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FORMULATION AND EVALUATION OF MUCOADHESIVE TABLETS OF NIACIN USING DIFFERENT BIOADHESIVE POLYMERS.

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ABSTRACT

In the present study, to establish mucoadhesive tablets of niacin using different bioadhesive polymers. The tablets were prepared using Sodium Carboxy methyl cellulose (SCMC), carbopol940P and Hydroxy Propyl Methyl Cellulose (HPMC K4M) as bioadhesive polymers to impart mucoadhesion. Tablets were evaluated by different parameters such as weight uniformity, content uniformity, thickness, hardness, surface pH, swelling index, *ex vivo* mucoadhesive strength, *in vitro* drug release, and *in vitro* drug permeation. . The present study concludes that mucoadhesive tablets of niacin can be a good way to swelling and bioadhesion properties a good improve the bio availability of niacin.

KEYWORDS

Mucoadhesive Tablet, Bioavailability, Niacin

INTRODUCTION

Bioadhesive formulations have a wide scope of applications, for controlled drug and site-specific drug delivery have made rapid advances. Though it is rapidly absorbed after oral administration[1], while it is completely absorbed from the gastrointestinal tract, the systemic availability is approximately 25- 35% Niacin is a non-selective and β-adrenergic antagonist and is widely used to treat essential hypertension and angina pectoris. Niacin, a sparingly water soluble drug having short half life near about 1 hour and its absorption takes place in the upper part of intestine. Niacin is a wide spectrum hypolipoproteinemic drug. It is highly efficacious in hypertriglyceridemia daily require dose 1-6g, it show good effective over lowering lipid. Niacin, a significant proportion of patients may be unable to tolerate the conventional immediate-release and mucoadhesive polymer showing antiulcerative action[3, 4].Mucoadhesive tablets of niacin shows the reduced side effects like, flushing, and itching due to controlled release rate of drug. Niacin shows maximized bioavailability and reduces the risk of gastrointestinal upset. Mucoadhesive

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when formulated as a matrix tablet. In the present study, the objective was to prepare muoadhesive tablets of niacin to prolong the residence time, which ensure satisfactory drug release to a mucosa and to avoid loss of drug resulting from wash out with saliva. The mucoadhesieve tablets were evaluated by weight uniformity, thickness, hardness, surface pH, swelling index, *ex vivo* mucoadhesive strength, and i*n vitro* drug release.

MATERIALS AND METHOD

Niacin (99.96% purity), were gift samples from Cipla ltd .Pune. SodiumCMC[5-8](Lucocel) (S.D.Fine chemicals Mumbai. India) Carbopol 940P [9-14] (Corel Pharma- Chem Kadi Coist-Gujarat)MethocelK4m (Colorncon Asia Pvt ltd, Goa, India).PVP- K30. (S.D.Fine chemicals Mumbai. India).HPC (S.D.Fine chemicals Mumbai. India) HPMC[15-18] (Hydroxy Propyl Methyl Cellulose) (S.D.Fine chemicals Mumbai. India).Guar Gum[18-20], Tragacanth and EthylcelluloseLactose (Anhydrous) (Mundra Enterprises Ltd. Bangalore.India).Magnesium Stearate (Scientific India, Akola, India).Talc (Scientific India – Akola, India) Propyl paraben and Methyl paraben (S.D. Chemicals, Mumbai. India). All other reagents and chemicals used were of analytical reagent grade.

Preparation of Mucoadhesive tablets

Mucoadhesive tablets containing Niacin were prepared by direct compression and wet granulation method. The ingredients of the mucoadhesive tablets (Table 1) were accurately and mixed tray and make granules. The mix was then compressed using 19.5 mm Caplet Concave punch. All the ingredients of the Mucoadhesive tablets of Niacin was weighed and sieved by using sieve no # 40 and mixed in tray, and blend was well mixed, then in the last magnesium stearate and talc was added for lubrication. Then the blended material was compressed into tablets containing 500 mg.

Table 1.
Composition of niacin mucoadhesive tablets.

