moran, H.F. Stauffer, L.B. Turnbull, L.F. Sancilio, "Antiinflammatory agents. 1. Synthesis and antiinflammatory activity of 2-amino-3-benzoylphenylacetic acid," *Journal of Medicinal Chemistry*, **22** (1979) 1074-1079.
- [37] I.V.P. Raj, T.M. Shaikh, A. Sudalai, "H-β Zeolite: An efficient, reusable catalyst for one-pot synthesis of isatins from anilines," *Acta Chim. Slov*, **57** (2010) 466-469.
- [38] P.G. Gassman, B.W. Cue Jr, T.-Y. Luh, "A general method for the synthesis of isatins," *The Journal of Organic Chemistry*, **42** (1977) 1344-1348.
- [39] P.G. Gassman, T. Van Bergen, "Oxindoles. New, general method of synthesis," *Journal of the American Chemical Society*, **96** (1974) 5508-5512.
- [40] H. Ma, Z.Z. Liu, S.Z. Chen, "New approach to synthesis of 6, 7-dimethoxyisatin," *Chinese Chemical Letters*, **14** (2003) 468-470.
- [41] S. BCG, Banini SR. Turner MR. Minter AR. Arrington AK, *Synthesis*, **903** (2008).
- [42] P. Hewawasam, N.A. Meanwell, "A general method for the synthesis of isatins: preparation of regiospecifically functionalized isatins from anilines," *Tetrahedron letters*, **35** (1994) 7303-7306.
- [43] J. Parrick, A. Yahya, Y. Jin, "A convenient conversion of indoles to 3, 3-dibromooxindoles and then to isatins," *Tetrahedron letters*, **25** (1984) 3099-3100.
- [44] B.-X. Tang, R.-J. Song, C.-Y. Wu, Y. Liu, M.-B. Zhou, W.-T. Wei, G.-B. Deng, D.-L. Yin, J.-H. Li, "Copper-catalyzed intramolecular C–H oxidation/acylation of formyl-N-arylformamides leading to indoline-2, 3-diones," *Journal of the American Chemical Society*, **132** (2010) 8900-8902.

- [45] F.A. Khan, B. Prabhudas, J. Dash, N. Sahu, "A Ruthenium-Catalyzed, Novel and Facile Procedure for the Conversion of Vicinal Dihaloalkenes to  $\alpha$ -Diketones," *Journal of the American Chemical Society*, **122** (2000) 9558-9559.
- [46] B.C. Söderberg, S.P. Gorugantula, C.R. Howerton, J.L. Petersen, S.W. Dantale, "A palladium-catalyzed synthesis of isatins (1H-Indole-2, 3-diones) from 1-(2-haloethynyl)-2-nitrobenzenes," *Tetrahedron*, **65** (2009) 7357-7363.
- [47] K.C. Majumdar, A.K. Kundu, P. Chatterjee, "1-Alkylisatins via aldol-retro-aldol condensation," *Journal of Chemical Research-Part S Synopsis*, (1996) 460-461.
- [48] T.M. Bridges, J.E. Marlo, C.M. Niswender, C.K. Jones, S.B. Jadhav, P.R. Gentry, H.C. Plumley, C.D. Weaver, P.J. Conn, C.W. Lindsley, "Discovery of the first highly M5-preferring muscarinic acetylcholine receptor ligand, an M5 positive allosteric modulator derived from a series of 5-trifluoromethoxy N-benzyl isatins," *Journal of medicinal chemistry*, **52** (2009) 3445-3448.
- [49] M. Rekhter, "Direct N-Alkylation of Isatin by Halomethyl Ketones," *Chemistry of Heterocyclic Compounds*, **41** (2005).
- [50] M.S. Shmidt, A.M. Reverdito, L. Kremenichuzky, I.A. Perillo, M.M. Blanco, "Simple and efficient microwave assisted N-alkylation of isatin," *Molecules*, **13** (2008) 831-840.
- [51] J.F. Da Silva, S.J. Garden, A.C. Pinto, "The chemistry of isatins: a review from 1975 to 1999," *Journal of the Brazilian Chemical Society*, **12** (2001) 273-324.
- [52] G.M. Coppola, "N-Arylation of isatins. A direct route to N-arylisatoic anhydrides," *Journal of heterocyclic chemistry*, **24** (1987) 1249-1251.
- [53] I. Zawadowska, "Synthesis of N-alkoxymethyl derivatives of isatin," *Acta poloniae pharmaceutica*, **32** (1975) 33-36.
- [54] R.S. Varma, S. Chauhan, C. Prasad, "Potential biologically active agents. part xliii. synthesis of substituted 2-phenylbenzoxazoles as cns active agents," *Chemischer Informationsdienst*, **16** (1985) no-no.

- [55] R. Gupta, N. Narayana, "Synthesis of some Mannich bases of 1-cyclohexylidene-N (1, 2-dihydro-2-oxo-3H-indol-3-ylidene) thiosemicarbazones and their antibacterial activity," *Pharmaceutica Acta Helvetiae*, **72** (1997) 43-45.
- [56] A.C. Pinto, F.S.Q. da Silva, R.B. da Silva, "Reduction of N-acylisatins with [BH<sub>3</sub>. THF] complex," *Tetrahedron letters*, **35** (1994) 8923-8926.
- [57] A. Tomchin, I. Krylova, "Semicarbazones and Thiosemicarbazones of the Heterocyclic Series. Part 48. Reaction of 1-Acetylisatins with Thiosemicarbazides," *ChemInform*, **18** (1987) no-no.
- [58] D.S.C. Black, M.C. Bowyer, M.M. Catalano, A.J. Ivory, P.A. Keller, N. Kumar, S.J. Nugent, "Substitution, oxidation and addition reactions at C-7 of activated indoles," *Tetrahedron*, **50** (1994) 10497-10508.
- [59] O. Radul, G. Zhungietu, M. Rekhter, S. Bukhanyuk, "Simple method for the preparation of 1-substituted isatins," *Chemistry of Heterocyclic Compounds*, **19** (1983) 286-288.
- [60] C. Berti, L. Greci, R. Andruzzi, A. Trazza, "New aspects in the chlorination of indoles with 1-chlorobenzotriazole and 1-chloroisatin," *The Journal of Organic Chemistry*, **47** (1982) 4895-4899.
- [61] C. Berti, L. Greci, "1-Chloroisatin and 2, 2-Diphenyl-2, 3-dihydro-3-one-1, 5, 7-trichloroindole: New Oxidants," *Synthetic Communications*, **11** (1981) 681-686.
- [62] C. Wang, J. Yan, M. Du, J.A. Burlison, C. Li, Y. Sun, D. Zhao, J. Liu, "One step synthesis of indirubins by reductive coupling of isatins with KBH<sub>4</sub>," *Tetrahedron*, **73** (2017) 2780-2785.
- [63] J.J. Badillo, N.V. Hanhan, A.K. Franz, "Enantioselective synthesis of substituted oxindoles and spirooxindoles with applications in drug discovery," *Curr. Opin. Drug Discovery Dev*, **13** (2010) 758-776.
- [64] K. Ding, Y. Lu, Z. Nikolovska-Coleska, G. Wang, S. Qiu, S. Shangary, W. Gao, D. Qin, J. Stuckey, K. Krajewski, "Structure-based design of spiro-oxindoles as potent, specific small-molecule inhibitors of the MDM2– p53 interaction," *Journal of medicinal chemistry*, **49** (2006) 3432-3435.

- [65] A. Fensome, W.R. Adams, A.L. Adams, T.J. Berrodin, J. Cohen, C. Huselton, A. Illenberger, J.C. Kern, V.A. Hudak, M.A. Marella, "Design, synthesis, and SAR of new pyrrole-oxindole progesterone receptor modulators leading to 5-(7-fluoro-3, 3-dimethyl-2-oxo-2, 3-dihydro-1 H-indol-5-yl)-1-methyl-1 H-pyrrole-2-carbonitrile (WAY-255348)," *Journal of medicinal chemistry*, **51** (2008) 1861-1873.
- [66] K. Ding, Y. Lu, Z. Nikolovska-Coleska, S. Qiu, Y. Ding, W. Gao, J. Stuckey, K. Krajewski, P.P. Roller, Y. Tomita, "Structure-based design of potent non-peptide MDM2 inhibitors," *Journal of the American Chemical Society*, **127** (2005) 10130-10131.
- [67] G. Kumari, M. Modi, S.K. Gupta, R.K. Singh, "Rhodium (II) acetate-catalyzed stereoselective synthesis, SAR and anti-HIV activity of novel oxindoles bearing cyclopropane ring," *European journal of medicinal chemistry*, **46** (2011) 1181-1188.
- [68] V.V. Vintonyak, K. Warburg, H. Kruse, S. Grimme, K. Hübel, D. Rauh, H. Waldmann, "Identification of thiazolidinones spiro-fused to indolin-2-ones as potent and selective inhibitors of the mycobacterium tuberculosis protein tyrosine phosphatase B," *Angewandte Chemie International Edition*, **49** (2010) 5902-5905.
- [69] M. Rottmann, C. McNamara, B.K. Yeung, M.C. Lee, B. Zou, B. Russell, P. Seitz, D.M. Plouffe, N.V. Dharia, J. Tan, "Spiroindolones, potent compound class for the treatment of malaria," *Science*, **329** (2010) 1175-1180.
- [70] B.K. Yeung, B. Zou, M. Rottmann, S.B. Lakshminarayana, S.H. Ang, S.Y. Leong, J. Tan, J. Wong, S. Keller-Maerki, C. Fischli, "Spirotetrahydro  $\beta$ -carboline (spiroindolones): a new class of potent and orally efficacious compounds for the treatment of malaria," *Journal of medicinal chemistry*, **53** (2010) 5155-5164.
- [71] T. Pashirova, Z. Shaihutdinova, A. Vandyukov, A. Lyubina, S. Amerhanova, A. Voloshina, A. Samorodov, E. Souto, V. Mironov, A. Bogdanov, "Synthesis and structure-activity-toxicity relationships of DABCO-containing ammonium amphiphiles based on natural isatin scaffold," *Journal of Molecular Liquids*, (2022) 120217.
- [72] K.M. Khan, U.R. Mughal, S. Perveen, M.I. Choudhary, "Schiff bases of istain: Potential anti-leishmanial agents," *Letters in Drug Design & Discovery*, **5** (2008) 243-249.

- [73] R.M. Piceirilli, F.D. Popp, "The reaction of isatin with cycloalkylamines," *Journal of Heterocyclic Chemistry*, **10** (1973) 671-673.
- [74] S.K. Sridhar, S.N. Pandeya, J.P. Stables, A. Ramesh, "Anticonvulsant activity of hydrazones, Schiff and Mannich bases of isatin derivatives," *European journal of pharmaceutical sciences*, **16** (2002) 129-132.
- [75] H. Pervez, M. Iqbal, M. Tahir, M. Choudhary, K. Khan, "Synthesis of some N4-substituted isatin-3-thiosemicarbazones," *Natural Product Research*, **21** (2007) 1178-1186.
- [76] B. Alcaide, P. Almendros, C. Aragoncillo, "Iridium-Promoted Allylation Reaction of Imino-Isatins in Aqueous Media: Synthesis of Quaternary 3-Aminooxindoles," *Wiley Online Library*, 2010.
- [77] W. Yan, D. Wang, J. Feng, P. Li, R. Wang, "Zinc-mediated diastereoselective synthesis of 3-amino oxindoles by addition of methyl and terminal alkynes to N-tert-butanesulfinyl ketimines," *The Journal of Organic Chemistry*, **77** (2012) 3311-3317.
- [78] Q.-X. Guo, Y.-W. Liu, X.-C. Li, L.-Z. Zhong, Y.-G. Peng, "Enantioselective and solvent-controlled diastereoselective Mannich reaction of isatin imines with hydroxyacetone: Synthesis of 3-substituted 3-aminooxindoles," *The Journal of Organic Chemistry*, **77** (2012) 3589-3594.
- [79] H. Junek, R. Dworzak, H. Sterk, W. Fabian, "Synthesen mit Nitrilen, LXXXIV Farbe und Stereochemie von 3-(Cyanmethylen)-2-indolonen," *Liebigs Annalen der Chemie*, **1989** (1989) 1065-1069.
- [80] K. Aikawa, S. Mimura, Y. Numata, K. Mikami, "Palladium-Catalyzed Enantioselective Ene and Aldol Reactions with Isatins, Keto Esters, and Diketones: Reliable Approach to Chiral Tertiary Alcohols," *Wiley Online Library*, 2011.
- [81] L. Liu, S. Zhang, F. Xue, G. Lou, H. Zhang, S. Ma, W. Duan, W. Wang, "Catalytic Enantioselective Henry Reactions of Isatins: Application in the Concise Synthesis of (S)-(-)-Spirobrassinin," *Chemistry—A European Journal*, **17** (2011) 7791-7795.

