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# Development and Evaluation of Buccal Tablet of Terbutaline Sulphate

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**Abstract:**

Buccal tablet was formulated by bioadhesive polymers as well as other formulations for both the production of modern Terbutaline sulphate formulations. That effect for bioadhesive polymer HPMC K100 M, EC, carbopol, Na-CMC had been observed in the present study. Direct type of compression has been used for formulation of buccal tablet of terbutaline sulphate and test are characterized by thickness, hardness, weight variation, friability, *in-vitro* bioadhesion, drug Material, in vitro drug release, in vitro swelling index. In vitro drug release was performed in 900 ml of dissolution medium (simulated salivary fluid pH 6.75) at 50 rpm in a USP type II dissolution apparatus for 8 hours. Result showed that drug release was increased with increasing of cellulose derivatives (HPMC, EC, and Na-CMC) and decreased with decreasing carbopol. Bioadhesion and swelling index was increased with increased in conc. of carbopol. Various kinetic Models for determining dosage form kinetics were added to the dissolution model. Here all physical properties measured and for buccal tablets was collected inside reasonable limits.

**Keywords:"**Bio-adhesion, Swelling index, Drug release, Terbutaline sulphate, buccal tablet, Simulated salivary fluid".

## INTRODUCTION

Bioadhesion Are being characterized as both a phenomenon between molecular inter - facial electrostatic attraction and in center of biological substratum substances or organic and conventional polymers that cause that polymer to bind to various substrates for even a longer length of time. Oral route, yet the most supported among patients and physicians between transversal drug delivery routes[1]. That being said, several drawbacks occur by oral administration of medications: first-pass hepatic metabolism through poor solubility and within gastrointestinal ( GI ) tract which prevents oral administration of such kinds of substances, mainly peptides including proteins. Several insulating mucosa also is called alternative medication management locations. Tran mucosal drug-delivery routes"(i.e., the mucosal linings of the nasal, rectal, oral, vaginal & ocular cavities)"Give different institutional Impact benefits across oral administration. Such advantages would include prospect of bypassing the very first-pass consequences and preventing presystemic removal within both the GI tract.[2]

Several study groups studied that nasal cavity as either a systemic regenerative medicine site; nevertheless, that possible inflammation and permanent harm to either the ciliary function including its nasal cavity arising through prolonged implementation with nasal dosage types render that nasal cavity rather appealing to drug delivery. Much like the nasal route, this same oral cavity as both a drug delivery site too has attained a commercial status with several other drugs including nitroglycerin as both a sublingual angina tablet as well as fantasy as just a Transmucosal buccalsmart phone"(Actiq, Abbott Laboratories, Abbott Park, IL)"To the cancer suffering that breaks away. That being said, patients are extremely satisfying for both the drug delivery through the oral cavity[3].

This same mucosa seems to be permeable and it has a rich amount of water, showing short healing time within a week of stress or damage. This same oral cavity was being used as location again for delivering of local or systemic drugs. Regional therapy includes certain diseases including gingivitis, oral candidacies, xerostoma, oral lesions, including dental caries though systemic control should be used for angina & asthma care. Systemic behavior for treating diseases the same as angina as well as asthma is studied.[1,2] Within oral cavity buccal route is also an enticing aim for deliver proteins including such proteins and peptide caused by acid hydrolysis as well as first-pass hepatic influence. That mucosal lining including its oral cavity provides certain unique benefits, including such high vascularization or flexibility for dose delivery and elimination, in owing to increased patient usability relative to many other non-oral medication management routes or accelerated cell regeneration[4,5].

## MATERIAL AND METHODS

**Materials:**

"Terbutaline sulphate collected by Themes Laboratories PVT LTD, Mumbai (India), as a free gift study andpurchased from CDH dealers, the polymers (HPMC K100 M, Ethyl cellulose, Carpool 934-P and Na-CMC) and excipients (magnesium separate and lactose monohydrate) All other reagents and excipients were of pharmaceutical grade".

**Methods:**

**"Preparation of buccal tablets of terbutalinesulphate"**

Buccal tablets Specific amounts of polymers or excipients like medications were formulated, formulation is provided in table No. 1. First, so all polymers are weighed correctly but tinctured though as well as their composition or intensity, and then lactose mixture was applied to both the "mixture and triturate for 2 minutes. Lactose is often used as binder. Magnesium separate as a lubricant was applied to the mixture following thorough grinding", but instead triturated afterwards. Dry granulation technique besides tablet preparation had been accompanied, in which the mixture has been condensed compacted rotary loading frame with such a continual force applied as well as the same climate has been maintained for certain

formulations."Total weight of per tablet was 150 mg including drug"[6].

