CHAPTER – III

REVIEW

OF

LITERATURE
A Brief Review of the Literature

- **Pearce et al., (1986)** studied different physical properties of lactose as a natural excipient in pharmaceutical formulations including its binding characteristics\(^27\).

- **Arama et al., (1988)** used Baobab fruit pulp as a new excipient in theophylline hydrophilic matrix type tablet dosage form. Results of dissolution tests indicated that this type of excipient behave as a hydrophilic matrix\(^28\).

- **Garr et al., (1991)** evaluated sorghum starch as a binder and disintegrant at various concentrations in tablet formulations using sodium bicarbonate and calcium carbonate as the medicinal substances. The results indicated that sorghum starch was a suitable binder and disintegrant and exhibited about twice the disintegrant power and about the same binding efficacy as compared to maize starch\(^29\).

- **Ozumba et al., (1992)** evaluated potential use of *Detarium microcarpum* seed mucilage as a binder, disintegrant and direct compression excipient in tablet formulations and concluded it could be used as a binder and disintegrate but not as a direct compressible material\(^30\).

- **Upadrashtas M. et al., (1992)** evaluated chitosan as a binder in chlorpheniramine maleate tablets\(^31\).

- **Rizk et al., (1993)** evaluated a natural polymer scleroglucan as an excipient in hydrophilic matrix tablets and indicated that tablets made from a mixture of 3 different diluents and scleroglucan provided the best matrix\(^32\).

- **Rao Kurma et al., (1993)** used drum stick polysaccharide mucilage from pods of *Moringa ptergosperma* as pharmaceutical excipient and concluded that polysaccharide showed properties comparable to the excipient tragacanth\(^33\).

- **Al-Meshal et al., (1995)** evaluated egg albumin as a filler for prolonged release direct compressible tablets and concluded that, in direct compression tablets, egg albumin can be used as a filler to control drug release and that the release profile will be controlled by drug interaction with the egg albumin, drug diffusion through the egg albumin matrix, or both\(^34\).
• Te wierik et al., (1996) evaluated binding properties of high surface area potato starch as an excipient in pharmaceutical tablets and concluded that the compactability of the final products showed a positive correlation with the specific surface area, and the binding capacity appeared to increase with the moisture content of the products.\(^{35}\)

• Ramani C.C. et al., (1996) studied diabetic acid as matrix forming material of Diclofenac tablets and showed that diabetic acid having good film forming, acid/alkali resistant properties could be successfully used to prolong release of water-soluble drug for up to 24 h.\(^{36}\)

• Chukwunweike onukwo et al., (1997) evaluated *Anacardium occidentale* gum as a binder in lactose based tablet formulations and concluded that tablets prepared using the polysaccharide gum as the binder had good hardness and friability profiles and the release rates exhibited by tablets containing the gum as the binder were slower compared with tablets containing acacia.\(^{37}\)

• Gebert et al., (1998) used purified guar galactomannan as an improved pharmaceutical excipients in which ranitidine hydrochloride was taken as a model drug and reported its effect on tablet hardness, hydration rate and dissolution profile.\(^{38}\)

• Kepsutlu et al., (1999) evaluated chitosan as an excipients in tablet formulations using piroxicam as a model drug and concluded that chitosan is a useful excipient for the controlled release of active substances in tablets.\(^{39}\)

• Katharina M. et al., (1999) studied the release behavior and effect of added cations of matrix tablets of carrageenans and found that the order of release was nearly zero-order kinetics for theophylline monohydrate, a nonionic drug. Diffusion of the anionic drug diclofenac sodium was anomalous and physical mixing of salts with the carrageenans could resulted in an increased release of drug caused by decreased cohesion of the matrix during drug release, mainly for calcium chloride.\(^{40}\)

• Vargas, C.I. et al., (1999) studied kinetic release of theophylline from hydrophilic swellable matrices and concluded that as the percentage of polymer increased, the
drug release decreased. However, no significant differences in release between 30 and 40% formulations were observed. At low levels of polymer, release was controlled by the type of diluent.

- **Munday Dale L. et al., (2000)** investigated hydration, erosion and drug release mechanism of compressed xanthan and karaya gum matrices using 2 model drugs caffeine and diclofenac sodium, exhibited both xanthan and karaya gums produced near zero order drug release with the erosion mechanism playing a dominant role, especially in karaya gum matrices.


- **Avachat et al., (2002)** examined oral controlled release drug delivery system with husk powder from *Lepidium sativum* seeds and exhibited that The gel forming husk powder obtained from *Lepidium sativum* seeds was present in the range of 10 to 70 % of the total weight of dosage form, the cross-linking enhancer selected from xanthan gum, karaya gum and the like in amounts of between 3 to 10 % by weight of the dosage form resulted a release profile between 4 to 20 hours.

- **Sumathi S. et al., (2002)** examined the sustained release behavior of both water-soluble (acetaminophen, caffeine, theophylline and salicylic acid) and water insoluble (indomethacin) drugs from tamarind seed polysaccharide isolated from tamarind kernel powder and concluded that tamarind seed polysaccharide could be used for controlled release of both water-soluble and water insoluble types of drugs. Zero order release could be achieved taking sparingly soluble drug like indomethacin from TSP. The rate of release could be controlled by using suitable diluents like lactose and microcrystalline cellulose. For water-soluble drugs the release amount could also be controlled by partially cross linking the matrix. The extent of release can be varied by controlling degree of cross-linking.
• Magnus A Iwuagwu et al., (2002) investigated *Pleurotus tuber-regium* powder as a tablet disintegrant and concluded that it may be used as an alternative to maize starch BP as a tablet disintegrant\(^\text{46}\).  