- [82] M.N. Elinson, V.M. Merkulova, A.I. Ilovaisky, A.O. Chizhov, P.A. Belyakov, F. Barba, B. Batanero, "Electrochemically induced aldol reaction of cyclic 1, 3-diketones with isatins," *Electrochimica acta*, **55** (2010) 2129-2133.
- [83] S. Allu, N. Molleti, R. Panem, V.K. Singh, "Enantioselective organocatalytic aldol reaction of unactivated ketones with isatins," *Tetrahedron letters*, **52** (2011) 4080-4083.
- [84] J. Feng, W. Yan, D. Wang, P. Li, Q. Sun, R. Wang, "The highly enantioselective addition of indoles and pyrroles to isatins-derived N-Boc ketimines catalyzed by chiral phosphoric acids," *Chemical Communications*, **48** (2012) 8003-8005.
- [85] L. Peng, L.-L. Wang, J.-F. Bai, L.-N. Jia, Q.-C. Yang, Q.-C. Huang, X.-Y. Xu, L.-X. Wang, "Highly effective and enantioselective phospho-aldol reaction of diphenyl phosphite with N-alkylated isatins catalyzed by quinine," *Tetrahedron Letters*, **52** (2011) 1157-1160.
- [86] G. Chen, Y. Tang, Q.-Z. Zhang, Y. Wu, S.-Z. Mu, "Rapid Eco-Friendly Synthesis and Structure of 3-Hydroxy-3-nitromethyl-1, 3-dihydro-indol-2-one," *Journal of Chemical Crystallography*, **40** (2010) 369-372.
- [87] D. Basavaiah, A.J. Rao, T. Satyanarayana, "Recent advances in the Baylis– Hillman reaction and applications," *Chemical reviews*, **103** (2003) 811-892.
- [88] S.J. Garden, J.M. Skakle, "Isatin derivatives are reactive electrophilic components for the Baylis–Hillman reaction," *Tetrahedron letters*, **43** (2002) 1969-1972.
- [89] X.-C. Qiao, S.-F. Zhu, Q.-L. Zhou, "From allylic alcohols to chiral tertiary homoallylic alcohol: palladium-catalyzed asymmetric allylation of isatins," *Tetrahedron: Asymmetry*, **20** (2009) 1254-1261.
- [90] J. Itoh, S.B. Han, M.J. Krische, "Enantioselective Allylation, Crotylation, and Reverse Prenylation of Substituted Isatins: Iridium-Catalyzed C-C Bond-Forming Transfer Hydrogenation," *Angewandte Chemie*, **121** (2009) 6431-6434.
- [91] G.M. Coppola, "The chemistry of isatoic anhydride," *Synthesis*, **1980** (1980) 505-536.
- [92] S. Taliansky, "Urea-hydrogen peroxide complex," *Synlett*, **2005** (2005) 1962-1963.

- [93] T. Moskovkina, M. Denisenko, A. Kalinovskii, V. Stonik, "Synthesis of substituted tryptanthrins via oxidation of isatin and its derivatives," *Russian Journal of Organic Chemistry*, **49** (2013) 1740-1743.
- [94] C. Wang, L. Zhang, A. Ren, P. Lu, Y. Wang, "Cu-catalyzed synthesis of tryptanthrin derivatives from substituted indoles," *Organic letters*, **15** (2013) 2982-2985.
- [95] T. Deligeorgiev, A. Vasilev, J.J. Vaquero, J. Alvarez-Builla, "A green synthesis of isatoic anhydrides from isatins with urea-hydrogen peroxide complex and ultrasound," *Ultrasonics sonochemistry*, **14** (2007) 497-501.
- [96] A. Sahu, A. Chatterjee, New Synthesis of Blepharin, "The naturally occurring  $\beta$ -D-glucoside of 2-Hydroxy-(2H, 4H)-1, 4-benzoxazin-3-one," *ChemInform*, **21** (1990) no-no.
- [97] R.-G. Shi, X.-H. Wang, R. Liu, C.-G. Yan, "Two-carbon ring expansion of isatin: a convenient construction of a dibenzo [b, d] azepinone scaffold," *Chemical Communications*, **52** (2016) 6280-6283.
- [98] R. Menicagli, L. Lardicci, O. Piccolo, L. Wis, "Chiral alpha-naphthalenic and beta-naphthalenic hydrocarbons-determination of enantiomeric purity," *Chimica & L Industria, Polo Vle Abruzzi 5, 20131 MILAN, ITALY*, (1977) pp. 652-652.
- [99] B.V. Silva, "Isatin, a versatile molecule: studies in Brazil," *Journal of the Brazilian Chemical Society*, **24** (2013) 707-720.
- [100] Y. Torisawa, T. Nishi, J.-I. Minamikawa, "An efficient conversion of 5-nitroisatin into 5-nitroindole derivative," *Bioorganic & medicinal chemistry letters*, **11** (2001) 829-832.
- [101] J. Tatsugi, K. Ikuma, Y. Izawa, "Selective photo-reduction of 1-alkylisatins in degassed alcoholic solutions," *Heterocycles*, **1** (1996) 7-10.
- [102] J.-J. Brunet, R. Chauvin, F. Kindela, D. Neibecker, "Potassium tetracarbonylhydridoferrate: A reagent for the selective reduction of carbonyl groups," *Tetrahedron Letters*, **35** (1994) 8801-8804.
- [103] L.-H. Kuo, J.-P. Hsu, C.-T. Chen, "Process for preparing 2-oxindole," Google Patents, 1999.

- [104] A. von Baeyer, V. Hottenroth, R. Hallensleben, "Adolf von Baeyer's gesammelte werke," *F. Vieweg und sohn*, 1905.
- [105] C. Crestini, R. Saladino, "A new efficient and mild synthesis of 2-sxindoles by one-pot Wolff-Kishner like reduction of isatin derivatives," *Synthetic communications*, **24** (1994) 2835-2841.
- [106] H. Calvery, C. Noller, R. Adams, "Arsonophenyl-cinchoninic acid (arsonocinchophen) and derivatives. II," *Journal of the American Chemical Society*, **47** (1925) 3058-3060.
- [107] K.L. Vine, J.M. Locke, M. Ranson, S.G. Pyne, J.B. Bremner, "In vitro cytotoxicity evaluation of some substituted isatin derivatives," *Bioorganic & medicinal chemistry*, **15** (2007) 931-938.
- [108] S.P. de Souza, J.F.M. da Silva, M.C. de Mattos, "SiO<sub>2</sub> mediated reaction of isatin with N-halosaccharins: A regiospecific preparation of 5-haloisatins," *Heterocyclic Communications*, **9** (2003) 31-34.
- [109] G.F. Mendonça, R.R. Magalhães, M. Mattos, P.M. Esteves, "Trichloroisocyanuric acid in H<sub>2</sub>SO<sub>4</sub>: an efficient superelectrophilic reagent for chlorination of isatin and benzene derivatives," *Journal of the Brazilian Chemical Society*, **16** (2005) 695-698.
- [110] G. Krishnegowda, A.P. Gowda, H.R.S. Tagaram, K.F. Staveley-O'Carroll, R.B. Irby, A.K. Sharma, S. Amin, "Synthesis and biological evaluation of a novel class of isatin analogs as dual inhibitors of tubulin polymerization and Akt pathway," *Bioorganic & medicinal chemistry*, **19** (2011) 6006-6014.
- [111] R. Westphal, E. Venturini Filho, F. Medici, M. Benaglia, S. Greco, "Stereoselective domino reactions in the synthesis of spiro compounds," *synthesis*, (2022).
- [112] M. Daraie, M. Mirzaei, M. Bazargan, V.S. Amiri, B.A. Sanati, M.M. Heravi, "Lanthanoid-containing polyoxometalate nanocatalysts in the synthesis of bioactive isatin-based compounds," *Scientific reports*, **12** (2022) 1-18.
- [113] Z.-L. He, P. Chen, Z.-C. Chen, W. Du, Y.-C. Chen, "Construction of Hydrodibenzo [b, d] furan Frameworks from Morita–Baylis–Hillman Carbonates of Isatins and o-Hydroxy

Enones via Palladium and Brønsted Base Relay Catalysis," *Organic Letters*, **24** (2021) 100-104.

[114] C.-C. Wang, X.-Y. Wu, "Catalytic asymmetric synthesis of 3-hydroxyl-2-oxindoles via enantioselective Morita–Baylis–Hillman reaction of isatins," *Tetrahedron*, **67** (2011) 2974-2978.

[115] G.A. da Silva, A.C. de Castro, R.K.S. Mendes, D. das Neves Moreira, G.R. da Silva Cavalcanti, M.G. da Fonseca, J.P.A. Gomes, E.B. de Alencar-Filho, B.G. Vaz, G.F. dos Santos, "Bentonite catalyzed solvent-free synthesis of N'-(2-oxoindolin-3-ylidene) benzohydrazide derivatives under microwave irradiation," *Journal of Molecular Structure*, **1270** (2022) 133914.

[116] J.W. Cornforth, "Structures of isamic acid and methylisatoid," *Journal of the Chemical Society, Perkin Transactions 1*, (1976) 2004-2009.

[117] J. Bergman, C. Stalhandske, H. Vallberg, "Studies of the reaction between indole-2, 3-diones (isatins) and secondary aliphatic amines," *Acta Chemica Scandinavica*, **51** (1997) 753-759.

[118] J. Bergman, R. Engqvist, C. Stålhandske, H. Wallberg, "Studies of the reactions between indole-2, 3-diones (isatins) and 2-aminobenzylamine," *Tetrahedron*, **59** (2003) 1033-1048.

[119] A.H. Cahyana, A.R. Liandi, M. Maghdalena, R.T. Yunarti, T.P. Wendari, "Magnetically separable Fe<sub>3</sub>O<sub>4</sub>/graphene oxide nanocomposite: An efficient heterogenous catalyst for spirooxindole derivatives synthesis," *Ceramics International*, (2022).

[120] C.-B. Cui, H. Kakeya, H. Osada, Spirotryprostatin B, "a novel mammalian cell cycle inhibitor produced by *Aspergillus fumigatus*," *The Journal of Antibiotics*, **49** (1996) 832-835.

[121] C.-B. Cui, H. Kakeya, H. Osada, "Novel mammalian cell cycle inhibitors, spirotryprostatins A and B, produced by *Aspergillus fumigatus*, which inhibit mammalian cell cycle at G<sub>2</sub>/M phase," *Tetrahedron*, **52** (1996) 12651-12666.