Batch code	Niacin (mg)	SCMC (mg)	EC (mg)	HPC (mg)	Carbopol 940P(mg)	PVP K30(mg)	HPMC K4M (mg)	Guar Gum (mg)
B-1	500	300	-	-	-	-	-	-
B-2	500	300	50	-	-	-	-	-
B-3	500	300	100	-	-	-	-	-
B-4	500	300	150	-	-	-	-	-
B-5	500	-	-	250	250	-	-	-

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B-6	500	-	-	250	150	-	-	-
B-7	500	-	-	150	250	250	-	-
B-8	500	-	-	250	150	150	-	-
B-9	500	100	-	150	250	-	-	-
B-10	500	300	-	150	250	-	-	-
B-11	500	100	-	-	250	-	150	-
B-12	500	100	-	-	150	-	250	-
B-13	500	300	-	-	-	-	-	100
B-14	500	300	-	-	-	-	-	200
B-15	500	300	-	-	-	-	-	300

Methyl Paraben 0.6 %, Propyl paraben 0.06 %, Magnesium stearate 1.5 % and Talc 0.75 % were added in all batches.

1. SCMC - Sodium Carboxy Methyl Cellulose.
2. EC - Ethyl Cellulose
3. HPC - Hydroxy Propyl Cellulose.
4. HPMC - Hydroxy Propyl Methyl Cellulose.

Ex vivo Mucoadhesive strength[21-25]

A modified balance method was used for determining the *ex vivo* mucoadhesive strength. In the present study, goat stomach and Intestine mucosa was used as a model surface for bioadhesion testing. After the stomach and Intestine mucosa was excised and trimmed evenly, it was then washed in isotonic phosphate buffer and then used immediately the working of a double beam physical balance formed the basis of the bio-adhesion test apparatus fabricated. The two pans of a physical balance were removed. The right pan was replaced with a lighter base and on the left side; a Teflon ring was hanged with a copper wire. This was kept inside the glass container, which was then placed below the left hand setup of the balance. The two sides were then balanced so that right hand side was exactly 5 gms heavier than the left.

Measurement of adhesive force

The two sides of the balance were balanced with a 5gms weight on the right hand side. The goat Intestine excised and washed was tied tightly with the mucosal side upwards using thread over the protrusion in the Teflon block. The block was then lowered into the glass container, which was then filled with isotonic phosphate buffer (pH 7.4). Such that the buffer just reaches the surface of mucosal membrane and keeps it moist. This was then kept below the left hand set up of the balance. The tablets was then stuck with a little moisture, on to the cylinder hanging on the left hand side and the balanced beam raised with the 5gm weight on the right pan removed. This lowered the Teflon cylinder along with films over the mucosa, with a weight of 5gms. The balance was kept in this position for 3

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minutes and then slowly weights were added on the right pan, till the tablet separated from the mucosal surface. The excess weight on the right pan i.e. total weight minus 5gm is the force required to separate the tablets from the mucosa. After each measurement the tissue was gently and thoroughly washed with isotonic phosphate buffer pH 7.4 and left for 5 minutes before the next measurement. The water (equivalent to weight) was added slowly with an infusion set (100 drops/min) to the right-hand pan until the tablet detached from the mucosal surface. After each measurement the tissue was gently and thoroughly washed with isotonic phosphate buffer pH 7.4 and left for 5 minutes before the next measurement.

Table 2.

In-vitro mucoadhesive strength study of prepared mucoadhesive tablets of niacin.

Batch code	Bioadhesive strength (gm) (Mean ± S.D.)	
	pH 1.2	pH 7.4
B-1	11.58 ±0.826	11.6 ±0.813
B-2	9.80±0.784	9.7±0.767
B-3	13.430±0.529	13.5± 0.547
B-4	9.405±0.564	9.3±0.534
B-5	13.169±0.534	13.2± 0.522
B-6	9.80±0.213	9.8± 0.143
B-7	5.09±0.801	5.1±0.871
B-8	10.126±0.345	10.1±0.328
B-9	12.97±0.301	12.9 ± 0.321
B-10	13.410±0.313	13.5± 0.356
B-11	14.30±0.243	14.2 ± 0.214
B-12	13.17±0.156	13.2 ± 0.167
B-13	12.43±0.220	12.3 ± 0.215
B-14	12.85±0.267	12.8 ± 0.278
B-15	8.85±0.019	8.9 ± 0.018