**"Table 1: Compositions of buccal tablet of terbutalinesulphate (5mg)"**

| Formulation code | HPMC K100M (mg) | Ethyl cellulose (mg) | Carbapol (mg) | Na-CMC (mg) | MS (mg) | Lactose (mg) (q.s.) |
|---|---|---|---|---|---|---|
| F1 | 80 | -- | -- | -- | 3 | 62 |
| F2 | -- | 80 | -- | -- | 3 | 62 |
| F3 | -- | -- | 80 | -- | 3 | 62 |
| F4 | -- | -- | -- | 80 | 3 | 62 |
| F5 | 40 | -- | 40 | -- | 3 | 62 |
| F6 | 27 | -- | 53 | -- | 3 | 62 |
| F7 | 53 | -- | 27 | -- | 3 | 62 |
| F8 | 20 | -- | 60 | -- | 3 | 62 |
| F9 | 60 | -- | 20 | -- | 3 | 62 |
| F10 | -- | 40 | 40 | -- | 3 | 62 |
| F11 | -- | 27 | 53 | -- | 3 | 62 |
| F12 | -- | 53 | 27 | -- | 3 | 62 |
| F13 | -- | 20 | 60 | -- | 3 | 62 |
| F14 | -- | 60 | 20 | -- | 3 | 62 |
| F15 | -- | -- | 40 | 40 | 3 | 62 |
| F16 | -- | -- | 53 | 27 | 3 | 62 |
| F17 | -- | -- | 27 | 53 | 3 | 62 |
| F18 | -- | -- | 60 | 20 | 3 | 62 |
| F19 | -- | -- | 20 | 60 | 3 | 62 |

## EVALUATION PARAMETERS OF DRUG AND EXCIPIENTS

**Pre-compression characterization:**[7]

The tapped density, bulk density, Hausner's ratio, Carr's index and angle of repose is the pre-compression characterization of buccal tablet.

***Angle of repose (θ):***

"The fractional force in the powder can be measured by the angle of repose. Angle of repose was obtained by fixed funnel method. Angle of repose can be calculated by using following formula":

$$\theta = \tan^{-1}(h/r)$$

Where:

θ= Angle of repose
h = Height of heap in cm
r = Radius of heap in cm

***Bulk density:***

Weighed accurately 10 gm of powder and transferred into 50 ml measuring cylinder. Carefully record the level of unsettled volume of powder. Calculate bulk density in gm/ml by following formula[8].

$$\text{Bulk Density} = \text{Weight of Powder/Bulk Volume}$$

***Tapped density:***

Weighed accurately 10 gm of powder and transferred into 50 ml graduated cylinder. After that 100 tapped to the cylinder was appliedand then volume of powder was measured carefully. Tapped density in gm/ml by following formula was calculated9.

$$\text{Tapped Density} = \text{Weight of powder / Tapped volume}$$

***Carr's index:***

The Carr / compressibility index is the test to evaluate the propensity to compress the powders. Carr's compressibility index can be calculated as follows:

$$\%\text{Carr's Index} = \frac{(\text{Tapped Density} - \text{Bulk Density})}{\text{Tapped Density}} \times 100$$

***"Hausner's ratio:"***

It is associated with the flow capacity of powder or granular material and was measured using the following formula[10,11].

Hausner's Ratio = Tapped Density / Bulk Density

**Post Compression Parameters:**

***Thickness[12]:***

That diameter or diameter of both the tablets of any and all formulations with vernier caliper is established.

***Tablet weight variation[13]:***

Each single tablet in such a batch is within reasonable parameters of standard weight or weight variations. Weight regulation is dependent upon a 20 tablet study. Twenty tablets with matrix was picked randomly and weighted correctly but use an electronic balance. Those outcomes of 20 determinations were presented as average value.

***Hardness[14]:***

Tablet hardness has been evaluated with a toughness test device (Monsanto Type). For dimensional characteristics a tablet hardness of about 4-6 kg / cm2 is deemed sufficient.