- [122] K. Niime, S. Kurosawa, F. Toda, M. Hasegawa, Y. Iwakura, "The condensation of isatin with o-phenylenediamine," *Bulletin of the Chemical Society of Japan*, **55** (1982) 2293-2294.
- [123] P. Gurevich, L. Sattarova, A. Petrovskiy, N. Frolova, B. Strunin, R. Musin, "Interaction of spiro-heterocyclic oxindole system with sodium diformylimide," *Chemistry of Heterocyclic Compounds*, **46** (2011) 1527-1530.
- [124] Y. Hu, M.-M. Wang, H. Chen, D.-Q. Shi, "Efficient and convenient synthesis of spiroindolinone-quinazolines induced by stannous chloride," *Tetrahedron*, **67** (2011) 9342-9346.
- [125] A.A. Mohammadi, M. Dabiri, H. Qaraat, "A regioselective three-component reaction for synthesis of novel 1' H-spiro [isoindoline-1, 2'-quinazoline]-3, 4'(3' H)-dione derivatives," *Tetrahedron*, **65** (2009) 3804-3808.
- [126] K.C. Joshi, R. Jain, S. Garg, "Studies in spiroheterocycles. Part V. Synthesis of new fluorinated spiro [3H-indole-3, 2'-oxiran]-2 (1H)-ones," *Journal of heterocyclic chemistry*, **21** (1984) 977-979.
- [127] T. Li, X. Zhu, H. Jiang, Y. Wang, N. Zheng, T. Peng, R. Gao, L. Shi, X.Q. Hao, M.P. Song, "Pd-catalyzed decarboxylative [3+ 2] cycloaddition: Assembly of highly functionalized spirooxindoles bearing two quaternary centers," *Applied Organometallic Chemistry*, **36** (2022) e6516.
- [128] A. Shikari, K. Mandal, D. Chopra, S.C. Pan, "Organocatalytic Asymmetric Synthesis of Cyclic Acetals with Spirooxindole Skeleton," *Advanced Synthesis & Catalysis*, **364** (2022) 58-63.
- [129] N.M. Ribeiro, A. da Cunha Pinto, B.V. da Silva, F. de Almeida Violante, M.O. Dias, "A fast, efficient and eco-friendly procedure to prepare isatin ketals," *Catalysis Communications*, **8** (2007) 2130-2136.
- [130] E.L. dos Santos, W.A. Gomes Jr, N.M. Ribeiro, H.M.C. Andrade, "Ecofriendly ketalization of isatin using heteropolycompounds as catalysts," *Journal of Molecular Catalysis A: Chemical*, **295** (2008) 18-23.

- [131] A. Dandia, S. Khanna, K. Joshi, "Reactions of Fluorinated Isatin Derivatives with 2-Aminothiophenol," *ChemInform*, **22** (1991) no-no.
- [132] A. Pictet, T. Spengler, "Über die Bildung von Isochinolin-derivaten durch Einwirkung von Methylal auf Phenyl-äthylamin, Phenyl-alanin und Tyrosin," *Berichte der deutschen chemischen Gesellschaft*, **44** (1911) 2030-2036.
- [133] W.M. Whaley, T.R. Govindachari, "The Pictet-Spengler Synthesis of Tetrahydroisoquinolines and Related Compounds," *Organic reactions*, **6** (2004) 151-190.
- [134] S. Rehn, J. Bergman, B. Stensland, "The three-component reaction between Isatin,  $\alpha$ -Amino Acids, and Dipolarophiles," *European Journal of Organic Chemistry*, **2004** (2004) 413-418.
- [135] N.V. Thomas, C. Meenakshy, S.S. Leena, A. Deepthi, "Stereoselective Synthesis of Dispirooxindoles Incorporating Pyrrolo [2, 1-a] isoquinoline via [3+ 2] Cycloaddition of Azomethine Ylides with a Thiazolo [3, 2-a] indole Dipolarophile," *Synthesis*, **54** (2022) 2885-2893.
- [136] M. Palomba, E. De Monte, A. Mambrini, L. Bagnoli, C. Santi, F. Marini, "A three-component [3+2]-cycloaddition/elimination cascade for the synthesis of spirooxindole-pyrrolizines," *Organic & Biomolecular Chemistry*, **19** (2021) 667-676.
- [137] W. Ren, Q. Zhao, M. Yu, L. Guo, H. Chang, X. Jiang, Y. Luo, W. Huang, G. He, "Design and synthesis of novel spirooxindole–indenoquininoxaline derivatives as novel tryptophanyl-tRNA synthetase inhibitors," *Molecular Diversity*, **24** (2020) 1043-1063.
- [138] N. Lashgari, G.M. Ziarani, Synthesis of heterocyclic compounds based on isatin through 1, 3-dipolar cycloaddition reactions, *ARKIVOC: Online Journal of Organic Chemistry*, (2012).
- [139] Y. Zhang, L. Luo, J. Ge, S.-Q. Yan, Y.-X. Peng, Y.-R. Liu, J.-X. Liu, C. Liu, T. Ma, H.-Q. Luo, "On water" direct organocatalytic cyanoarylmethylation of isatins for the diastereoselective synthesis of 3-hydroxy-3-cyanomethyl oxindoles," *The Journal of Organic Chemistry*, **84** (2019) 4000-4008.

- [140] S.A.S. Ghozlan, M.A. Ramadan, A.M. Abdelmoniem, I.A. Abdelhamid, "Synthesis and antimicrobial evaluations of novel spiro cyclic 2-oxindole derivatives of n-(1h-pyrazol-5-yl) hexahydroquinoline derivatives," *Heterocycles*, **92** (2016) 1075-1084.
- [141] I.A. Abdelhamid, M.H. Mohamed, A.M. Abdelmoniem, S.A. Ghozlan, DBU-Catalyzed, "facile and efficient method for synthesis of spirocyclic 2-oxindole derivatives with incorporated 6-amino-4H-pyridazines and fused derivatives via [3+ 3] atom combination," *Tetrahedron*, **65** (2009) 10069-10073.
- [142] M. Hamzehloueian, Y. Sarrafi, M. Darroudi, M.A. Arani, R.N. Darestani, F. Safari, A. Foroumadi, "Synthesis, Antibacterial and Anticancer Activities Evaluation of New 4-Thiazolidinone-Indolin-2-One" *Analogs*, (2021).
- [143] S. Hegade, G. Gaikwad, Y. Jadhav, A. Pore, A. Mulik, Catalytic one-pot three-component synthesis of 3, 3'-disubstituted oxindoles and spirooxindole pyrans by mixed ligand transition metal complexes, *Monatshefte für Chemie-Chemical Monthly*, **153** (2022) 95-103.
- [144] M. Salimi, R. Sandaroods, F. Esmaeli-nasrabadi, "Efficient synthesis of spirooxindole derivatives by magnetic and recyclable  $\text{CaFe}_2\text{O}_4@ \text{MgAl-LDH}$ ," *Journal of the Iranian Chemical Society*, **18** (2021) 1-12.
- [145] K. Rad-Moghadam, L. Youseftabar-Miri, "Ambient synthesis of spiro [4H-pyran-oxindole] derivatives under [BMIm]  $\text{BF}_4$  catalysis," *Tetrahedron*, **67** (2011) 5693-5699.
- [146] M. Jain, R. Sakhuja, P. Khanna, S. Bhagat, S.C. Jain, "A facile synthesis of novel unsymmetrical bis-spiro [indole-pyrazolinyl-thiazolidine]-2, 4'-diones," *Arkivoc*, **15** (2008) 54-64.
- [147] A. Dandia, A. kumar Laxkar, R. Singh, "New multicomponent domino reaction on water: highly diastereoselective synthesis of spiro [indoline-3, 4'-pyrazolo [3, 4-b] pyridines] catalyzed by NaCl," *Tetrahedron Letters*, **53** (2012) 3012-3017.
- [148] M. Toorbaf, L. Moradi, "Preparation of  $\text{GO/SiO}_2/\text{PEA}$  as a new solid base catalyst for the green synthesis of some spirooxindole derivatives," *RSC advances*, **11** (2021) 21840-21850.

- [149] K. Balamurugan, S. Perumal, J.C. Menendez, "New four-component reactions in water: a convergent approach to the metal-free synthesis of spiro [indoline/acenaphthylene-3, 4'-pyrazolo [3, 4-b] pyridine derivatives," *Tetrahedron*, **67** (2011) 3201-3208.
- [150] X. Gao, Z. Yang, W.J. Hao, B. Jiang, S.J. Tu, "Three-Component Synthesis of Spiro [indoline-3, 4'-pyrazolo [3, 4-b] pyridines] under Microwave Irradiation," *Journal of Heterocyclic Chemistry*, **54** (2017) 2434-2439.
- [151] P.E. Romo, B. Insuasty, J. Quiroga, R. Abonia, "3'-Methyl-2-oxo-1', 5'-diphenyl-1', 7'-dihydrospiro [indoline-3, 4'-pyrazolo [3, 4-b] pyridine]-6'-carboxylic Acid," *Molbank*, **2021** (2021) M1214.
- [152] F. Naglaa, S.A. Rizk, A.E. Galal, A.K. Ali, "Expeditious microwavable one-pot synthesis and biological exploration of spiro [indoline-3, 4'-pyrazolo [3, 4-b] pyridine derivatives," *Journal of the Iranian Chemical Society*, (2022) 1-9.
- [153] S. Gulati, S.E. John, N. Shankaraiah, "Microwave-assisted multicomponent reactions in heterocyclic chemistry and mechanistic aspects," *Beilstein Journal of Organic Chemistry*, **17** (2021) 819-865.
- [154] P.R. Mali, P.K. Shirsat, N. Khomane, L. Nayak, J.B. Nanubolu, H. Meshram, "1, 3-dipolar cycloaddition reactions for the synthesis of novel oxindole derivatives and their cytotoxic properties," *ACS Combinatorial Science*, **19** (2017) 633-639.
- [155] W.T. Wu, Y. Han, J. Sun, C.G. Yan, "Diastereoselective Synthesis of Spiro [indoline-3, 7'-pyrrolo [1, 2-a] azepines] via Sequential [3+ 2] Cycloaddition and Ring Expansion Reaction," *Asian Journal of Organic Chemistry*, **9** (2020) 1815-1819.
- [156] M. Ganesh, S. Suraj, "Expeditious entry into carbocyclic and heterocyclic spirooxindoles," *Organic & Biomolecular Chemistry*, **20** (2022) 5651-5693.
- [157] N. Poomathi, S. Mayakrishnan, D. Muralidharan, R. Srinivasan, P.T. Perumal, "Reaction of isatins with 6-amino uracils and isoxazoles: isatin ring-opening vs. annulations and regioselective synthesis of isoxazole fused quinoline scaffolds in water," *Green Chemistry*, **17** (2015) 3362-3372.

