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Review Article

The Pharmaceutical Profile of Oxazine Compound Derived from Chalcones

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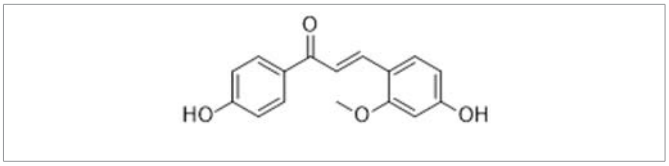
ABSTRACT

The pharmacological value of heterocyclic compounds draw the attentions of many researchers to find new methodologies on the synthesis of this kind of compounds due to the presence of hetero atoms within their structures which make these compounds active towards many diseases. According to the above, Many routes were used for the synthesis of those heterocyclic compounds were used. Among the heterocyclic compounds having oxygen and Nitrogen heterocycles that showed a lot of pharmaceutical applications is the Oxazine compounds. In this study we will focus on the methods of synthesis especially the method which is the synthesis of the oxazine compounds from chalcon routes.

Keywords: Pharmaceutical; Profile; Oxazine; Chalcones; Derivatives

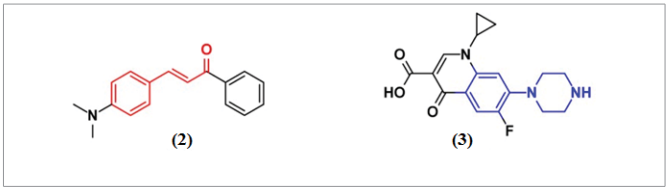
INTRODUCTION

Among the well-known natural chalcone compounds is Echinatin which was isolated from Licorice which is hydroxyl chalcone derivative called retrochalcone. This compound has divers therapeutic effects these effects including anti-oxidant and inflammatory effects which exhibited affects against I/R-induced myocardial on hearts due to this anti-inflammatory and oxidant bioactivities of Echinatin. And alsoit was found HAT active side 4-OH rather than 4-OH which both form the final RAF products [1].



Echinatin (1)

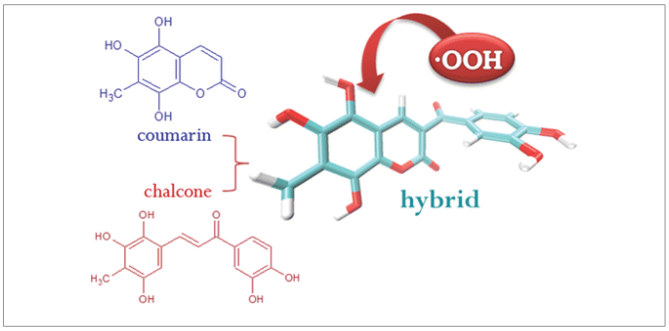
Chalcone compounds themselves have many medical and pharmaceutical applications including anti-cancer activity this was found in the work of Modo and his colleagues, they synthesized many chalcone derivatives among them are the compounds bellow [2]:



(2) (3)

Marcelo N. and his colleagues have reviewed the investigation and the therapeutic drug design of many chalcone compounds as anti-cancer agent together with the well-known chalcone drugs sealed in the market [3].

Gloria and his co-workers have studied the anti-oxidant activities of Coumarin chalcone hybrid as phenoxy radical scavengers using the density function and conventional transition state theory using polar solvents. They found that the scavenging ability is more than that for non-hybrid one. The study revealed that the molecules reacts faster than Trolox with the peroxy radical [4].



Yasameen K. et-al has reviewed the anti-microbial activity of many chalcones against different microorganism [5]. There are many papers in the literatures concerning the preparation of oxazine compounds; the most popular method is the cyclization of chalcone compound using urea derivatives [6-8].

kalirajan et-al has synthesized some heterocyclic compounds including oxazines by the cyclization of chalcones using hydrazine and urea derivatives. The synthesized compound was evaluated for anti-microbial activities against both gram-ve and gram +ve which showed comparable activities toward the standard antibiotics [9].

V. Tiwari et-al have studied the synthesis of some oxazine compounds from chalcone derivatives and also studied the cytotoxicity and inhibition of β hematin formation in both vitro and vivo [10]. Sadhana and her co-workers in 2013 have prepared oxazine from chalcones and urea. They studied the biological activities of these compounds including testing against gram +ve and –ve bacteria and some fungi [11]. In the same year Thirunarayanan G. and his co-workers were also studied aryl chalcones as an efficient precursors for oxazine compounds, the oxazine compounds were also studied for anti-microbial activaty against gram +ve and –ve bacteria [12].

Girly and co-workers have synthesized some oxazine compounds from chalcone derivatives. These oxazine compounds were studded their anti-fungal activity by molecular docking using Argus lab. The in vivo study of anti-microbial assay revealed that the synthesized compounds have an inhibition of β-hematin inhibitory using DMSO as solvent [13]. Solid SiO2-H3PO4 was used for the cyclization of some chalcones using solvent free-condition for the preparation of some oxazine derivatives. These derivatives (amino oxazine) were studded for anti-microbial activity some of these compound have showed appreciable anti-microbial effects [14].

P. Anusha and his co-workers have investigated the synthesis of shiff bass oxazine compounds from chalcones and screened them for anti-bacterial activities. They found that these compounds possess good anti-bacterial activities against Eschertiacoli and pseudomonas areugsnosa [15]. Nadia S. and her co-workers have synthesized some oxazine derivatives from some chalcone derivatives, these compounds were screened against different types of microorganisms they found that these compounds showed high effective towards these microorganisms even at low concentration and more effective than Ampicillin and Ciprofloxacin [16]. In 1020 Mohammad A. and Mohd have reviewed the pharmacological profile of oxazine and its derivatives including antimicrobial activity, antiplatelet aggregation, antidiabetic, antidepressant, enzyme inhibitory, anticoagulant and receptor agonist activities, just one of them was from chalcone precursors [17].

