floating tablet depends on the HPMC. HPMC K100 shows lower floating lag time at their high value and Carbopol 971p does not show any significant effect on the floating lag time.

Optimization: The optimized solution obtained from the model was formulated and the results are performed in the triplicates for determination of %CDR, FLT, hardness, friability thickness and contain uniformity.

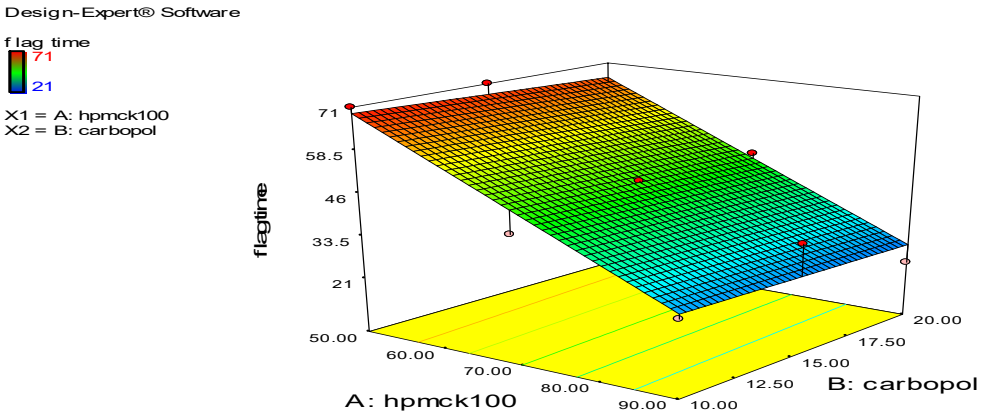

Fig. 05 3-D surface plot for floating lag time

Table 05 Composition of optimized formulation

Metoprolol succinate	HPMC K100M	Carbopol 971p	Banana starch (binder)	Sodium bicarbonate	An. Citric acid	Mg-stearate	Talc	Lactose	Total
100mg	59.40 mg	10.52 mg	5%	75 mg	20 mg	5 mg	5 mg	40.08 mg	315 mg

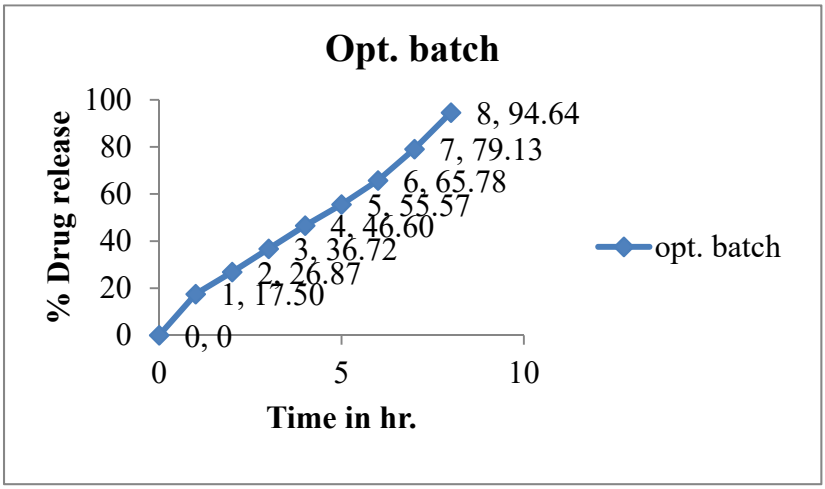

Fig. 06 Dissolution profile of optimized formulation of Metoprolol Succinate

Table 06 comparison of Predicted and experimental values

Responses	Predicted values	Experimental values
% release	89.15	94.63 ± 4.6
Floating lag time	59.51	40.5 ± 7.9

Table 07 the Dissolution Models for Matrix Tablets (O) Of Metoprolol Succinate

batch code	**R2**				**Korsmeyer Peppas (N)**
	Zero order	First order	Higuchi	Korsmeyer Peppas	
O	0.975	0.94	0.93	0.99	0.946

Tablets were compressed with hardness 5 ±0.31 Kg/cm^2 Thickness of tablets was found to be 4.29±0.10mm.Content uniformity was found to be 91.13 ± 0.23.All results obtained were complies with the

official standards. The comparison between predicted values and experimental values was carried out. As per coefficient of correlation the best fitted model for optimized formulation was Zero order and Korsmayer Peppas. This indicate that the drug release is controlled order and super case II transport indicate drug release does not change over time and drug release characterized by zero order.

CONCLUSION

Floating drug delivery of metoprolol succinate by using *Musa paradisiaca* starch as binder was developed. The swelling polymer HPMC K100M and gas forming agent sodium bicarbonate and citric acid was crucial ingredients to achieved buoyancy of tablet. The drug release rate was controlled by Carbopol 971P and binding property of *Musa paradisiaca* starch. The main benefit of *Musa paradisiaca* starch was maintaining the tablet intact for longer period of time and that helpful in extends the drug release for more than 18 hrs. The future scope of this study is extended release floating drug delivery using release retarded polymer and *Musa paradisiaca* starch as a binder in combination with swellable polymer and gas forming agent.