- [158] D.J. Boruah, R.A. Maurya, P. Yuvaraj, "Chemo-selective Synthesis of [indoline-3, 4'-isoxazolo [5, 4-b] pyridine Fused spirooxindole Derivatives via Brønsted Acid Catalysed Three-Component Tandem Knoevenagel/Michael Addition Reaction," *Results in Chemistry*, **2** (2020) 100064.
- [159] X. Companyó, A. Zea, A.-N.R. Alba, A. Mazzanti, A. Moyano, R. Rios, "Organocatalytic synthesis of spiro compounds via a cascade Michael–Michael-aldol reaction," *Chemical communications*, **46** (2010) 6953-6955.
- [160] G. Chen, J. Yang, S. Gao, H. He, S. Li, Y. Di, Y. Chang, Y. Lu, X. Hao, "Spiro [pyrrolidine-2, 3'-oxindole] derivatives synthesized by novel regioselective 1, 3-dipolar cycloadditions," *Molecular diversity*, **16** (2012) 151-156.
- [161] S.J.T. Rezaei, M.R. Nabid, A. Yari, S.W. Ng, "Ultrasound-promoted synthesis of novel spirooxindolo/spiroacenaphthen dicyano pyrrolidines and pyrrolizidines through regioselective azomethine ylide cycloaddition reaction," *Ultrasonics sonochemistry*, **18** (2011) 49-53.
- [162] H. Sachdeva, D. Dwivedi, R. Bhattacharjee, S. Khaturia, R. Saroj, "NiO nanoparticles: an efficient catalyst for the multicomponent one-pot synthesis of novel spiro and condensed indole derivatives," *Journal of Chemistry*, **2013** (2013).
- [163] A.S. Babu, D. Gavaskar, R. Raghunathan, "A facile synthesis of novel ferrocene grafted spiro-indenoquinoxaline pyrrolizidines via one-pot multicomponent [3+ 2] cycloaddition of azomethine ylides," *Tetrahedron Letters*, **53** (2012) 6676-6681.
- [164] A.S. Babu, R. Raghunathan, "Synthesis of ferrocenyl monospirooxindolopyrrolidines—a facile [3+ 2]-cycloaddition of azomethine ylides," *Tetrahedron Letters*, **49** (2008) 4487-4490.
- [165] K. Zhao, S.-L. Zhu, D.-Q. Shi, X.-P. Xu, S.-J. Ji, "Regioselective synthesis of highly functionalized 3-spiropyrrolidine/pyrrolizidine oxindoles and acenaphthenones via one-pot four-component [3+ 2] cycloaddition," *synthesis*, **2010** (2010) 1793-1803.
- [166] K. Arya, D.S. Rawat, A. Dandia, H. Sasai, "Brønsted acidic ionic liquids: Green, efficient and reusable catalyst for synthesis of fluorinated spiro [indole-

thiazinones/thiazolidinones] as antihistamic agents," *Journal of Fluorine Chemistry*, **137** (2012) 117-122.

[167] K. Arya, D.S. Rawat, H. Sasai, "Zeolite supported Brønsted-acid ionic liquids: an eco approach for synthesis of spiro [indole-pyrido [3, 2-e] thiazine] in water under ultrasonication," *Green Chemistry*, **14** (2012) 1956-1963.

[168] K. Karnakar, S.N. Murthy, K. Ramesh, K.H.V. Reddy, Y. Nageswar, U. Chandrakala, B.P. Devi, R. Prasad, "A novel one-pot synthesis of spiro [indoline-3, 4'-pyrazolo [3, 4-e][1, 4] thiazepine] diones using recyclable bioglycerol-based sulfonic acid functionalized carbon catalyst," *Tetrahedron Letters*, **53** (2012) 3497-3501.

[169] H. Chen, D. Shi, "Efficient one-pot synthesis of spiro [indoline-3, 4'-pyrazolo [3, 4-e][1, 4] thiazepine] dione via three-component reaction," *Tetrahedron*, **67** (2011) 5686-5692.

[170] R. Jain, K. Sharma, D. Kumar, A greener, "facile and scalable synthesis of indole derivatives in water: reactions of indole-2, 3-diones with 1, 2-difunctionalized benzene," *Tetrahedron Letters*, **53** (2012) 6236-6240.

[171] J. Jayashankaran, R.D.R. Manian, M. Sivaguru, R. Raghunathan, "Synthesis of novel spiro-pyrrolidines through [3+ 2] cycloaddition reactions with Baylis–Hillman adducts as dipolarophiles," *Tetrahedron letters*, **47** (2006) 5535-5538.

[172] N.V. Lakshmi, P. Thirumurugan, C. Jayakumar, P.T. Perumal, "An easy access to novel spiro-fused pyrrolo benzo [b] thiophene 1, 1-dioxide derivatives via 1, 3-dipolar cycloaddition using benzo [b] thiophene 1, 1-dioxide," *Synlett*, **2010** (2010) 955-961.

[173] R. Bouhfid, N. Joly, E.M. Essassi, V. Lequart, M. Massoui, P. Martin, "Synthesis of New Spiro [1, 4, 2-dioxazole-5, 3'-indolin]-2'-one by 1, 3-Dipolar Cycloaddition," *Synthetic Communications*, **41** (2011) 2096-2102.

[174] S. Muthusamy, S.A. Babu, M. Nethaji, "A facile regioselective construction of spiro epoxy-bridged tetrahydropyranone frameworks," *Tetrahedron*, **59** (2003) 8117-8127.

[175] M. Jain, P. Khanna, A. Saxena, S. Bhagat, C.E. Olsen, S.C. Jain, "Synthesis of Some Novel bis-Spiro [indole-pyrazolinyl-thiazolidine]-2, 4'-diones," *Synthetic communications*, **36** (2006) 1863-1872.

- [176] I. Yavari, Z. Hossaini, M. Sabbaghan, M. Ghazanfarpour-Darjani, "Reaction of N-heterocycles with acetylenedicarboxylates in the presence of N-alkylisatins or ninhydrin. Efficient synthesis of spiro compounds," *Monatshefte für Chemie-Chemical Monthly*, **138** (2007) 677-681.
- [177] V. Nair, A. Sreekanth, A. Biju, N.P. Rath, "The reaction of isoquinoline and dimethyl acetylenedicarboxylate with 1, 2-and 1, 4-benzoquinones: a novel synthesis of spiro [1, 3] oxazino [2, 3-a] isoquinolines," *Tetrahedron letters*, **44** (2003) 729-732.
- [178] A. Rahmati, Z. Khalesi, "A one-pot, three-component synthesis of spiro [indoline-isoxazolo [4', 3': 5, 6] pyrido [2, 3-d] pyrimidine] triones in water," *Tetrahedron*, **68** (2012) 8472-8479.
- [179] R. Ghahremanzadeh, S. Ahadi, G.I. Shakibaei, A. Bazgir, "Grindstone chemistry: one-pot synthesis of spiro [diindenopyridine-indoline] triones and spiro [acenaphthylene-diindenopyridine] triones," *Tetrahedron Letters*, **51** (2010) 499-502.
- [180] Y. Sun, J. Sun, C.-G. Yan, "Synthesis of 1'-aryl-2'-(2-oxoindolin-3-yl) spiro [indoline-3, 5'-pyrroline]-2, 3'-dione via one-pot reaction of arylamines, acetone, and isatins," *Tetrahedron Letters*, **53** (2012) 3647-3649.
- [181] M. Kumar, K. Sharma, A.K. Arya, "Use of SO<sub>3</sub>H-functionalized halogenfree ionic liquid ([MIM (CH<sub>2</sub>)<sub>4</sub>SO<sub>3</sub>H][HSO<sub>4</sub>]) as efficient promoter for the synthesis of structurally diverse spiroheterocycles," *Tetrahedron Letters*, **53** (2012) 4604-4608.
- [182] X. Yang, L. Yang, L. Wu, "[Hmim][HSO<sub>4</sub>]: An Efficient and Reusable Catalyst for the Synthesis of Spiro [dibenzo [a, i]-xanthene-14, 3'-indoline]-2', 8, 13-triones and Spironaphthopyran [2, 3-d] pyrimidine-5, 3'-indolines," *Bulletin of the Korean Chemical Society*, **33** (2012) 714-716.
- [183] M.M. Moghaddam, A. Bazgir, M.M. Akhondi, A.H. Zarnani, R. Ghahremanzadeh, "Simple and efficient route to synthesis of functionalized spiro-[chromeno [2, 3-d] pyrimidine-3', 5-indoline]-tetraones by K-10 as a reusable catalyst," *Org. Chem. J*, **2** (2010) 54-59.

[184] K. Jadidi, R. Ghahremanzadeh, A. Bazgir, "Efficient synthesis of spiro [chromeno [2, 3-d] pyrimidine-5, 3'-indoline]-tetraones by a one-pot and three-component reaction," *Journal of Combinatorial Chemistry*, **11** (2009) 341-344.

[185] J. Deng, L.-P. Mo, F.-Y. Zhao, Z.-H. Zhang, S.-X. Liu, "One-pot, three-component synthesis of a library of spirooxindole-pyrimidines catalyzed by magnetic nanoparticle supported dodecyl benzenesulfonic acid in aqueous media," *ACS combinatorial science*, **14** (2012) 335-341.

[186] K. Jadidi, R. Ghahremanzadeh, A. Bazgir, 'Spirooxindoles: reaction of 2, 6-diaminopyrimidin-4 (3H)-one and isatins," *Tetrahedron*, **65** (2009) 2005-2009.

[187] A. Alizadeh, J. Mokhtari, "Novel four-component route to the synthesis of spiro [indoline-3, 4'-pyridine]-3'-carboxylate derivatives," *Tetrahedron*, **67** (2011) 3519-3523.

[188] Y.-Y. Han, W.-B. Chen, W.-Y. Han, Z.-J. Wu, X.-M. Zhang, W.-C. Yuan, "Highly Efficient and Stereoselective Construction of Dispiro-[oxazolidine-2-thione] bisoxindoles and Dispiro [imidazolidine-2-thione] bisoxindoles," *Organic letters*, **14** (2012) 490-493.

### 2.6 References

- [1] G. Cravotto, P. Cintas, "Power ultrasound in organic synthesis: moving cavitation chemistry from academia to innovative and large-scale applications," *Chemical Society Reviews*, **35** (2006) 180-196.
- [2] T.J. Mason, J.P. Lorimer, "Applied sonochemistry: the uses of power ultrasound in chemistry and processing," *Wiley-Vch Weinheim* 2002.
- [3] J.-T. Li, Y. Yin, L. Li, M.-X. Sun, "A convenient and efficient protocol for the synthesis of 5-aryl-1, 3-diphenylpyrazole catalyzed by hydrochloric acid under ultrasound irradiation," *Ultrasonics Sonochemistry*, **17** (2010) 11-13.
- [4] C.-L. Ni, X.-H. Song, H. Yan, X.-Q. Song, R.-G. Zhong, "Improved synthesis of diethyl 2, 6-dimethyl-4-aryl-4H-pyran-3, 5-dicarboxylate under ultrasound irradiation," *Ultrasonics sonochemistry*, **17** (2010) 367-369.
- [5] A. Bazgir, S. Ahadi, R. Ghahremanzadeh, H.R. Khavasi, P. Mirzaei, "Ultrasound-assisted one-pot, three-component synthesis of spiro [indoline-3, 4'-pyrazolo [3, 4-b] pyridine]-2, 6'(1' H)-diones in water," *Ultrasonics sonochemistry*, **17** (2010) 447-452.
- [6] M.R. Vengatesan, S. Devaraju, D. Kannaiyan, J.K. Song, M. Alagar, "Ultrasound-assisted synthesis of benzoxazine monomers: thermal and mechanical properties of polybenzoxazines," *Polymer international*, **62** (2013) 127-133.
- [7] R.N. Butler, A.G. Coyne, "Water: Nature's Reaction Enforcer Comparative Effects for Organic Synthesis "In-Water" and "On-Water"," *Chemical reviews*, **110** (2010) 6302-6337.
- [8] M.-O. Simon, C.-J. Li, "Green chemistry oriented organic synthesis in water," *Chemical Society Reviews*, **41** (2012) 1415-1427.
- [9] Y. Jung, R. Marcus, "On the theory of organic catalysis "on water"," *Journal of the American Chemical Society*, **129** (2007) 5492-5502.
- [10] J.K. Beattie, C.S. McErlean, C.B. Phippen, "The Mechanism of On-Water Catalysis," *Chemistry—A European Journal*, **16** (2010) 8972-8974.