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RESULTS AND DISCUSSION

There were limited researches concerning review on the pharmaceutical, biological and medical applications of chalcones which are rarely found as a review in the literature. According to the mentioned of the above applications in the introduction part of this review we are here provide a collections of many research works of authors whom they concentrate their effort to do this task so we hope to put the researcher efforts available for others to expand their knowledge on this field.

CONCLUSION

In conclusion of this study we found that limited work has been introduced concerning the importance of both oxazine and their precursors (chalcones) in pharmaceutical field so that we did this work.

REFERENCES

1. Liang M, Li X, Ouyang X, Xie H, Chen D. Antioxidant mechanisms of echinatin and licochalcone a. Molecules. 2018 Dec 20;24(1):3. doi: 10.3390/molecules24010003. PMID: 30577443; PMCID: PMC6337356.
2. Mao Z, Zheng X, Qi Y, Zhang M, Huang Y, Wan C, Rao G. Synthesis and biological evaluation of novel hybrid compounds between chalcone and piperazine as potential antitumor agents. RSC Adv. 2016;6:7723–7727. https://tinyurl.com/3akas4a5
3. Gomes MN, Muratov EN, Pereira M, Peixoto JC, Rosseto LP, Cravo PVL, Andrade CH, Neves BJ. Chalcone derivatives: Promising starting points for drug design. Molecules. 2017 Jul 25;22(8):1210. doi: 10.3390/molecules22081210. PMID: 28757583; PMCID: PMC6152227.
4. Mazzone G, Galano A, Alvarez-Idaboy JR, Russo N. Coumarin-Chalcone hybrids as peroxyl radical scavengers: kinetics and mechanisms. J Chem Inf Model. 2016 Apr 25;56(4):662-670. doi: 10.1021/acs.jcim.6b00006. Epub 2016 Mar 29. PMID: 26998844.
5. Majedy, Abdul H, Kadhum, Amiery, Mohamad. Coumarins: The Antimicrobial agents. Sys Rev Pharm. 2017;8(1):62-70. https://tinyurl.com/fsvxts
6. Majeed. Preparation and identification of some new compounds chalcone and new derivatives of 1,3- oxazpine. Journal of al-qadisiyah for pure science (quarterly). 2013;13(4):181-195. https://tinyurl.com/u335ye3a
7. Shaman IM, Mohammad SAJ. Synthesis of some heterocyclic compounds derived from furfural using ultrasonic waves. Biomed J Sci & Tech Res. 2019;22(1):6. https://tinyurl.com/9jtfj44u
8. Ajely M, Noori A. An efficient and solvent free synthesis of N-Aryl2,3-Dihydro-4H naphtho-[2,1-e] 1,3-oxazines. Biomed J Sci & Tech Res. 2020;29(3). https://tinyurl.com/3tf6b9am
9. Kalirajan R, Gowramma B, Jubie J. Synthesis and biological evaluation of some heterocyclic derivatives of chalcones. International Journal of Chem Tech Research. 2009;1(1):27-34.
10. Tiwari V, Meshram J, Ali P, Sheikh J, Tripathi U. Novel oxazine skeletons as potential antiplasmodial active ingredients: Synthesis, in vitro and in vivo biology of some oxazine entities produced via cyclization of novel chalcone intermediates. J Enzyme Inhib Med Chem. 2011 Aug;26(4):569-578. doi: 10.3109/14756366.2010.539566. Epub 2010 Dec 20. PMID: 21171899.
11. Upadhya S, Dhanya S, Srilatha R, Soumyashee AS. Anusandhana. Journal of science, Engineering and manegment. 2013;2:56-64.
12. Thirunarayanan G, Sundararajan R, Arulkumaran R. Aryl chalcones as efficient precursors for deriving oxazine: solvent-free synthesis and antimicrobial activities of some oxazine-2-amines. International Letters of Chemistry. Physics and Astronomy. 2014;23:82-97. https://tinyurl.com/6yem9nbh
13. Girly T, Meena C, Bhat AR, Krishnakumar K. Molecular docking studies: 1, 3-thiazine and 1,3-oxazine dervatives. Journal of Pharmacy Research. 2014;8(2):136-138. https://tinyurl.com/d2kjh5rn
14. Ganesamoorthy T, Velayutham R. Solid SiO_2-H_3PO_4 is an efficient catalyst for cyclization of enones under solvent-free condition: synthesis and antimicrobial activities of some oxazine derivatives. J Chil Chem Soc. 2014;59(3):2574-2581.
15. Anusha P, Manichandrika P, Shruthi S, Nishat S. Synthesis of schiff's base derivatives of oxazine from chalcones and evaluation of their antibacterial activity. World journal of pharmacy and pharmaceutical sciences. 2015;4(11):886-895. https://tinyurl.com/42kxvphc
16. Majeed, Falah M, Aldujai. Synthesis, characterization and biological activity of some new heterocyclic compounds derived from 4-aminoacetophenone. Biochem Cell Arch. 2018;18:1107-1116. https://tinyurl.com/8f5t7mp6
17. Mohammad A, Mohd I. Pharmacological profile of oxazine and its derivatives. Int J New Chem. 2020;7:60-73. https://tinyurl.com/xbfw79rw

DOI: https://dx.doi.org/10.37871/ajpt.id25