# CHAPTER-2

# LITERATURE REVIEW

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## 2.1 Literature Review

Diacerein and Febuxostat are class-II drugs as per Biopharmaceutical classification system and strongly needed efficient formulation strategies on solubility and bioavailability enhancement. Many scientists and researchers have been associated with this aspect of these drugs and published their research. In this chapter of thesis, we are trying to summarize all research articles and reports available for solubility and bioavailability enhancement of the same.

Patrekar P et al. reported about solubility enhancement and evaluation of Diacerein using cyclodextrin as hydrophilic carriers[1]. Patil SB et al. worked on improvement in the dissolution profile of Diacerein using a surfactant-based solid dispersion technique and reported their research[2,3]. Walke PS et al. prepared sold dispersion of Diacerein with mannitol for solubility enhancement[4] while Deshmukh DB et al. reported for dissolution enhancement of Diacerein by solid dispersion with PVP K-30[5]. An European patent had also been reported by Nakhat P et al. on self-emulcifying pharmaceutical compositions of Rhein or Diacerein for solubility and bioavailability enhancement of drug[6]. Aggarwal AK et al. researched on solid dispersion of Diacerein with polyethylene glycol 6000[7] and fast-dissolving, fatty acid-based self-emulsifying solid dispersions of Diacerein for improvement of its solubility and dissolution[8]. Yadav DS et al. reported the preparation and characterization of Diacerein microcrystals for betterment of dissolution behaviour of drug[9]. Jain A et al. developed and characterized the solid lipid nanoparticles of Diacerein for enhancement in bioavailability and reduction in its side effects[10]. Bhatt DK et al. worked on preparation and evaluation of inclusion complexes of Diacerein with β-cyclodextrin and hydroxypropyl β-cyclodextrin for improvement of in vitro drug release[11]. Elsayed I et al. published their research on nanosizing of Diacerein and pharmacokinetic study in healthy human volunteers for oral bioavailability enhancement[12]. Petralito S et al. studied and reported the spectroscopic characterization of both aqueous and solid-state Diacerein/hydroxypropyl-β-cyclodextrin inclusion complexes[13]. Rehman M et al. reported the preparation of solid and liquid lipid-based binary solid lipid nanoparticles of Diacerein with in vitro evaluation of sustained release, simultaneous loading of gold nanoparticles, and potential thermoresponsive behavior[14]. El-Laithy HM et al. researched and reported on novel self-nanoemulsifying self-nanosuspension (SNESNS) for enhancing oral

bioavailability of Diacerein[15]. Gómez-Gaete C et al. developed and characterize the rhein (an active metabolite of drug Diacerein) loaded microparticles for treatment of osteoartritis[16]. Moghddam SR et al. formulated and optimized niosomes of Diacerein for topical delivery using 3-factor, 3-level Box-Behnken design for the management of psoriasis[17]. Khan MI et al. also reported about development and characterization of Diacerein niosomes for better solubility and dissolution compared to pure drug[18,19]. Javed I et al. prepared and reported the lecithin-gold hybrid nanocarriers as efficient and pH selective vehicles for improvement in oral bioavailability of Diacerein (in-vitro and in-vivo study)[20]. Solubility improved immediate release formulation (IR) and a gastroretentive formulation (GR) was designed, developed and characterized by Mandawgade SD et al to achieve rapid absorption of Diacerein through upper part of gastro-intestinal tract[21]. Malik R et al. stated the development and in vitro characterization of Diacerein loaded novel gastroretentive nanofiber system using Poly L-(lactic acid) (PLLA) for improvement of Diacerein solubility[22].

Kuchekar BS et al. researched and published the report on solubility enhancement and formulation of rapid disintegrating tablet of Febuxostat Cyclodextrin complex[23]. Maddileti D et al. published an article about soluble cocrystals of the xanthine oxidase inhibitor Febuxostat[24]. Dass R et al. reported their work on formulation and evaluation of Febuxostat fast disintegrating tablet with β-cyclodextrin intended for enhanced dissolution[25]. Compatibility Study and Solubility Enhancement of Febuxostat with hydroxylpropyl-β-cyclodextrin, polyethylene glycol 6000 and croscarmellose sodium using Box Behnken Design was reported by Neupane S et al[26]. Ahuja BK et al. reported on formulation, optimization and in vitro–in vivo evaluation of Febuxostat nanosuspension for oral bioavailability enhancement of drug[27]. Pandya RB et al. also reported their study for dissolution enhancement of Febuxostat by developing a solid dispersion adsorbate-a novel technique[28]. The research article of Han X et al. explored the preparation optimization and in vitro-in vivo investigation for capsules of the choline salt of Febuxostat aimed to increase its water solubility and in vivo oral absorption[29]. Improvement in dissolution and bioavailability of Febuxostat was reported by Sharma OP et al. by developing Febuxostat nanocrystals using Soluplus as stabilizer[30]. Kini A et al. reported the phase behavior, intermolecular interaction, and solid state characterization of amorphous solid dispersion of Febuxostat by solvent evaporation technique[31]. Sundari PT et al. described the physicochemical

characterization and in vitro evaluation of Febuxostat solid dispersion for solubility enhancement of drug using PVP K30 and HPMC E15 as carrier module[32].

## 2.2 References


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