Detachment force Measurement[26]

Immediately after slaughter, the intestine was removed from the sheep and transported to laboratory in Tyrode solution (composition) is (g/lit): sodium chloride 8; potassium chloride 0.2; calcium chloride $2H_2O$ 0.134; Sodium bicarbonate 1.0; Sodium dihydrogen phosphate 0.05 and Glucose H_2O 1.0. During the experiment the solution was aerate with pure oxygen and kept at 37^0C. Segments of 6-7 cm long were cut from the intestine. The lower end of the intestinal segment was tied off and was then tied to the aerator tube and the upper end was tied around a glass tube of diameter 15 mm.

Recording of Adherence

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The Niacin tablet on one side with mucoadhesive polymer, and the in polymer matrix tablets were prepared a fine hole drilled in the tablets to be tested with a fine needle in the centre. A thread was passed through it and tied around the tablet. The other end of the thread is tied to the single pan suspended from the stand. The length of the tread is such that in resting state the tablet should be at the middle of the intestinal piece. After inserting the tablet into the G.I.T. segment and lightly pressing the G.I.T. segment with tablet by a forceps, the assembly should be kept undisturbed for a fixed time interval of 30 min. Then water was added with a burette slowly drop by drop into the beaker. The amount of water required to pull out the tablet from the intestinal segment represents the force required to pull the tablet against the adhesion. (Table 3)

The force in Newton's in calculated by the equation.

$$F = 0.00981\ W/2$$

W- The amount of water.

Table.3

Detachment force measurement.

Batch code	Required water in ml	Force of Adhesion (N)
B-1	257	1.260
B-2	239	1.172
B-3	147.50	0.723
B-4	139.2	0.6827
B-5	367.1	1.800
B-6	177.5	0.870
B-7	128.5	0.630
B-8	210	1.030
B-9	225	1.1036
B-10	407	1.996
B-11	540	2.648
B-12	365	1.790
B-13	310	1.520
B-14	230	1.1280
B-15	190	0.930

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Swelling Study[27]

The swelling study of tablets was determined by gravimetry.The swelling rate of the bioadhesive tablet was evaluated by using 1% agar gel plate (Table: 4). The average weight of the tablet was calculated (w1).The tablets were placed on gel surface in a Petri dish placed in an incubator at 37.1^0c.Tablets was removed at different time intervals (1, 2, 3, 4, 5) wiped with filter paper and reweighed (w2).The swelling index was calculated by the formula.

Swelling index = (w2. w1)/ w.

Table .4

In vitro swelling study of prepared mucoadhesive tablets of niacin.

Batch Code	% Swelling Index (Mean ± S.D.) Time (hrs)				
	1	2	3	4	5
B-1	25.41 ± 0.19	31.47 ± 0.49	36.41 ± 0.03	43.00 ± 0.09	47.54 ± 0.07
B-2	23.81 ± 0.97	28.50 ± 0.32	34.67 ± 0.41	37.98 ± 0.23	43.75 ± 0.67
B-3	17.50 ± 0.58	23.29 ± 0.67	27.19 ± 0.83	30.25 ± 0.93	36.28 ± 0.87
B-4	16.29 ± 0.23	19.97 ± 0.37	24.37 ± 0.10	29.71 ± 0.17	33.99 ± 0.32
B-5	18.70 ± 0.97	22.39 ± 0.33	26.26 ± 0.29	29.29 ± 0.36	35.79 ± 0.36
B-6	20.29 ± 0.82	26.29 ± 0.70	29.29 ± 0.47	35.92 ± 0.29	40.95 ± 0.80
B-7	18.81 ± 0.73	24.32 ± 0.32	29.01 ± 0.51	33.75 ± 0.79	37.87 ± 0.29
B-8	20.19 ± 0.12	26.39 ± 0.25	20.30 ± 0.27	34.99 ± 0.97	39.01 ± 0.28
B-9	21.91 ± 0.52	27.39 ± 0.25	30.39 ± 0.92	33.90 ± 0.79	38.47 ± 0.45
B-10	20.75 ± 0.62	23.23 ± 0.25	25.97 ± 0.12	31.27 ± 0.29	38.89 ± 0.79
B-11	19.29 ± 0.97	25.93 ± 0.97	27.19 ± 0.72	32.10 ± 0.29	38.01 ± 0.29
B-12	23.81 ± 0.24	30.50 ± 0.72	37.31 ± 0.21	42.17 ± 0.29	46.79 ± 0.21
B-13	21.62 ± 0.50	28.97 ± 0.23	31.32 ± 0.32	36.07 ± 0.09	42.76 ± 0.26
B-14	22.62 ± 0.32	27.97 ± 0.23	31.97 ± 0.62	35.09 ± 0.29	42.06 ± 0.43
B-15	22.81 ± 0.34	28.50 ± 0.63	35.37 ± 0.23	41.67 ± 0.12	45.49 ± 0.237