- [11] S. Mellouli, L. Bousekkine, A.B. Theberge, "W.T. Huck, Investigation of "on water" conditions using a biphasic fluidic platform," *Angewandte Chemie International Edition*, **51** (2012) 7981-7984.
- [12] M. Bayat, Z. Amiri, "Catalyst-free Synthesis of Tetrahydroacenaphtho [1, 2-b] indolone Derivatives via One-pot Four-component Reaction," *Journal of Heterocyclic Chemistry*, **55** (2018) 1346-1351.
- [13] G.-J. Mei, F. Shi, "Catalytic asymmetric synthesis of spirooxindoles: recent developments," *Chemical Communications*, **54** (2018) 6607-6621.
- [14] G. Zhu, Q. Wei, H. Chen, Y. Zhang, W. Shen, J. Qu, B. Wang, "Asymmetric [3+ 2] cycloaddition of 3-amino oxindole-based azomethine ylides and  $\alpha$ ,  $\beta$ -enones with divergent diastereocontrol on the spiro [pyrrolidine-oxindoles]," *Organic letters*, **19** (2017) 1862-1865.
- [15] Q.-N. Zhu, Y.-C. Zhang, M.-M. Xu, X.-X. Sun, X. Yang, F. Shi, "Enantioselective construction of tetrahydroquinolin-5-one-based spirooxindole scaffold via an organocatalytic asymmetric multicomponent [3+ 3] cyclization," *The Journal of organic chemistry*, **81** (2016) 7898-7907.
- [16] C.-S. Wang, R.-Y. Zhu, J. Zheng, F. Shi, S.-J. Tu, "Enantioselective construction of spiro [indoline-3, 2'-pyrrole] framework via catalytic asymmetric 1, 3-dipolar cycloadditions using allenes as equivalents of alkynes," *The Journal of organic chemistry*, **80** (2015) 512-520.
- [17] W. Dai, X.-L. Jiang, Q. Wu, F. Shi, S.-J. Tu, "Diastereo-and enantioselective construction of 3, 3'-pyrrolidinylspirooxindole framework via catalytic asymmetric 1, 3-dipolar cycloadditions," *The Journal of organic chemistry*, **80** (2015) 5737-5744.
- [18] W. Dai, H. Lu, X. Li, F. Shi, S.J. Tu, "Diastereo-and Enantioselective Construction of a Bisprirooxindole Scaffold Containing a Tetrahydro- $\beta$ -carboline Moiety through an Organocatalytic Asymmetric Cascade Reaction," *Chemistry—A European Journal*, **20** (2014) 11382-11389.

- [19] F. Shi, R.Y. Zhu, W. Dai, C.S. Wang, S.J. Tu, "Catalytic Asymmetric Formal [3+ 3] Cycloaddition of an Azomethine Ylide with 3-Indolylmethanol: Enantioselective Construction of a Six-Membered Piperidine Framework," *Chemistry—A European Journal*, **20** (2014) 2597-2604.
- [20] W.-B. Chen, Z.-J. Wu, Q.-L. Pei, L.-F. Cun, X.-M. Zhang, W.-C. Yuan, "Highly enantioselective construction of spiro [4H-pyran-3, 3'-oxindoles] through a domino Knoevenagel/Michael/cyclization sequence catalyzed by cupreine," *Organic Letters*, **12** (2010) 3132-3135.
- [21] K. Jiang, Z.-J. Jia, X. Yin, L. Wu, Y.-C. Chen, "Asymmetric quadruple aminocatalytic domino reactions to fused carbocycles incorporating a spirooxindole motif," *Organic Letters*, **12** (2010) 2766-2769.
- [22] C.-W. Jao, W.-C. Lin, Y.-T. Wu, P.-L. Wu, "Isolation, structure elucidation, and synthesis of cytotoxic tryptanthrin analogues from *Phaius mishmensis*," *Journal of natural products*, **71** (2008) 1275-1279.
- [23] S.-L. Zhu, S.-J. Ji, Y. Zhang, "A simple and clean procedure for three-component synthesis of spirooxindoles in aqueous medium," *Tetrahedron*, **63** (2007) 9365-9372.
- [24] H. Chen, D. Shi, "Efficient one-pot synthesis of novel spirooxindole derivatives via three-component reaction in aqueous medium," *Journal of Combinatorial Chemistry*, **12** (2010) 571-576.
- [25] Y. Li, H. Chen, C. Shi, D. Shi, S. Ji, "Efficient one-pot synthesis of spirooxindole derivatives catalyzed by L-proline in aqueous medium," *Journal of Combinatorial Chemistry*, **12** (2010) 231-237.
- [26] H. Naeimi, H. Foroughi, "Facile three-component preparation of benzodiazepine derivatives catalyzed by zinc sulfide nanoparticles via grinding method," *Research on Chemical Intermediates*, **42** (2016) 3999-4020.

- [27] K.D. Clevenger, R. Ye, J.W. Bok, P.M. Thomas, M.N. Islam, G.P. Miley, M.T. Robey, C. Chen, K. Yang, M. Swyers, "Interrogation of benzomalvin biosynthesis using fungal artificial chromosomes with metabolomic scoring (FAC-MS): discovery of a benzodiazepine synthase activity," *Biochemistry*, **57** (2018) 3237-3243.
- [28] R. Kumar, P. Chaudhary, S. Nimesh, A.K. Verma, R. Chandra, "An efficient synthesis of 1, 5-benzodiazepine derivatives catalyzed by silver nitrate," *Green Chemistry*, **8** (2006) 519-521.
- [29] J. Schimer, P. Cígler, J. Vesely, K.r. Grantz Šašková, M. Lepsik, J. Brynda, P. Rezacova, M. Kozisek, I. Cisarova, H. Oberwinkler, "Structure-aided design of novel inhibitors of HIV protease based on a benzodiazepine scaffold," *Journal of Medicinal Chemistry*, **55** (2012) 10130-10135.
- [30] L.D. Fader, R. Bethell, P. Bonneau, M. Bös, Y. Bousquet, M.G. Cordingley, R. Coulombe, P. Deroy, A.-M. Faucher, A. Gagnon, "Discovery of a 1, 5-dihydrobenzo [b][1, 4] diazepine-2, 4-dione series of inhibitors of HIV-1 capsid assembly," *Bioorganic & medicinal chemistry letters*, **21** (2011) 398-404.
- [31] F. Foden, J. McCormick, D. O'mant, "Vulpinic acids as potential antiinflammatory agents. 1. Vulpinic acids with substituents in the aromatic rings," *Journal of Medicinal Chemistry*, **18** (1975) 199-203.
- [32] S.K. De, R.A. Gibbs, "Scandium (III) triflate as an efficient and reusable catalyst for synthesis of 1, 5-benzodiazepine derivatives," *Tetrahedron Letters*, **46** (2005) 1811-1813.
- [33] M. Pozarentzi, J. Stephanidou-Stephanatou, C.A. Tsoleridis, "An efficient method for the synthesis of 1, 5-benzodiazepine derivatives under microwave irradiation without solvent," *Tetrahedron letters*, **43** (2002) 1755-1758.
- [34] J. Yadav, B.S. Reddy, S. Praveenkumar, K. Nagaiah, N. Lingaiah, P. Saiprasad, "Ag<sub>3</sub>pw<sub>12</sub>o<sub>40</sub>: a novel and recyclable heteropoly acid for the synthesis of 1, 5-benzodiazepines under solvent-free conditions," *Synthesis*, **2004** (2004) 901-904.

- [35] R. Smalley, Barton; WD Ollis, "Comprehensive Organic Chemistry," *Pergamon, Oxford*, **4** (1979) 600.
- [36] J. Landquist, A. Katritzky, C. Rees, "Comprehensive heterocyclic chemistry," *Pergamon: Oxford*, **1** (1984) 166.
- [37] N. Kausar, P. Mukherjee, A.R. Das, "Practical carbocatalysis by graphene oxide nanosheets in aqueous medium towards the synthesis of diversified dibenzo [1, 4] diazepine scaffolds," *RSC advances*, **6** (2016) 88904-88910.
- [38] K. Luk, S.A. Readshaw, Structural studies of MM46115, "a novel tetronic acid containing macrolide with antiviral and antibacterial activity isolated from *Actinomadura pelletieri*," *Journal of the Chemical Society, Perkin Transactions 1*, (1991) 1641-1644.
- [39] A. Ibi, E. Taniguchi, K. Maekawa, "Syntheses and biological activities of tetramic acid and tetronic acid derivatives," *Agricultural and Biological Chemistry*, **43** (1979) 1641-1646.
- [40] K. Rehse, J. Wagenknecht, N. Rietbrock, "Gerinnungsphysiologische Aktivität von 3, 5-disubstituierten Tetrensäuren," *Archiv der Pharmazie*, **311** (1978) 986-992.
- [41] K. Rehse, U. Emisch, "Tetrensäuren mit direkten antikoagulanten Wirkungen," *Archiv der Pharmazie*, **316** (1983) 115-120.
- [42] K. Rehse, M. Rothe, M. Kühn, "Untersuchungen zur Eiweißbindung von Arzneistoffen durch kontinuierliche Ultrafiltration, 3. Mitt. 5) Eiweißbindung von blutgerinnungshemmenden Tetrensäuren," *Archiv der Pharmazie*, **315** (1982) 52-56.
- [43] D.T. Witiak, S.S. Kokrady, S.T. Patel, H. Akbar, D.R. Feller, H.A. Newman, "Hypocholesterolemic and antiaggregatory properties of 2-hydroxytetronic acid redox analogs and their relationship to clofibrilic acid," *Journal of Medicinal Chemistry*, **25** (1982) 90-93.
- [44] A. Dal Pozzo, A. Dansi, E. Meneghini, "Unsaturated gamma-lactones. Relationship between their structure and antimicrobial activity," *Bollettino chimico farmaceutico*, **113** (1974) 280-285.

- [45] C. Zhang, S. Chatterjee, U. Stein, U. Heinemann, "Comparison of the effects of losigamone and its isomers on maximal electroshock induced convulsions in mice and on three different patterns of low magnesium induced epileptiform activity in slices of the rat temporal cortex," *Naunyn-Schmiedeberg's archives of pharmacology*, **345** (1992) 85-92.
- [46] L.H. Sternbach, "The benzodiazepine story," *Journal of medicinal chemistry*, **22** (1979) 1-7.
- [47] J. Wu, F. Xu, Z. Zhou, Q. Shen, "Efficient synthesis of 1, 5-benzodiazepine derivatives by ytterbium trichloride-catalyzed condensation of o-phenylenediamine and ketones," *Synthetic communications*, **36** (2006) 457-464.
- [48] X.Y. Zhang, J.X. Xu, S. Jem, "Cycloaddition of benzoheteroazepine III Reaction of 2, 3-dihydro-1H-15benzodiazepines with dichlorocarbene and stereo-structures of products," *Chinese Journal of Chemistry*, **17** (1999) 404-410.
- [49] Z.I. Orlova, L.Y. Ukhin, K.Y. Suponitskii, E. Shepelenko, L. Belousova, G. Borodkin, O. Popova, "Synthesis, structure, and properties of new spirooxindolodibenzodiazepine derivatives," *Russian Chemical Bulletin*, **62** (2013) 1409-1416.
- [50] S. Wang, C. Cheng, F. Gong, F. Wu, B. Jiang, J. Zhou, S. Tu, "Microwave-Assisted Aqueous Synthesis: A Rapid Approach to Poly-functionalized Indoline-Spiro Benzofurodiazepines," *Chinese Journal of Chemistry*, **29** (2011) 2101-2108.
- [51] J. Fu, S.J. Shuttleworth, R.V. Connors, A. Chai, P. Coward, "Discovery and optimization of a novel Neuromedin B receptor antagonist," *Bioorganic & medicinal chemistry letters*, **19** (2009) 4264-4267.
- [52] S. Nagaraju, K. Divakar, B. Paplal, D. Kashinath, "'On water' synthesis of dibenzo-[1, 4]-diazepin-1-ones using l-proline as an organocatalyst and under catalyst-free conditions, and their evaluation as  $\alpha$ -glucosidase inhibitors," *New Journal of Chemistry*, **41** (2017) 8993-9001.

