TABLE 4
Some of the marketed brands containing mucoadhesive polymers.—cont'd

Sr. No.	Brand name	API	Indication	Mucoadhesive excipients	Dosage form	Mfg. company
18	Replens	Glycerin	Vaginal dryness symptoms	Polycarbophil	Moisturizer	LDS Consumer Products
19	Rhincort	Budesonide	Nasal allergy	Hydroxypropyl cellulose	Nasal spray	Johnson & Johnson Consumer Inc.
20	Sitavig/ labiriad (Italy)	Acyclovir	Herpes labialis	Milk protein concentrate, hypromellose	buccal tablet	Onxeo S.A.
21	Striant	Testosterone	Primary hypogonadism	Carbomer 934P, polycarbophil	Monoconvex tablet	Columbia Laboratories, Inc.
22	Susadrin	Nitroglycerin	Angina	Synchron (modified HPMC)	Buccal tablet	
23	Systane	Polyethylene Glycol 400	Dry Eye Syndrome,	Hydroxypropyl, guargum	Eye drops	Alcon Laboratories Inc.
24	Timoptol-la	Timolol	Glaucoma	Gellan gum	Eye gel-solution	Merc, Sharpe and Dohme
25	Zidoval	Metronidazole	Bacterial vaginosis	Carbomer	Vaginal gel	3-M

improvement of mucoadhesive systems that further enhance the bioavailability of protein/peptide by protecting them from endogenous thiols. In this view, charge-changing polymers improve the bioavailability of these APIs by penetrating deep into the mucus. These polymers changes zeta potential from negative to positive during their journey through mucus gel layer toward epithelial membrane. However, the authors are convinced that these so far established systems are just the tip of the iceberg because further progress in understanding the physiological processes involved in delivery of drug across mucosal barrier will provide vast knowledge to explore new ways of drug delivery. The boundaries are seamless and will eventually reward, in particular, all those experts that are discovering new bridges between life sciences and polymer chemistry in order to shift the paradigm according to new challenges for breaking new ground in this thriving field.

10. CONCLUSION

Mucoadhesive polymers has been a technological advancement in the field of drug delivery providing prolonged residence time and an intimate contact of dosage form on mucosa. Because of this advantage, mucoadhesive drug delivery systems pioneered in the last decade with an advancement of having controlled release of API. Moreover, the different techniques to evaluate the mucoadhesive properties of these delivery systems enhance their reputation and credibility. Furthermore, the design and development of novel mucoadhesive polymers provides additional advantage of protecting the incorporated drugs against different physiological factors and even possibility to maintain constant plasma drug levels. In view of all this discussion, it seems that mucoadhesion will be explored more extensively in future and definitely will contribute toward the pharmaceutical market in huge number.

REFERENCES

[1] M. Hornof, W. Weyenberg, A. Ludwig, A. Bernkop-Schnürch, Mucoadhesive ocular insert based on thiolated poly (acrylic acid): development and in vivo evaluation in humans, J. Control. Release 89 (3) (2003) 419–428.

[2] S. Mansuri, P. Kesharwani, K. Jain, R.K. Tekade, N. K. Jain, Mucoadhesion: a promising approach in drug