Surface pH study[28-29]

The surface pH of the tablets was determined in order to investigate the possibility of any side effects in vivo. As an acidic or alkaline pH may cause irritation to the buccal mucosa, it was determined to keep the surface pH as close to neutral as possible, The method adopted by Bottenberg et al used to determine the surface pH of the tablet. A combined glass electrode was used for this purpose the tablet was allowed to swell by keeping it in contact with 1 ml of distilled water (pH 6.8 $\pm$ 0.01) for 2 hours at room temperature. The pH was

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measured by bringing the electrode in contact with the surface of the tablet and allowing it to equilibrate for 1 minute.

Table 5.
Physico chemical properties of muco adhesive tablets of niacin [30-32.]

Batch code	Friability (%)	Hardness (kg/cm^2) (Mean ± S.D.)	Thickness (mm) (Mean ± S.D.)	Surface pH	Drug content (%) (Mean ± S.D.)
B-1	0.225	7 ± 0.42	5.4 ± 0.690	6.86±0.02	99.18 ± 0.40
B-2	0.345	8 ± 0.32	5.6 ± 0.513	6.92±0.02	99.08± 0.31
B-3	0.678	7.5±0.25	5.1 ± 0.463	6.95±0.03	98.45 ± 0.51
B-4	0.705	6.5±0.21	5.4 ± 0.418	7.10±0.03	99.26 ± 0.00
B-5	0.645	8±0.30	5.5 ± 0.562	6.81±0.01	98.91 ± 0.23
B-6	0.550	7.5 ± 0.33	5.2 ± 0.378	6.82±0.02	99.11 ± 0.31
B-7	0.256	7 ± 0.25	5.0 ± 0.621	4.23±0.01	99.6 ± 0.35
B-8	0.602	6 ± 0.21	5.4 ± 0.597	4.81±0.01	98.42 ± 0.35
B-9	0.392	7.5 ± 0.21	5.4 ± 0.478	6.32±0.02	99.12± 0.24
B-10	0.562	6.5±0.75	5.3 ± 0.431	7.23±0.03	99.62 ± 0.26
B-11	0.789	7 ± 0.75	5.2 ± 0.499	6.90±0.03	100.05 ± 0.32
B-12	0.789	8 ± 0.34	5.5 ± 0.631	7.22±0.02	99.91 ± 0.03
B-13	0.722	7.5 ±0.25	5.5 ± 0.733	6.72±0.01	99.13± 0.21
B-14	0.875	8.5 ± 0.75	5.3 ± 0.483	6.42±0.02	99.63 ± 0.24
B-15	0.532	6.5 ± 0.02	5.1 ± 0.587	6.82±0.03	99.05 ± 0.32

In vitro dissolution studies[33]

In vitro release study of mucoadhesive tablets on Niacin was carried out using the USP I (Basket apparatus) method at 100 rpm. Medium used for release rate study was 900 ml of phosphate buffer (pH 1.2 and pH 7.4) solution maintaining the sink conditions. Dissolution medium temperature was maintained at 37^0C $\pm 0.2^0$C and 50 rpm. 5 ml withdrawn at specific time interval and from that withdrawn 3 ml sample & make up volume with phosphate buffer up to 25 ml in volumetric flask. Then amount of Niacin released was determined spectroscopically at 263 nm.