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REFERENCES

[1] Indian Pharmacopoeia 2007, The Indian Pharmacopoeia Commission Ghaziabad, vol-1, pp 763
[2] Jobin G., Cortot A., Godbillon J., Investigation of drug absorption from the gastrointestinal tract of man, I: Metoprolol in stomach, duodenum, and jejunum, British Journal of Clinical Pharmacology, 1985; 19: 975-979.
[3] Laurence L. Brunton, John S. Lazo, Keith L. Parker. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 11th ed. McGRAW-HILL Medical publishing Division; 2006. 278,1849.
[4] Narendra C., Srinath M. S., & Babu G., Optimization of Bilayer Floating Tablet Containing Metoprolol Tartrate as a Model Drug for Gastric Retention, AAPS PharmSciTech, 2006; 7(2): 1–7.
[5] Rangaiah K., Abbulu K., & Bhaskar R., Preformulation parameters characterization to design, development and formulation of metoprolol succinate, International journal of Pharmacy & industrial research, 2011; 1(4): 289–294.
[6] Sean C. Sweetman. Martindale the Complete Drug Reference. 34thed. The Pharmaceutical Press; Royal Pharmaceutical Society of Great Britain; 2005. 956-958.
[7] Tadros M. I., Controlled-release effervescent floating matrix tablets of ciprofloxacin hydrochloride : Development, optimization and in vitro – in vivo evaluation in healthy human volunteers, European Journal of Pharmaceutics and Biopharmaceutics, 2010; 74(2): 332–339.
[8] Patel A., Modasiya M., Shah D., & Patel V. Development and In Vivo Floating Behavior of Verapamil HCl Intragastric Floating Tablets, AAPS PharmSciTech, 2009; 10 (1): 310–315.
[9] James Swarbrick. Encyclopedia of Pharmaceutical Technology. 3rd ed. Informa Healthcare; New York, London; 2007: (1). 1850.
[10] Raymond C Rowe, Paul J Sheskey, Sian C Owen. Handbook of Pharmaceutical Excipients. 5th Ed. The Pharmaceutical Press; Royal Pharmaceutical Society Of Great Britain; 2006: 111-113, 185-187, 346-348, 389, 430-432, 665-667, 767-768.
[11] Supriya Sandhan, Nilima Thombre and Sagar Aher, Isolation and Evaluation of Starch from Musa Paradisiaca L. as a Binder in Tablet, International Journal of Pharmaceutical Sciences and Research, 2017; 8(8): 1000-08.
[12] Mohan Rathi, Rohan Medhekar, Ashish Pawar, Chetan Yewale, Vilas Gudsoorkar, Floating and bioadhesive delivery system of metoprolol succinate: Formulation, development and in vitro evaluation, Asian Journal of Pharmaceutics, 2012; 227-236.
[13] Panigrahy R. N., Mahale A. M., Dhaked P. S., Formulation and In Vitro Evaluation of Combined Floating mucoadhesive Tablet of Metoprolol Succinate, International Journal of Pharmacy and Pharmaceutical Sciences, 2011; 3(2): 221-226.
[14] Singh B., Chakkal S. K., and Ahuja N., Formulation and Optimization of Controlled Release Mucoadhesive Tablets of Atenolol Using Response Surface Methodology, AAPS PharmSciTech , 2006; 7 (1): E1-E10.
[15] Rahman Z., Ali M., & Khar R. K., Design and evaluation of bilayer floating tablets of captopril, Acta Pharm, 2006; 56: 49–57.
[16] Xiaoqiang X., Minjie S., Feng Z., & Yiqiao H., Floating matrix dosage form for phenoporlamine hydrochloride based on gas forming agent : In vitro and in vivo evaluation in healthy volunteers, International Journal of Pharmaceutics, 2006; 310: 139–145.
[17] Leon Lachman, Herbert A. Liberman, Joseph L. Kanig. The Theory and Practice of Industrial Pharmacy. 3rd ed. Varghese publishing house; Bombay, 2009: 183, 296-297,317.
[18] M. E. Alton. Pharmaceutics: The science of Dosage Form Design. 2nded. Churchill Living Stone; UK 2007: 355-356
[19] Kalyani G., Singh R. and Parihar A. K. Singh, Development and in vitro evaluation of sustained release matrix tablets of diclofenac sodium using different grade hydrophilic polymer & peg 6000 as release retardant, International Journal of Pharmaceutical Sciences and Research, 2017; 8 (1): 251-253.
[20] Gambhire M. N., Ambade K. W., Kurmi S. D., Kadam V. J., and Jadhav K. R., Development and In Vitro Evaluation of an Oral Floating Matrix Tablet Formulation of Diltiazem Hydrochloride, AAPS PharmSciTech, 2007; 8 (3): E1-E9.
[21] USP (2006) The United States Pharmacopeia: The National Formulary, The official Compendia of Standard, Asian Edition, pp. 1418
[22] Mendham J., Denney R. C., Barnes J. D., Thomas M. J. K. Vogel's Textbook of Quantitative Chemical Analysis. 6th ed. Pearson education; 2000: 386.
[23] Singh S., Prajapati K., Pathak A. K., & Mishra A., Formulation and Evaluation of Floating Tablet of Captopril, International Journal of PharmTech Research, 2011; 3(1): 333–341.