***Friability[15]:***

That tablets' friability has been assessed using a roche friabilator. Tablets with a known weight (W0) or a sample of 10 tablets have been subtracted for a fixed time in either a drum (100 revolutions) but also weighed again (W). Percentage friability has been calculated from weight loss as shown in equation below in. This same weight loss should not be greater unlike 1 % w/w.

% Friability = (W0 −W)/W0 ×100

***Drug content[16]:***

10 tablets Weighed but dried, powder equal to 10 mg the drug being extracted and dissolved in 6.75 simulated salivary fluid, creating 10 ml of distilled water of amount. After which a solution of 10 ppm became formulated and absorption spectrum determined at 280.40 nm by using SHIMADZU UV-1800 spectrophotometer.

***In-vitro bioadhesion study[17]:***

There in laboratory that equipment used during bioadhesion research was assembled. A intensity of both the tablet's mucoadhesion were calculated on either a changed physical balance that use the procedure stated in Gupta et al. ,22 utilizing bovine cheek pouch as that of the model mucosal membranes.

Physical alignments were provided with a double beam; that left pan became cut. A thick thread with sufficient length became tied to the left arm of equilibrium. A glass stopper with either a standard surface became attached to both the underside of both the thread. Installed under the hanging glass stopper was indeed a clean glass mortar. And in mortar, The spotless 500 ml glass sample was

filled inside that some other 50 ml glass beaker has been positioned upside down as well as weighed 50 g to help stop hovering. This same temperature sensor done by placing thermometer throughout 500 ml beaker as well as occasionally attaching hot water throughout water-filled outer mortar. That composition was balanced in such a way that now the right side was precisely 5 g lighter than the left[18].

**Method:**

That bovine cheek pouch were excised, dried, but instead wrapped up securely with both the mucosal side utilizing string from over base of a 50-ml glass beaker inverted. A correctly measured beaker then lowered through 500 ml beaker, which would then be packed of artificial salivary fluid "(pH 6.75) kept at 37°C"Just so the buffer reaches that mucosal cell membrane but holds it wet. This has since been held throughout the balance below left hand edge. That used a cyanoacrylete adhesive (feviquick), that buccal tablet also was attached on glass stopper along with its supporting membrane. Delete the 5 g mostly on right side of the screen; The above causes 5 g of media scrutiny to be applied to the moist mucosa overlying buccal tablets. That equilibrium were held for 3 min in that same role and instead gradually raised weights mostly on right pan until the tablet separated from of the mucosal membrane. Maximum weight on appropriate pan minus 5 g provides the needed action to stop tablet from mucosa. The above gives bioadhesive resistance throughout grams. By each set with formulations that minimum scores from three trials were taken. That tissue was carefully but carefully washed in medicinal plant fluid it after every calculation and left for 5 minutes before reading a fresh tablet of the very same formulation to achieve repeatable repeated tests and for formulations[19].

$$\text{Force of adhesion (N)} = (\text{Bioadhesive strength}/10$$

***In-vitro swelling index*:**

One major element concerning adhesive seems to be the degree of swelling in bio-adhesive polymers. The tablet was then weighed and placed in a Petri dish containing 5 ml of simulated salivary liquid (pH 6.75) for a period of time (1,2,4,6 hours) in addition to performing the test. The tablets are removed from the Petri dish and the tissue fluid was respected using the filter paper. He weighed it and the swelling index was calculated using the following formula[21]:

$$\text{Swelling Index (SI)} + (\text{Wt-Wo})/\text{Wo} \times 100$$

Where:

SI= Swelling index.

Wt = Weight of tablets after time at 't'.

Wo = Weight of tablet before placing in the beaker.

***In-vitro drug release characteristics*[25]:**

Utilising USP type II dissolution apparatus outfitted to paddles at 37oC ±0,5oC with the a rpm of 50, this same drug release from both the buccal tablets has been assessed. That research was conducted then using dissolution medium of 900 ml with artificial salivary fluid (pH 6.75). Analysis of the breakdown took place in triplicate, this same sink circumstances for all of the other preparations are maintained. During daily intervals, a 5 ml sample aliquot was collected, screened then spectro-photo-metrically checked 280.40 nm.

***Drug release kinetics*[22-25]:**

That data collected were incorporated into a) Zero order kinetics; b) First order kinetics; c) Higuchi's square root system or d) Korsemeyer and peppas design for evaluate each function of both the medication release rate kinetics for the dosage size. Statistical analysis will be carried out on information gathered from of the treatment duration (student's t-test) And figure about some important gap of optimal type product quality.