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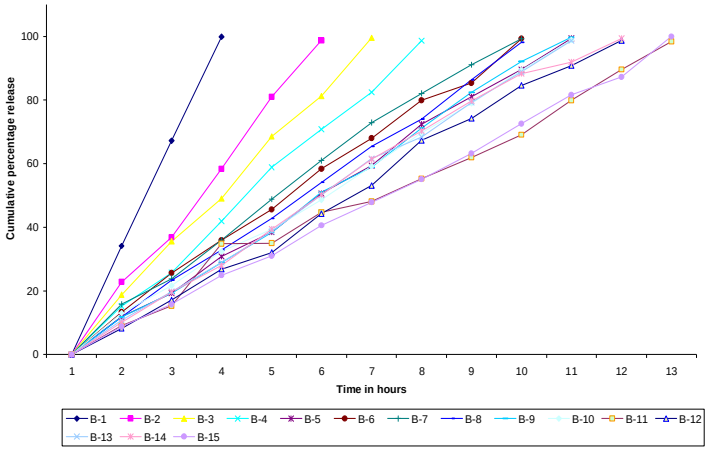

Fig 1.Comparative cumulative percentage drug release from B-1 toB-15 formulations(for pH 1.2).

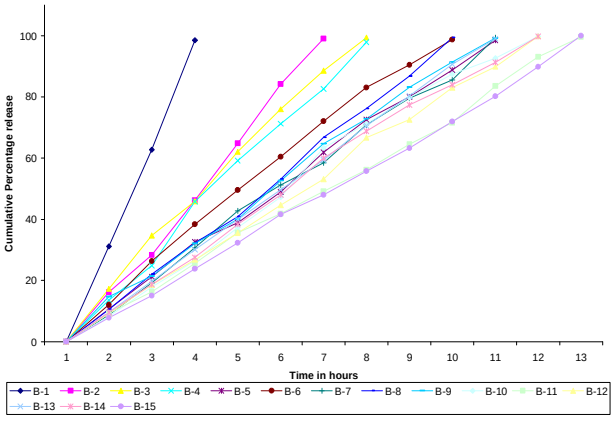

Fig 2.Comparative cumulative percentage drug releases from B-1 to B-15 formulations(for pH 7.4).

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Table 6.

$T_{50\%}$ value and $T_{80\%}$ value for mucoadhesive tablets of niacin.

Batch code	$T_{50\%}$. Value (mins)		$T_{80\%}$ value (mins)	
	pH-1.2	pH-7.4	pH-1.2	pH-7.4
B-1	90	96	144	150
B-2	156	192	234	285
B-3	186	198	294	318
B-4	204	210	336	342
B-5	315	300	471	468
B-6	255	246	444	408
B-7	246	275	408	468
B-8	276	288	444	438
B-9	285	291	465	456
B-10	282	306	486	498
B-11	363	376	606	612
B-12	342	342	516	528
B-13	300	270	486	420
B-14	300	312	483	507
B-15	372	375	585	588

Table .7

***In-vitro* data of various kinetic release studies.**

Batch Code		Zero order		Higuchi (r)	Korsmeyer-peppas	
		(r)	Slope		(r)	Slope
B-1	pH1.2	0.9604	0.01722	0.97305	0.99906	1.14233
	pH7.4	0.9730	0.96046	0.96046	0.99779	1.03851
B-2	pH1.2	0.99700	0.05102	0.99700	0.98641	1.12160
	pH7.4	0.99832	0.05941	0.94283	0.99647	0.95618
B-3	pH1.2	0.99900	0.06079	0.99900	0.99893	1.07503
	pH7.4	0.09964	0.07048	0.95942	0.99828	1.11543
B-4	pH1.2	0.99889	0.07111	0.95497	0.99705	1.01155
	pH7.4	0.99702	0.07125	0.95695	0.99578	0.96509
B-5	pH1.2	0.99935	0.10014	0.95816	0.99751	1.04415
	pH7.4	0.998996	0.10127	0.96183	0.99906	1.03742
B-6	pH1.2	0.99848	0.09250	0.96673	0.99951	1.10460
	pH7.4	0.99893	0.08608	0.96447	0.99793	1.03256