• Sumathi S. et al., (2003) investigated the role of modulating factors on release of caffeine from tamarind seed polysaccharide tablets and concluded that diffusion of caffeine from tamarind seed polysaccharide matrix was found to be dependent on gel concentration and the rate of release of caffeine from this matrix decreased with increase of loading of drug\(^\text{47}\).  

• Y.S.R. Krishnaiah et al., (2002) studied design of oral controlled drug delivery systems for highly water-soluble drugs using guar gum as a carrier in the form of three-layer matrix tablets and found that guar gum, in the form of three-layer matrix tablets, is a potential carrier in the design of oral controlled drug delivery systems for highly water-soluble drugs such as trimetazidine dihydrochloride\(^\text{48}\).  

• Hossein orafai et al., (2003) prepared a granule model for evaluating adhesion of pharmaceutical binders by using corn starch, gelatin, methylcellulose and hydroxypropylmethylcellulose and concluded this model could be applicable to differentiate efficacy of binder under studies\(^\text{49}\).  

• Bashar M. et al., (2003) investigated the microenvironment pH of swellable and erodible buffered matrices on the release characteristics of Diclofenac sodium and concluded that changing the pH within the matrix influenced the rate of release of drug without affecting the release pattern\(^\text{50}\).  

• Oluwatoyin A. Odeku et al., (2005) evaluated *Albizia zygia* gum as a binding agent in tablet formulations in comparison with gelatin BP and found that tablets produced with Albizia gum exhibit better mechanical properties and longer disintegration and dissolution times than those containing gelatin BP\(^\text{51}\).  

• Olufunke D. Akin-Ajani et al., (2005) investigated the effects of plantain starch obtained from the unripe fruit of the plant *Musa paradisiaca* L. (Musaceae) on the mechanical and disintegration properties of paracetamol tablets and compared with the effects of corn starch BP and concluded that plantain starch could be useful as an
alternative binding agent to corn starch, especially where faster disintegration is required and the problems of lamination and capping are of particular concern\textsuperscript{52}.

- **Ohwoavworhua F.O. *et al.*, 2005, evaluated the physical characteristics of microcrystalline cellulose (CP-MCC), obtained from the raw cotton of *Cochlospermum planchonii* and concluded that CP-MCC would be a better disintegrant than Avicel PH 101\textsuperscript{53}.

- **Yeole P G *et al.*, (2006) designed and evaluated xanthan gum based sustained release matrix tablets of Diclofenac sodium, found that the drug was released by zero order kinetic and concluded xanthan gum can be used as an effective matrix former, to extend the release of Diclofenac sodium\textsuperscript{54}.

- **Chowdary KPR *et al.*, (2006) evaluated olibanum and its resin as rate controlling matrix for controlled release of Diclofenac and concluded drug release from matrix tablets was by Fickian diffusion and followed first order kinetics\textsuperscript{55}.

- **Ghule B.V. *et al.*, (2006) evaluated binding properties of *Eulophia campestris* Wall. mucilage and concluded that it can be used as a successful binder at 6-8% concentrations\textsuperscript{56}.

- **Oladapo A. Adetunji *et al.*, (2006) evaluated binding properties of trifoliate yam starch, obtained from *Dioscorea dumetorum* (Pax), in chloroquine phosphate tablet formulations and compared with official corn starch and found that Trifoliate yam starch produced tablets have better binding properties than corn starch\textsuperscript{57}.

- **Morkhade D.M. *et al.*, (2006) evaluated natural gum copal and gum damar as novel sustained release matrix forming materials in tablet formulation using Diclofenac sodium as a model drug and concluded that both gums possess substantial matrix forming property that could be used for sustained drug delivery\textsuperscript{58}.

- **Senapati M.K. *et al.*, (2006) evaluated in vitro release characteristics of matrix tablets based on karaya gum and guar gum as a release modulator and concluded that combination of gums exhibited more sustained release than individual gum\textsuperscript{59}.
• Bhimte A. Nitin et al., (2007) evaluated microcrystalline cellulose prepared from sisal fibers as a tablet excipient and concluded that the derived MCC can be used as diluent and disintegrant for both immediate-release as well as sustained-release oral solid dosage forms

• S.H. Lakade et al., (2008) developed hydrophilic polymer (HPMC) and hydrophobic polymer (Ethyl cellulose) based Nicorandil matrix sustained release tablet which can release the drug up to time of 24 hrs in predetermined rate.

• Kar R.K. et al., (2009) developed oral controlled release matrix tablets of Zidovudine (AZT) in order to improve efficacy and better patient compliance.

• Hindustan Abdul Ahad et al., (2010) developed a Controlled release matrix tablets of Glibenclamide with the fruit mucilage of Azadirachta indica and found it can be used as a matrix forming material for making Controlled release Glibenclamide tablets.

• Phani Kumar G. K et al., (2011) isolated and evaluated using Tamarind Seed Polysaccharide (TSP) as a natural excipient.

• Phani Kumar G. K et al., (2011) evaluated sustained release matrix tablets of Lornoxicam using Tamarind Seed Polysaccharide (TSP) as a natural excipient and found Zero order drug release kinetics via, swelling, diffusion and erosion.

• Bangale G.S et al., (2011) formulated and evaluated sustained release matrix tablets of nimodipine by using various natural matrix former gums as Xanthan gum, Olibanum gum, and Locust bean gum separately and demonstrated the feasibility of natural gum in the development of matrix tablets for controlled delivery of nimodipine.