## RESULT AND DISSCUSSION

**Table No. 2: Pre compression characterization**

| Formulation code | Angle of repose±SD | Bulk density (g/ml) ±SD | Tapped density (g/ml) ±SD | Carr's index ±SD | Hausner's ratio ±SD |
|---|---|---|---|---|---|
| F1. | 29.24±0.254 | 0.42±0.017 | 0.50±0.028 | 16.00±2.309 | 1.19±0.017 |
| F2. | 24.22±0.475 | 0.37±0.005 | 0.43±0.000 | 13.95±1.339 | 1.16±0.017 |
| F3. | 27.92±0.767 | 0.24±0.005 | 0.29±0.005 | 17.24±0.357 | 1.21±0.005 |
| F4. | 24.70±0.722 | 0.63±0.023 | 0.71±0.046 | 11.27±2.840 | 1.13±0.034 |
| F5. | 29.68±0.321 | 0.31±0.011 | 0.36±0.017 | 13.89±0.860 | 1.16±0.011 |
| F6. | 27.92±0.45 | 0.28±0.011 | 0.33±0.011 | 15.15±0.565 | 1.18±0.005 |
| F7. | 29.25±0.917 | 0.38±0.011 | 0.45±0.017 | 15.56±0.733 | 1.18±0.005 |
| F8. | 27.92±1.116 | 0.21±0.005 | 0.25±0.011 | 16.00±0.386 | 1.19±0.023 |
| F9. | 29.68±0.917 | 0.39±0.017 | 0.45±0.017 | 13.33±0.554 | 1.15±0.011 |
| F10. | 26.57±0.696 | 0.28±0.011 | 0.33±0.011 | 15.15±0.565 | 1.18±0.005 |
| F11. | 27.47±0.687 | 0.28±0.025 | 0.33±0.025 | 15.15±2.357 | 1.18±0.025 |
| F12. | 25.17±0.47 | 0.25±0.005 | 0.29±0.005 | 13.79±0.288 | 1.16±0.005 |
| F13. | 27.02±0.964 | 0.25±0.015 | 0.29±0.023 | 13.79±2.479 | 1.16±0.030 |
| F14. | 24.23±0.47 | 0.36±0.011 | 0.42±0.017 | 14.29±0.733 | 1.17±0.005 |
| F15. | 26.57±0.46 | 0.42±0.017 | 0.50±0.034 | 16.00±2.101 | 1.19±0.028 |
| F16. | 27.02±0.46 | 0.36±0.017 | 0.42±0.023 | 14.29±0.871 | 1.17±0.011 |
| F17. | 24.22±1.356 | 0.50±0.028 | 0.56±0.028 | 10.71±0.606 | 1.12±0.005 |
| F18. | 25.64±0.713 | 0.26±0.005 | 0.31±0.011 | 16.13±1.351 | 1.19±0.017 |
| F19. | 24.70±0.712 | 0.56±0.034 | 0.63±0.034 | 11.11±0.675 | 1.13±0.005 |

For each prepared formulation, mixtures of drug and excipients were prepared and characterized for micromeritic properties and mentioned in table no. 2. Such criteria suggested that perhaps the formulated blend of both formulations provides decent to exceptional variety for flow properties. The resting angle is used to measure the flow capacity and also the resting angle of all formulations has been outstanding with pretty decent flow.