- [53] B. Kuila, D. Mahajan, P. Singh, G. Bhargava, "A facile and highly chemoselective synthesis of 1-thia-3 a, 6-diaza-benzo [e] azulene-3-ones by 7-exo-dig/trig halocyclizations," *RSC advances*, **6** (2016) 101587-101591.
- [54] Y. Wang, F. Shi, X.X. Yao, M. Sun, L. Dong, S.J. Tu, "Catalytic Asymmetric Construction of 3, 3'-Spirooxindoles Fused with Seven-Membered Rings by Enantioselective Tandem Reactions," *Chemistry—A European Journal*, **20** (2014) 15047-15052.
- [55] Y. Wang, M.S. Tu, F. Shi, S.J. Tu, "Enantioselective Construction of the Biologically Significant Dibenzo [1, 4] diazepine Scaffold via Organocatalytic Asymmetric Three-Component Reactions," *Advanced Synthesis & Catalysis*, **356** (2014) 2009-2019.

### 3.5 References

- [1] C. de Graaff, E. Ruijter, R.V. Orru, "Recent developments in asymmetric multicomponent reactions," *Chemical Society Reviews*, **41** (2012) 3969-4009.
- [2] F. Shi, X.-N. Zeng, G. Zhang, N. Ma, B. Jiang, S. Tu, "Facile synthesis of new 4-azapodophyllotoxin analogs via microwave-assisted multi-component reactions and evaluation of their cytotoxic activity," *Bioorganic & medicinal chemistry letters*, **21** (2011) 7119-7123.
- [3] M. Somei, F. Yamada, "Simple indole alkaloids and those with a nonrearranged monoterpenoid unit," *Natural product reports*, **21** (2004) 278-311.
- [4] I.B. Taraporewala, "Thiazolo [5, 4-b] acridines and thiazolo [4, 5-b] acridines: probable pharmacophores of antiviral and anti-tumor marine alkaloids," *Tetrahedron letters*, **32** (1991) 39-42.
- [5] L.M. Opegard, A.V. Ougolkov, D.N. Luchini, R.A. Schoon, J.R. Goodell, H. Kaur, D.D. Billadeau, D.M. Ferguson, H. Hiasa, "Novel acridine-based compounds that exhibit an anti-pancreatic cancer activity are catalytic inhibitors of human topoisomerase II," *European journal of pharmacology*, **602** (2009) 223-229.
- [6] E. Nassar, "Synthesis,(in vitro) antitumor and antimicrobial activity of some pyrazoline, pyridine, and pyrimidine derivatives linked to indole moiety," *J. Am. Sci*, **6** (2010) 463-471.
- [7] Q. Michaudel, D. Thevenet, P.S. Baran, "Intermolecular Ritter-type C–H amination of unactivated sp<sup>3</sup> carbons," *Journal of the American Chemical Society*, **134** (2012) 2547-2550.
- [8] J.-J. Zhang, X. Feng, X.-C. Liu, Z.-B. Huang, D.-Q. Shi, "An efficient three-component synthesis of highly functionalized tetrahydroacenaphtho [1, 2-*b* *b*] indolone derivatives catalyzed by L-proline," *Molecular diversity*, **18** (2014) 727-736.
- [9] M. Wainwright, "Acridine—a neglected antibacterial chromophore," *Journal of Antimicrobial Chemotherapy*, **47** (2001) 1-13.
- [10] G. Verma, A. Marella, M. Shaquiquzzaman, M. Akhtar, M.R. Ali, M.M. Alam, "A review exploring biological activities of hydrazones," *Journal of pharmacy & bioallied sciences*, **6** (2014) 69.

- [11] H. Dansena, H. Dhongade, K. Chandrakar, "Pharmacological potentials of pyrimidine derivative: a review," *Asian J. Pharm. Clin. Res.*, **8** (2015) 171-177.
- [12] K. Jain, T. Chitre, P. Miniyar, M. Kathiravan, V. Bendre, V. Veer, S. Shahane, C. Shishoo, "Biological and medicinal significance of pyrimidines," *Current science*, (2006) 793-803.
- [13] N. Gokhale, U. Dalimba, M. Kumsi, "Facile synthesis of indole-pyrimidine hybrids and evaluation of their anticancer and antimicrobial activity," *Journal of Saudi Chemical Society*, **21** (2017) 761-775.
- [14] S. Tu, S. Wu, Z. Han, W. Hao, "An Efficient Microwave-assisted Synthesis of Pyrido [2, 3-d] pyrimidine Derivatives," *Chinese Journal of Chemistry*, **27** (2009) 1148-1152.
- [15] S. Xia, S. Yin, S. Tao, Y. Shi, L. Rong, X. Wei, Z. Zong, "An efficient and facile synthesis of novel substituted pyrimidine derivatives: 4-amino-5-carbonitrile-2-nitroaminopyrimidine," *Research on Chemical Intermediates*, **38** (2012) 2435-2442.
- [16] M.A. Radwan, M. El-Sherbiny, "Synthesis and antitumor activity of indolylpyrimidines: marine natural product meridianin D analogues," *Bioorganic & medicinal chemistry*, **15** (2007) 1206-1211.
- [17] S.-L. Zhu, S.-J. Ji, K. Zhao, Y. Liu, "Multicomponent reactions for the synthesis of new 3'-indolyl substituted heterocycles under microwave irradiation," *Tetrahedron Letters*, **49** (2008) 2578-2582.
- [18] J.-K. Son, L.-X. Zhao, A. Basnet, P. Thapa, R. Karki, Y. Na, Y. Jahng, T.C. Jeong, B.-S. Jeong, C.-S. Lee, "Synthesis of 2, 6-diaryl-substituted pyridines and their antitumor activities," *European journal of medicinal chemistry*, **43** (2008) 675-682.
- [19] F. Miyake, M. Hashimoto, S. Tonsiengsom, K. Yakushijin, D.A. Horne, "Synthesis of 5-(3-indolyl) oxazole natural products. Structure revision of Almazole D," *Tetrahedron*, **66** (2010) 4888-4893.
- [20] A.M. Farag, A.S. Mayhoub, S.E. Barakat, A.H. Bayomi, "Synthesis of new N-phenylpyrazole derivatives with potent antimicrobial activity," *Bioorganic & medicinal chemistry*, **16** (2008) 4569-4578.

- [21] S. Nasri, F. Rahimi, M. Karimi, M. Bayat, "Regio-and diastereoselective synthesis of new functionalized indolo [2, 3-b] indole-pyrimidine based on C–N bond formation via a four-component reaction," *Tetrahedron Letters*, **59** (2018) 2272-2276.
- [22] X.-B. Chen, S.-L. Xiong, Z.-X. Xie, Y.-C. Wang, W. Liu, "Three-component one-pot synthesis of highly functionalized bis-indole derivatives," *ACS omega*, **4** (2019) 11832-11837.
- [23] I. Dhinakaran, V. Padmini, N. Bhuvanesh, "Chemodivergent, one-pot, multi-component synthesis of pyrroles and tetrahydropyridines under solvent-and catalyst-free conditions using the grinding method," *ACS Combinatorial Science*, **18** (2016) 236-242.
- [24] T. Lohar, A. Mane, S. Kamat, A. Kumbhar, R. Salunkhe, "Trifluoroethanol and liquid-assisted grinding method: a green catalytic access for multicomponent synthesis," *Research on Chemical Intermediates*, **44** (2018) 1919-1933.
- [25] L.A. Polindara-García, E. Juaristi, "Synthesis of Ugi 4-CR and Passerini 3-CR Adducts under Mechanochemical Activation," *European Journal of Organic Chemistry*, **2016** (2016) 1095-1102.
- [26] S. Kumari, D. Kumar, S. Gajaganti, V. Srivastava, S. Singh, "Sc (OTf)<sub>3</sub> catalysed multicomponent synthesis of chromeno [2, 3-d] pyrimidinetriones under solvent-free condition," *Synthetic Communications*, **49** (2019) 431-443.
- [27] S.K. Maury, D. Kumar, A. Kamal, H.K. Singh, S. Kumari, S. Singh, "A facile and efficient multicomponent ultrasound-assisted "on water" synthesis of benzodiazepine ring," *Molecular diversity*, **25** (2021) 131-142.

### 4.5 References

- [1] M. Zhang, Q.-Y. Fu, G. Gao, H.-Y. He, Y. Zhang, Y.-S. Wu, Z.-H. Zhang, “Catalyst-free, visible-light promoted one-pot synthesis of spirooxindole-pyran derivatives in aqueous ethyl lactate”, *ACS Sustainable Chemistry & Engineering*, **5** (2017) 6175-6182.
- [2] P.P. Ghosh, S. Paul, A.R. Das, “Light induced synthesis of symmetrical and unsymmetrical dihydropyridines in ethyl lactate–water under tunable conditions,” *Tetrahedron Letters*, **54** (2013) 138-142.
- [3] P. Rai, H. Sagir, I. Siddiqui, “Visible Light and Aqueous Ethanol Synergy: An Efficient One-Pot Route for the Synthesis of Spiropyran Derivatives,” *ChemistrySelect*, **1** (2016) 4550-4553.
- [4] S.K. Maury, S. Kumari, A.K. Kushwaha, A. Kamal, H.K. Singh, D. Kumar, S. Singh, “Grinding induced catalyst free, multicomponent synthesis of indoloindole pyrimidine,” *Tetrahedron Letters*, **61** (2020) 152383.
- [5] S.K. Maury, D. Kumar, A. Kamal, H.K. Singh, S. Kumari, S. Singh, “A facile and efficient multicomponent ultrasound-assisted “on water” synthesis of benzodiazepine ring,” *Molecular diversity*, **25** (2021) 131-142.
- [6] S.-L. Zhu, K. Zhao, X.-M. Su, S.-J. Ji, “Microwave-assisted synthesis of new spiro [indoline-3, 4'-quinoline] derivatives via a one-pot multicomponent reaction,” *Synthetic Communications*, **39** (2009) 1355-1366.
- [7] L. Weber, “Multi-component reactions and evolutionary chemistry,” *Drug discovery today*, **7** (2002) 143-147.
- [8] N. Vinoth, P. Vadivel, A. Lalitha, “Expedient Synthesis and Antibacterial Activity of Tetrahydro-1' H-spiro [indoline-3, 4'-quinoline]-3'-carbonitrile Derivatives Using Piperidine as Catalyst,” *Synlett*, **32** (2021) 708-712.
- [9] S. Cretton, S. Dorsaz, A. Azzollini, Q. Favre-Godal, L. Marcourt, S.N. Ebrahimi, F. Voinesco, E. Michellod, D. Sanglard, K. Gindro, “Antifungal quinoline alkaloids from *Waltheria indica*,” *Journal of Natural Products*, **79** (2016) 300-307.
- [10] F. Aribi, A. Panossian, J.-P. Vors, S. Pazenok, F. Leroux, “2, 4-Bis (fluoroalkyl) quinoline-3-carboxylates as Tools for the Development of Potential Agrochemical Ingredients,” *European Journal of Organic Chemistry*, **2018** (2018) 3792-3802.

