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● *RESEARCH NOTE* ●

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Optimization of different marketed grades of polymers for mucoadhesive suspension

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The oral route of drug administration is the most important method for administering drugs for systemic effects. When a new drug is discovered, one of the first questions, a pharmaceutical company asks is whether or not the drug can be effectively administered by the oral route, for its intended effect. From a patient's perspective swallowing a dosage form is comfortable and familiar means of taking medication. As a result, patient compliance and hence drug treatment is typically more effective with orally administered medications as compared to the non-conventional routes of administration (Dhirendra *et al.,* 2009). The development of oral dosage forms for poorly water soluble drugs and their bioavailability enhancement has been a challenge to formulation scientists in drug development. The three major factors that govern the rate and extent of bioabsorption from the GIT for such drugs are the permeability of drug to GI mucosa, their degree of solubility and retention time at absorption window. The inability to restrain and localize the system at gastrointestinal tract is one of the significant factors for low bioavailability of brick dust molecules formulated in the form of suspensions (Khan, 2001). In order to circumvent this problem, it has been proposed, successfully for several of them, to associate drugs to mucoadhesive polymeric systems because of their propensity to interact with the mucosal surface (Ponchel *et al*., 1998). This is finally requires not only for the local targeting of drugs but also for a better control of systemic delivery (Ahmed, Bonner and Desai, 2002). Currently however it is rather difficult to place the oral suspecsions at selective sites in the gastrointestinal tract for the long time, for this reason there have been considerable attempts to lower the fraction undergoing directly fecal elimination by increasing the bioadhesives interaction of the particles at the surface of intestinal membrane (Ben *et al.,* 1994; 1996).

Therefore the potential of a drug delivery system to localize a drug at the site of absorption for longer time and to promote intimate contact between the formulation and underlying absorption tissue has great appeal for both local and systemic effects. The idea of using bioadhesive polymers to prolong the contact time in the mucosal route of drug delivery was introduced in early 1980s, and since then it has attracted considerable attention from pharmaceutical scientists (Bernkop-Schnurch, 2005). This is a simple and yet highly innovative concept. Soon after the idea of mucoadhesion was introduced, its utility to pharmaceutical systems was studied (Park and Robinson, 1984) and since then large number of investigators have been involved in exploring the fundamental aspects of mucoadhesion and potential application of mucoadhesive dosage forms. In this context, the present study undertaken and designed to determine the rationale grade of Carbopol, a proven mucoadhesive polymer, for the formulation of mucoadhesive suspension dosage forms intended to improve bioavailability of poorly soluble drug - norfloxacin, patient compliance, reduce dose of drug and cost of formulation products.

Carbopol is acrylic acid polymer, carboxy-vinyl polymer, aldo known as polyacrylic acid available in the market in different grades *viz.,* carbomer 934P, 971P, 71G, 974P, resin share the common CAS registry number of (9003-01-4). Carbomers are synthetic high molecular weight polymers of polyacrylic acid that are cross-linked with either allylsucrose or allylethers of pentaerythritol.they contain between 56-68% of carboxylic groups appears as white/coloured, fully acidic hygroscopic powder, with a

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