**Table No. 3: Post compression characterization**

| Formulation code | Hardness±SD (kg/cm$^2$) | Average wt.±SD (mg) | Friability±SD (%) | Thickness±SD (mm) |
|---|---|---|---|---|
| F1. | 3.98±0.011 | 148.37±1.218 | 0.94±0.137 | 3.30±0.028 |
| F2. | 3.97±0.011 | 148.09±0.439 | 0.99±0.037 | 3.55±0.098 |
| F3. | 5.69±0.020 | 149.89±0.470 | 0.15±0.050 | 3.38±0.098 |
| F4. | 3.08±0.023 | 147.42±1.145 | 1.09±0.065 | 3.22±0.030 |
| F5. | 4.10±0.020 | 148.69±0.897 | 0.57±0.030 | 3.38±0.046 |
| F6. | 4.23±0.011 | 148.91±0.660 | 0.52±0.025 | 3.38±0.046 |
| F7. | 4.04±0.011 | 148.18±1.006 | 0.66±0.030 | 3.30±0.028 |
| F8. | 4.72±0.020 | 149.69±0.212 | 0.45±0.026 | 3.38±0.046 |
| F9. | 4.01±0.010 | 147.93±0.165 | 0.89±0.025 | 3.30±0.000 |
| F10. | 4.06±0.020 | 148.40±0.513 | 0.69±0.369 | 3.55±0.098 |
| F11. | 4.18±0.011 | 148.12±0.544 | 0.47±0.052 | 3.38±0.046 |
| F12. | 4.02±0.000 | 147.23±0.321 | 0.78±0.030 | 3.55±0.098 |
| F13. | 4.20±0.011 | 149.32±0.371 | 0.42±0.041 | 3.38±0.046 |
| F14. | 3.99±0.011 | 148.14±0.416 | 0.85±0.040 | 3.55±0.098 |
| F15. | 3.81±0.011 | 147.25±0.927 | 0.78±0.025 | 3.25±0.028 |
| F16. | 3.89±0.011 | 147.81±0.170 | 0.62±0.020 | 3.30±0.046 |
| F17. | 3.48±0.011 | 148.15±0.510 | 0.93±0.092 | 3.22±0.017 |
| F18. | 4.15±0.011 | 148.01±0.662 | 0.52±0.047 | 3.30±0.046 |
| F19. | 3.22±0.011 | 147.31±0.268 | 0.97±0.036 | 3.22±0.017 |

Only certain formulating batches have been evaluated for different physical parameters as well as displayed in table 3. Tablet hardness has been observed in the range of 3.08 to 5.69 kg / cm2 however the formulation (F1-F4, F14-F17, and F19) is already out of spectrum by pharmacopoeia. This same average weight of any and all formulations would be within the range of 147.23-149.89 mg as well as the weight variation with each formulation had been observed throughout range per the IP. Friability was observed in the ranges from 0.15 to 1.09 percent, apart from F4. This has been identified in regular shape as per the thickness of any and all formulations[8].

***In-vitro* bioadhesion study:**

Apparatus has been constructed throughout laboratory for such a research, as well as simulated salivary fluid (pH 6.75) was included in the study of bioadhesion. Their findings were listed in table above, that ranges from in 0.28-0.59 N.

That effect of adhesion differs as per polymer as well as its ratio (concentration). That formulation will also have strong adhesive bond the delivery of buccal drugs. Ethyl cellulose does have the highest adhesion strength, but carbopol will have the growing adhesion strength. Adhesion force has been enhanced through adding carbopol absorption, and also the adhesion force has been reduced lowered significantly reducing ethyl cellulose concentration. That carbopol analysis reveals that best bioadhesive agent compared with HPMC, ethyl cellulose, Na-CMC[7].

**Table 4:** *In-vitro* bioadhesion characterization

| Formulation code | Bioadhesion (N) |
|---|---|
| F1 | 0.32±0.015 |
| F2 | 0.28±0.025 |
| F3 | 0.59±0.015 |
| F4 | 0.33±0.010 |
| F5 | 0.44±0.010 |
| F6 | 0.49±0.005 |
| F7 | 0.43±0.015 |
| F8 | 0.54±0.010 |
| F9 | 0.36±0.005 |
| F10 | 0.43±0.010 |
| F11 | 0.48±0.010 |
| F12 | 0.39±0.010 |
| F13 | 0.53±0.005 |
| F14 | 0.35±0.005 |
| F15 | 0.46±0.005 |
| F16 | 0.52±0.005 |
| F17 | 0.41±0.005 |
| F18 | 0.57±0.020 |
| F19 | 0.37±0.005 |