- [11] D. Pathak, D. Singh, "Quinoline: a diverse therapeutic agent," *International Journal of Pharmaceutical Sciences and Research*, **7** (2016) 1.
- [12] M. Boskabady, N. Mohsenpoor, L. Takaloo, "Antiasthmatic effect of *Nigella sativa* in airways of asthmatic patients," *Phytomedicine*, **17** (2010) 707-713.
- [13] A.N.B. KG, Sabde S. Mitra D. Singh IP, Bhutani KK. *Bioorg. Med. Chem*, **18** (2010) 2872.
- [14] S. Laurent, "Antihypertensive drugs," *Pharmacological research*, **124** (2017) 116-125.
- [15] X. Wen, S.-B. Wang, D.-C. Liu, G.-H. Gong, Z.-S. Quan, "Synthesis and evaluation of the anti-inflammatory activity of quinoline derivatives," *Medicinal Chemistry Research*, **24** (2015) 2591-2603.
- [16] R. Abonia, D. Insuasty, J. Castillo, B. Insuasty, J. Quiroga, M. Nogueras, J. Cobo, "Synthesis of novel quinoline-2-one based chalcones of potential anti-tumor activity," *European journal of medicinal chemistry*, **57** (2012) 29-40.
- [17] P. Prasanna, K. Balamurugan, S. Perumal, P. Yogeewari, D. Sriram, "A regio-and stereoselective 1, 3-dipolar cycloaddition for the synthesis of novel spiro-pyrrolothiazolyloxindoles and their antitubercular evaluation," *European journal of medicinal chemistry*, **45** (2010) 5653-5661.
- [18] K. Kaur, M. Jain, R.P. Reddy, R. Jain, "Quinolines and structurally related heterocycles as antimalarials," *European journal of medicinal chemistry*, **45** (2010) 3245-3264.
- [19] S.U. Maheswari, K. Balamurugan, S. Perumal, P. Yogeewari, D. Sriram, "A facile 1, 3-dipolar cycloaddition of azomethine ylides to 2-arylidene-1, 3-indanediones: synthesis of dispiro-oxindolylpyrrolothiazoles and their antimycobacterial evaluation," *Bioorganic & medicinal chemistry letters*, **20** (2010) 7278-7282.
- [20] K. Ding, Y. Lu, Z. Nikolovska-Coleska, G. Wang, S. Qiu, S. Shangary, W. Gao, D. Qin, J. Stuckey, K. Krajewski, "Structure-based design of spiro-oxindoles as potent, specific small-molecule inhibitors of the MDM2-p53 interaction," *Journal of medicinal chemistry*, **49** (2006) 3432-3435.
- [21] A. Thangamani, "Regiospecific synthesis and biological evaluation of spirooxindolopyrrolizidines via [3+ 2] cycloaddition of azomethine ylide," *European journal of medicinal chemistry*, **45** (2010) 6120-6126.
- [22] N. Karalı, Ö. Güzel, N. Özsoy, S. Özbey, A. Salman, "Synthesis of new spiroindolinones incorporating a benzothiazole moiety as antioxidant agents," *European journal of medicinal chemistry*, **45** (2010) 1068-1077.

- [23] S.R. Kang, Y.R. Lee, "Efficient one-pot synthesis of spirooxindole derivatives bearing hexahydroquinolines using multicomponent reactions catalyzed by ethylenediamine diacetate," *Synthesis*, **45** (2013) 2593-2599.
- [24] G.S. Singh, Z.Y. Desta, "Isatins as privileged molecules in design and synthesis of spiro-fused cyclic frameworks," *Chemical Reviews*, **112** (2012) 6104-6155.
- [25] F.-T. Sheng, J.-Y. Wang, W. Tan, Y.-C. Zhang, F. Shi, "Progresses in organocatalytic asymmetric dearomatization reactions of indole derivatives," *Organic Chemistry Frontiers*, **7** (2020) 3967-3998.
- [26] A. Kamal, H.K. Singh, D. Kumar, S.K. Maury, S. Kumari, V. Srivastava, S. Singh, "Visible Light-Induced Cu-Catalyzed Synthesis of Schiff's Base of 2-Amino Benzonitrile Derivatives and Acetophenones," *ChemistrySelect*, **6** (2021) 52-58.
- [27] H.K. Singh, A. Kamal, S. Kumari, D. Kumar, S.K. Maury, V. Srivastava, S. Singh, "Eosin Y-Catalyzed Synthesis of 3-Aminoimidazo [1, 2-a] Pyridines via the HAT Process under Visible Light through Formation of the C–N Bond," *ACS omega*, **5** (2020) 29854-29863.
- [28] K. Ansari, M. Nazeef, S. Ali, M.A. Waseem, W.A. Shah, S. Ansari, I.R. Siddiqui, J. Singh, "A metal-free visible light promoted three-component facile synthesis of 4-oxo-tetrahydroindoles in ethanol–water," *Journal of Heterocyclic Chemistry*, **58** (2021) 622-629.
- [29] F. Mohamadpour, "Visible light irradiation promoted catalyst-free and solvent-free synthesis of pyrano [2, 3-d] pyrimidine scaffolds at room temperature," *Journal of Saudi Chemical Society*, **24** (2020) 636-641.
- [30] M. Zhang, M.N. Chen, Z.H. Zhang, "Visible Light-Initiated Catalyst-Free One-Pot, Multicomponent Construction of 5-Substituted Indole Chromeno [2, 3-b] pyridines," *Advanced Synthesis & Catalysis*, **361** (2019) 5182-5190.

### 5.5 References

- [1] F. Zaera, "The long and winding road to catalysis," *Nature*, **541** (2017) 37-38.
- [2] S. Gajaganti, D. Kumar, S. Singh, V. Srivastava, B.K. Allam, "A New Avenue to the Synthesis of Symmetrically Substituted Pyridines Catalyzed by Magnetic Nano-Fe<sub>3</sub>O<sub>4</sub>: Methyl Arenes as Sustainable Surrogates of Aryl Aldehydes," *ChemistrySelect*, **4** (2019) 9241-9246.
- [3] D.J. Cole-Hamilton, "Homogeneous catalysis--new approaches to catalyst separation, recovery, and recycling," *Science*, **299** (2003) 1702-1706.
- [4] S. MacMillan, K. Lancaster, *ACS Catal.* 2017, **7**, 1776–1791; b) Kau LS; Spira-Solomon DJ; Penner-Hahn JE; Hodgson KO; Solomon EI J, *Am. Chem. Soc*, **109** (1987) 6433-6442.
- [5] P.W. Van Leeuwen, "Homogeneous catalysis: understanding the art," *Springer Science & Business Media*, 2006.
- [6] A.Z. Fadhel, P. Pollet, C.L. Liotta, C.A. Eckert, "Combining the benefits of homogeneous and heterogeneous catalysis with tunable solvents and nearcritical water," *Molecules*, **15** (2010) 8400-8424.
- [7] S. Jain, P.K. Paliwal, G.N. Babu, A. Bhatewara, "DABCO promoted one-pot synthesis of dihydropyrano (c) chromene and pyrano [2, 3-d] pyrimidine derivatives and their biological activities," *Journal of Saudi Chemical Society*, **18** (2014) 535-540.
- [8] H. Yang, R. Tian, Y. Li, "Organic reactions catalyzed by 1, 4-diazabicyclo [2.2. 2] octane (DABCO)," *Frontiers of Chemistry in China*, **3** (2008) 279-287.
- [9] W. Dong, P. Hu, J. Hu, X. Tong, "Lewis base-catalyzed divergent isomerizations of 5-hydroxyl-2, 3-dienoate," *Tetrahedron Letters*, **55** (2014) 1682-1685.
- [10] R. Ghorbani-Vaghei, F. Rahmatpour, N. Sarmast, J. Mahmoudi, A. Shahriari, "DABCO as a green catalyst for the synthesis of pyranoquinoline derivatives," *Canadian Journal of Chemistry*, **95** (2017) 601-604.

- [11] N. Vinoth, P. Vadivel, A. Lalitha, "Expedient Synthesis and Antibacterial Activity of Tetrahydro-1' H-spiro [indoline-3, 4'-quinoline]-3'-carbonitrile Derivatives Using Piperidine as Catalyst," *Synlett*, **32** (2021) 708-712.
- [12] F. Aribi, A. Panossian, J.P. Vors, S. Pazenok, F.R. Leroux, "2, 4-Bis (fluoroalkyl) quinoline-3-carboxylates as Tools for the Development of Potential Agrochemical Ingredients," *European Journal of Organic Chemistry*, **2018** (2018) 3792-3802.
- [13] X.F. Shang, S.L. Morris-Natschke, Y.Q. Liu, X. Guo, X.S. Xu, M. Goto, J.C. Li, G.Z. Yang, K.H. Lee, "Biologically active quinoline and quinazoline alkaloids part I," *Medicinal research reviews*, **38** (2018) 775-828.
- [14] D. Pathak, D. Singh, "Quinoline: a diverse therapeutic agent," *International Journal of Pharmaceutical Sciences and Research*, **7** (2016) 1.
- [15] S. Cretton, S. Dorsaz, A. Azzollini, Q. Favre-Godal, L. Marcourt, S.N. Ebrahimi, F. Voinesco, E. Michellod, D. Sanglard, K. Gindro, "Antifungal quinoline alkaloids from *Waltheria indica*," *Journal of Natural Products*, **79** (2016) 300-307.
- [16] Y. Fan, Y. He, X. Liu, T. Hu, H. Ma, X. Yang, X. Luo, G. Huang, "Iodine-mediated domino oxidative cyclization: one-pot synthesis of 1, 3, 4-oxadiazoles via oxidative cleavage of C (sp<sup>2</sup>)-H or C (sp)-H bond," *The Journal of organic chemistry*, **81** (2016) 6820-6825.
- [17] P. Kumar, V. Garg, M. Kumar, A.K. Verma, "Rh (iii)-catalyzed alkynylation: synthesis of functionalized quinolines from aminohydrazones," *Chemical Communications*, **55** (2019) 12168-12171.
- [18] S.K. Kang, J. Woo, S.E. Lee, Y.K. Kim, S.S. Yoon, "Organic light-emitting diodes based on benzo [q] quinoline derivatives," *Molecular Crystals and Liquid Crystals*, **685** (2019) 114-123.
- [19] C. Han, H. Li, R. Shi, T. Zhang, J. Tong, J. Li, B. Li, "Organic quinones towards advanced electrochemical energy storage: recent advances and challenges," *Journal of Materials Chemistry A*, **7** (2019) 23378-23415.

- [20] G. Luongo, G. Thorsén, C. Östman, "Quinolines in clothing textiles—a source of human exposure and wastewater pollution?," *Analytical and bioanalytical chemistry*, **406** (2014) 2747-2756.
- [21] C. Wu, J. Wang, J. Shen, C. Zhang, Z. Wu, H. Zhou, "A colorimetric quinoline-based chemosensor for sequential detection of copper ion and cyanide anions," *Tetrahedron*, **73** (2017) 5715-5719.
- [22] S.M. Prajapati, K.D. Patel, R.H. Vekariya, S.N. Panchal, H.D. Patel, "Recent advances in the synthesis of quinolines: a review," *Rsc Advances*, **4** (2014) 24463-24476.
- [23] K. Thomas, A.V. Adhikari, S. Telkar, I.H. Chowdhury, R. Mahmood, N.K. Pal, G. Row, E. Sumesh, "Design, synthesis and docking studies of new quinoline-3-carbohydrazide derivatives as antitubercular agents," *European journal of medicinal chemistry*, **46** (2011) 5283-5292.
- [24] K. Thomas, A.V. Adhikari, N.S. Shetty, "Design, synthesis and antimicrobial activities of some new quinoline derivatives carrying 1, 2, 3-triazole moiety," *European Journal of Medicinal Chemistry*, **45** (2010) 3803-3810.
- [25] N. Ahmed, K.G. Brahmhatt, S. Sabde, D. Mitra, I.P. Singh, K.K. Bhutani, "Synthesis and anti-HIV activity of alkylated quinoline 2, 4-diols," *Bioorganic & medicinal chemistry*, **18** (2010) 2872-2879.
- [26] N. de Silva, H. Guyatt, D. Bundy, "Anthelmintics," *Drugs*, **53** (1997) 769-788.
- [27] X. Wen, S.-B. Wang, D.-C. Liu, G.-H. Gong, Z.-S. Quan, "Synthesis and evaluation of the anti-inflammatory activity of quinoline derivatives," *Medicinal Chemistry Research*, **24** (2015) 2591-2603.
- [28] A. Montoya, J. Quiroga, R. Abonia, M. Nogueras, J. Cobo, B. Insuasty, "Synthesis and in vitro antitumor activity of a novel series of 2-pyrazoline derivatives bearing the 4-aryloxy-7-chloroquinoline fragment," *Molecules*, **19** (2014) 18656-18675.
- [29] K. Kaur, M. Jain, R.P. Reddy, R. Jain, "Quinolines and structurally related heterocycles as antimalarials," *European journal of medicinal chemistry*, **45** (2010) 3245-3264.