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B-7	pH1.2	0.99760	0.08949	0.96768	0.99589	1.12474
	pH7.4	0.99703	0.10241	0.96162	0.99745	0.96803
B-8	pH1.2	0.99963	0.0933	0.95832	0.99956	1.04738
	pH7.4	0.99339	0.09085	0.95315	0.99938	0.98815
B-9	pH1.2	0.99119	0.09854	0.95473	0.99707	1.02762
	pH7.4	0.99249	0.10022	0.96392	0.99441	1.12774
B-10	pH1.2	0.99337	0.10304	0.99937	0.99783	1.11699
	pH7.4	0.99561	0.10391	0.96116	0.99775	0.93698
B-11	pH1.2	0.99786	0.12612	0.95817	0.98864	1.04557
	pH7.4	0.99797	0.11978	0.95701	0.99846	1.03005
B-12	pH1.2	0.99324	0.10741	0.95413	0.99874	0.94857
	pH7.4	0.99234	0.10967	0.99874	0.99954	1.00246
B-13	pH1.2	0.99161	0.10124	0.95837	0.99921	1.02295
	pH7.4	0.99489	0.09991	0.95825	0.99969	0.98612
B-14	pH1.2	0.99694	0.96616	0.96616	0.99870	1.01574
	pH7.4	0.99838	0.96431	0.96443	0.99919	1.00304
B-15	pH1.2	0.99125	0.95633	0.95633	0.99915	1.01885
	pH7.4	0.99912	0.95778	0.95778	0.99952	0.98517

Stability Protocol

Stability studies were carried out on the formulation tablets of batch were first wrapped in aluminum foil then placed in an amber colored bottle. It stored at 45°c/ 75%RH for 6 months. After the time period the formulations were evaluated for physical characteristics; mucoadhesive properties, and *in vitro* drug release and muco adhesive strength study after 6months. Results obtained were compared with data obtained for zero time at ambient temperature.

Table .8

Parameters after stability studies of mucoadhesive tablets of niacin.

No.	Evaluation Parameter		Initial	After 6 months
1	Hardness (kg/cm^2)		7.3 ± 0.321	7.3 ± 0.212
5	Avg. weight Content (%) Mean ± S.D)		99.58 ± 0.27	99.48 ±0.18
6	Mucoadhesive Strength (gm) (Mean ± S.D.)	1.2	11.61 ± 0.32	11.52 ±0.12
		7.4	11.63 ± 0.42	11.48 ± 0.38

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7	Swelling index. (%) (Mean ± S.D.)		22.04 ± 0.21	22.01 ± 0.11
8	T_{80} (Dissolution min.) (Mean ± S.D.)	1.2	307.74 ± 0.35	306.21 ± 0.22
		7.4	313.58 ± 0.74	312.75 ± 0.34