- [30] F. Yu, R. Huang, H. Ni, J. Fan, S. Yan, J. Lin, "Three-component stereoselective synthesis of spirooxindole derivatives," *Green chemistry*, **15** (2013) 453-462.
- [31] P. Prasanna, K. Balamurugan, S. Perumal, P. Yogeeswari, D. Sriram, "A regio- and stereoselective 1, 3-dipolar cycloaddition for the synthesis of novel spiro-pyrrolothiazolyloxindoles and their antitubercular evaluation," *European journal of medicinal chemistry*, **45** (2010) 5653-5661.
- [32] K. Ding, Y. Lu, Z. Nikolovska-Coleska, G. Wang, S. Qiu, S. Shangary, W. Gao, D. Qin, J. Stuckey, K. Krajewski, "Structure-based design of spiro-oxindoles as potent, specific small-molecule inhibitors of the MDM2– p53 interaction," *Journal of medicinal chemistry*, **49** (2006) 3432-3435.
- [33] A. Nandakumar, P. Thirumurugan, P.T. Perumal, P. Vembu, M. Ponnuswamy, P. Ramesh, "One-pot multicomponent synthesis and anti-microbial evaluation of 2'-(indol-3-yl)-2-oxospiro (indoline-3, 4'-pyran) derivatives," *Bioorganic & medicinal chemistry letters*, **20** (2010) 4252-4258.
- [34] A. Thangamani, "Regiospecific synthesis and biological evaluation of spirooxindolopyrrolizidines via [3+ 2] cycloaddition of azomethine ylide," *European journal of medicinal chemistry*, **45** (2010) 6120-6126.
- [35] S.U. Maheswari, K. Balamurugan, S. Perumal, P. Yogeeswari, D. Sriram, "A facile 1, 3-dipolar cycloaddition of azomethine ylides to 2-arylidene-1, 3-indanediones: synthesis of dispiro-oxindolylpyrrolothiazoles and their antimycobacterial evaluation," *Bioorganic & medicinal chemistry letters*, **20** (2010) 7278-7282.
- [36] N. Karalı, Ö. Güzel, N. Özsoy, S. Özbey, A. Salman, "Synthesis of new spiroindolinones incorporating a benzothiazole moiety as antioxidant agents," *European journal of medicinal chemistry*, **45** (2010) 1068-1077.
- [37] M. Kidwai, A. Jain, V. Nemaish, R. Kumar, P.M. Luthra, "Efficient entry to diversely functionalized spirooxindoles from isatin and their biological activity," *Medicinal Chemistry Research*, **22** (2013) 2717-2723.

- [38] M. Beyrati, M. Forutan, A. Hasaninejad, E. Rakovský, S. Babaei, A. Maryamabadi, G. Mohebbi, "One-pot, four-component synthesis of spiroindoloquinazoline derivatives as phospholipase inhibitors," *Tetrahedron*, **73** (2017) 5144-5152.
- [39] S.K. Maury, D. Kumar, A. Kamal, H.K. Singh, S. Kumari, S. Singh, "A facile and efficient multicomponent ultrasound-assisted "on water" synthesis of benzodiazepine ring," *Molecular Diversity*, **25** (2021) 131-142.
- [40] K. De, P. Bhanja, A. Bhaumik, C. Mukhopadhyay, "Zeolite-Y-Mediated Multicomponent Reaction of Isatins, Cyclic 1, 3-Diketones, and 1, 2-Phenylenediamine: Easy Access to Spirodibenzo [1, 4] diazepines," *ChemCatChem*, **10** (2018) 590-600.
- [41] S.-L. Zhu, K. Zhao, X.-M. Su, S.-J. Ji, "Microwave-assisted synthesis of new spiro [indoline-3, 4'-quinoline] derivatives via a one-pot multicomponent reaction," *Synthetic Communications*®, **39** (2009) 1355-1366.
- [42] S.R. Kang, Y.R. Lee, "Efficient one-pot synthesis of spirooxindole derivatives bearing hexahydroquinolines using multicomponent reactions catalyzed by ethylenediamine diacetate," *Synthesis*, **45** (2013) 2593-2599.
- [43] S.A. Ghozlan, M.F. Mohamed, A.G. Ahmed, S.A. Shouman, Y.M. Attia, I.A. Abdelhamid, "Cytotoxic and Antimicrobial Evaluations of Novel Apoptotic and Anti-Angiogenic Spiro Cyclic 2-Oxindole Derivatives of 2-Amino-tetrahydroquinolin-5-one," *Archiv der Pharmazie*, **348** (2015) 113-124.
- [44] H.K. Singh, A. Kamal, S. Kumari, D. Kumar, S.K. Maury, V. Srivastava, S. Singh, "Eosin Y-catalyzed synthesis of 3-aminoimidazo [1, 2-a] pyridines via the HAT process under visible light through formation of the C–N bond," *ACS omega*, **5** (2020) 29854-29863.
- [45] A. Kamal, H.K. Singh, D. Kumar, S.K. Maury, S. Kumari, V. Srivastava, S. Singh, "Visible Light-Induced Cu-Catalyzed Synthesis of Schiff's Base of 2-Amino Benzonitrile Derivatives and Acetophenones," *ChemistrySelect*, **6** (2021) 52-58.

- [46] H.K. Singh, A. Kamal, S. Kumari, S.K. Maury, A.K. Kushwaha, V. Srivastava, S. Singh, "Visible-Light-Promoted Synthesis of Fused Imidazoheterocycle by Eosin Y under Metal-Free and Solvent-Free Conditions," *ChemistrySelect*, **6** (2021) 13982-13991.
- [47] S.K. Maury, S. Kumari, A.K. Kushwaha, A. Kamal, H.K. Singh, D. Kumar, S. Singh, "Grinding induced catalyst free, multicomponent synthesis of indoloindole pyrimidine," *Tetrahedron Letters*, **61** (2020) 152383.
- [48] A. Kamal, H.K. Singh, S.K. Maury, S. Kumari, A.K. Kushwaha, V. Srivastava, S. Singh, "Visible Light-Driven Synthesis of Amine–Sulfonate Salt Derivatives: A Step towards Green Approach," *Journal of Molecular Structure*, **1257** (2022) 132523.

**LIST OF  
RESEARCH PUBLICATIONS**

---

---

## List of Publications: Suresh Kumar

---

---

- 1 Visible light triggered synthesis of spiro[indoline-3,4'-quinoline] via oxidative coupling of indole with enaminone and malononitrile

**Suresh Kumar Maury**, Ambuj Kumar Kushwaha, Arsala Kamal, Himanshu Kumar Singh and Sundaram Singh

*Journal of Molecular Structure*, (2022) <https://doi.org/10.1016/j.molstruc.2022.134452>
- 2 A New Avenue to One-Pot Four-Component Synthesis of Spiro[Indoline-3,4'-Quinoline] Derivative Using DABCO As A Green Catalyst

**Suresh Kumar Maury** and Sundaram Singh

*Synthesis*, (2022), DOI: 10.1055/a-1948-2677
- 3 Visible Light Initiated Oxidative Coupling of Indole and Active Methylene Compounds Using Eosin Y as a Photocatalyst.

Ambuj Kumar Kushwaha, **Suresh Kumar Maury**, Arsala Kamal, Himanshu Kumar Singh and Sundaram Singh

*Synthesis*, (2022), DOI: 10.1055/a-1894-830
- 4 Visible Light-Driven Synthesis of Amine–Sulfonate Salt Derivatives: A Step towards Green Approach

Arsala Kamal, Himanshu Kumar Singh, **Suresh Kumar Maury**, Savita Kumari, Ambuj Kumar Kushwaha, Vandana Srivastava, and Sundaram Singh

*Journal of Molecular Structure*, 1257(1):132523,(2022)

## List of Publications

---

---

- 5 TBAI-catalyzed C–N bond formation through oxidative coupling of benzyl bromides with amines: a new avenue to the synthesis of amides  
Dhirendra Kumar, **Suresh Kumar Maury**, Savita Kumari, Arsala Kamal, Himanshu Kumar Singh, Sundaram Singh & Vandana Srivastava  
*Synthetic communication, Volume 52, 2022 - Issue 3, 2022*
- 6 Visible Light Mediated, Photocatalyst-Free Condensation of Barbituric Acid with Carbonyl Compounds  
Savita Kumari, **Suresh Kumar Maury**, Dhirendra Kumar, Arsala Kamal, Himanshu Kumar Singh, Sundaram Singh  
*Chemistry Select, 6(12), Pages 2980-2987(2021)*
- 7 Visible-Light-Promoted Synthesis of Fused Imidazoheterocycle by Eosin Y under Metal-Free and Solvent-Free Conditions  
Himanshu Kumar Singh, Arsala Kamal, Savita Kumari, **Suresh Kumar Maury**, Ambuj Kumar Kushwaha, Vandana Srivastava, Sundaram Singh  
*Chemistry Select, 6(48), 13982-13991(2021)*
- 8 Visible Light-Induced Cu-Catalyzed Synthesis of Schiff's Base of 2- Amino Benzonitrile Derivatives and Acetophenones  
Arsala Kamal, Himanshu Kumar Singh, Dhirendra Kumar, **Suresh Kumar Maury**, Savita Kumari, Sundaram Singh  
*Chemistry Select 6.1:52-58(2021)*

## List of Publications

---

---

- 9 Grinding induced catalyst free, multicomponent synthesis of Indoloindole pyrimidine  
**Suresh Kumar Maury**, Savita Kumari, Ambuj Kumar Kushwaha, Arsala Kamal,  
Himanshu Kumar Singh, Dharendra Kumar, Sundaram Singh  
*Tetrahedron Letter 61 (2020) 152383*
- 10 Eosin Y-Catalyzed Synthesis of 3-Aminoimidazo [1,2-a] Pyridines via the HAT  
Process under Visible Light through Formation of the C–N Bond  
Himanshu Kumar Singh, Arsala Kamal, Savita Kumari, **Suresh Kumar Maury**,  
Dhirendra Kumar, Sundaram Singh  
*ACS Omega 5, 46, 29854–29863(2020)*
- 11 A facile and efficient multicomponent ultrasound-assisted “on water” synthesis of  
Benzodiazepine ring  
**Suresh Kumar Maury**, Dharendra Kumar, Arsala Kamal, Himanshu Kumar Singh,  
Savita Kumari, Sundaram Singh  
*Molecular Diversity, (2020) DOI: 10.1007/s11030-019-10031-y*