RESULTS AND DISCUSSION

In the present work efforts have been made to develop mucoadhesive buccal tablets of niacin using direct compression and wet granulation techniques involving mucoadhesive polymers like Carbopol 940, Sodium CMC, HPMC K_4M, HPC, Guar gum, PVP K30 and Ethyl Cellulose. The FTIR spectral analysis showed that there was no appearance or disappearance of any characteristic peak, which confirms the absence of chemical interaction between drug and polymers. The Angle of repose was found in the range of 27.14-34.43^0. The good flow ability of powder blend was also evidenced with angle of repose which has indicated a good Flow ability. The bulk density was found in the range of 0.136 – 0.666 gm/cm^3 respectively. The tapped density was found in the range of 0.1449 – 0.833 gm/cm^3.The Compressibility index of various different polymers, using bulk density and tapped density data, compressibility index was calculated. It was found in the range of 13.04-34.60 %. The Hausner ratio of various different polymers it was calculated by using bulk density and tapped density data. It was found in the range of 1.057 – 1.266.Tablets were obtained in the range with acceptable weight variations as per pharmacopoeia specification (less than 5 %.).The thickness of the tablets was found in the range of 5.1– 5.6 mm. Hardness of the tablets was found in the range of 6-8 kg/cm^2. Uniform hardness was obtained due to equal compression force. The friability of tablets was observed in acceptable range of 0.225-0.875% (Limit-less than 1%). The swelling index was for all formulations B-1 to B-15 (After 5 hours) were in the range 33.99 ± 0.32 to 47.54 ± 0.07.

The highest adhesion force and highest strength of the mucoadhesive bond was observed with the formulation as followed by B-8 to B-15 containing Carbopol 940P, HPC and SodiumCMC, PVPK30 and Guar gum respectively. Tablets of formulation B-1 to B-7 containing showed least adhesion force than tablet of all other formulation. The formulations of tablets B-1 to B-15 comparative plotted graphs of Cumulative drug release were shown in the Fig. 2 and 3 respectively. The bio-adhesive strength of the various formulations from the results it was found that Carbopol 940 P had higher mucoadhesive strength than the other polymers. The mucoadhesive strength of all the formulations B-1 to B-15 was found to be in the range of 5.09 ± 0.801 to 14.30±0.243. B-5, B-6 was studied by changing polymer with HPC and Carbopol 940 P and results indicated that Carbopol produced a more retardant effect since it is a synthetic high molecular weight polymer of acrylic acid with good swelling ability and low disintegrating properties. HPC through a freely water soluble polymers has less swelling capacity as compare to Sodium CMC has retarded the drug comparatively higher than Sodium CMC and its was evidence from $t_{80\%}$ value, obtained from batch No B-8 to B-12. Then carbopol was substituted with guar gum in the B-13, B-15 and the $t_{80\%}$ value of the batches was found to be equal to that of Carbopol batches.

When compared with carbopol 940P this was evidence from the $t_{80\%}$ values are showed in Table 6. The batch B-5 and B-11 shows 74.91%, 93.59% of

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drug release which contain Sodium CMC and Carbopol 940P and HPMC K4M.The batch B-11 shows promising result by releasing 93.59% drug release by controlled manner at 8 hours. This is due to the HPMC K4M along with Sodium CMC absorbed water rapidly with maximum swelling at 4 hours and start to welling erosion and finally drug release of at constant manner by zero order kinetic and swelling gel diffusion mechanism by applying zero order regression and peppas value of regression is correlated with each other the values are shown in Table 7. The formulation B-11 showed 59 $\pm$ 1.10 percentage of drug released at 8 th hr with good swelling index and bioadhesion strength. The optimized batch F11 shows dissolution zero order regression value and regression value of peppas plot as 0.9924,0.9933 is best correlated with each other also this values follows 1.04557, 1.03005 After the stability studies there was no change in the physical appearance for tablets. Insignificant changes with respect to hardness and drug content were reported in table 8).

CONCLUSION

The prepared mucoadhesive tablets of niacin were evaluated or characterized based upon their physico chemical characteristics like Angle of repose, Bulk density, Tapped density, Compressibility index, Hausner ratio, surface pH, swelling percentage, Hardness, Thickness uniformity ,Friability and drug content. The *in vitro* release studies were performed. Good results were obtained both in physico chemical characteristics and *in vitro* studies. Hence the formulations of niacin bioadhesive buccal tablets are promising one as the controlled drug delivery, improve bioavailability and the mucoadhesive tablets of niacin may be a good way from all above Observations It was concluded that batch B-11 containing Sodium CMC (10%), Carbopol 940P (25%) and HPMC K4M (15%) can successfully be employed as a sustain release of niacin since it produced adequate swelling and bioadhesion properties due to the hydrophilic nature of polymers.

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