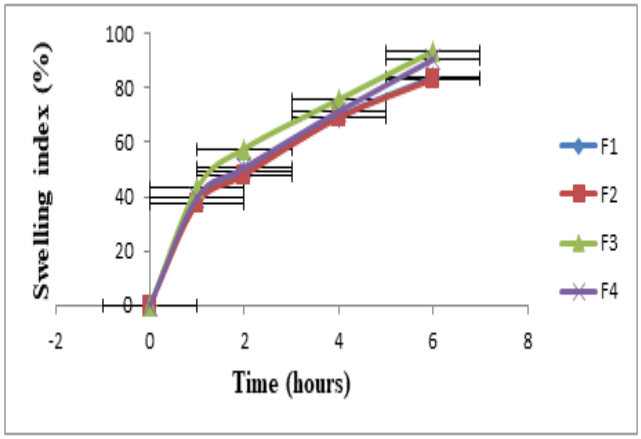


**Figure 1: Time v/s swelling index (%) curve [F1-F4]**

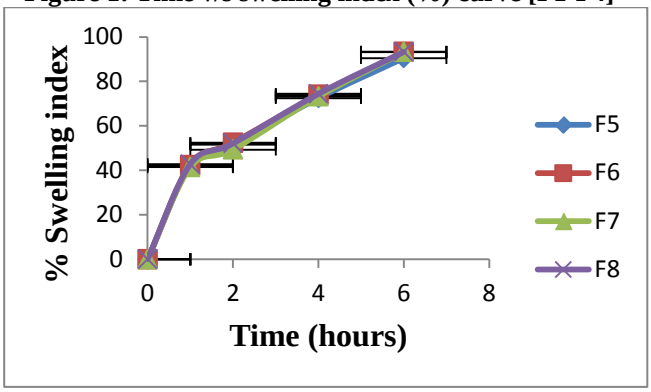


**Figure 2: Time v/s swelling index (%) curve [F5-F8]**

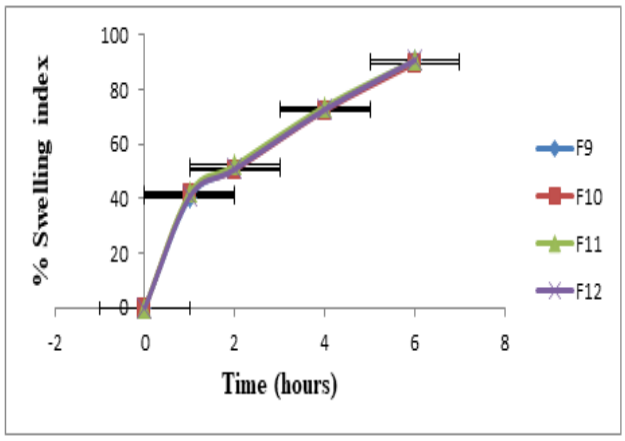


**Figure 3: Time v/s swelling index (%) curve [F9-F12]**

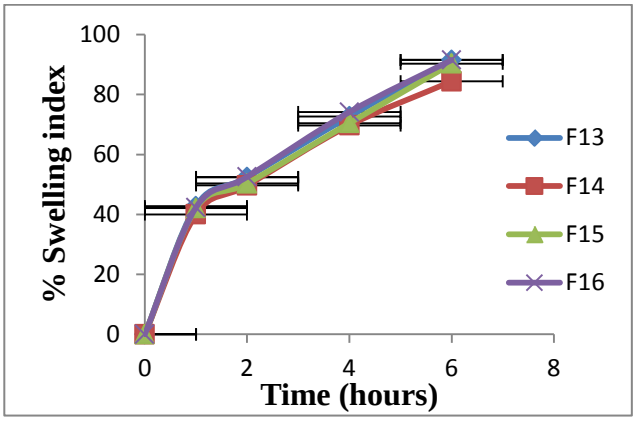


**Figure 4: Time v/s swelling index (%) curve [F13-F16]**

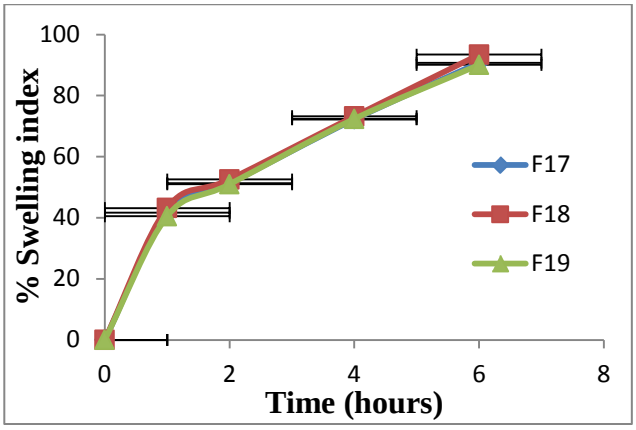


**Figure 5: Time v/s swelling index (%) curve [F17-F19]**

For swelling index study different types of polymers with different-different concentration are formulated. The experiment had done in laboratory. For this experiment a simulated salivary fluid (pH 6.75) was used. Oral tablet of various formulations Weighed but classified in significant Petri dishes 5 ml of simulated salivary liquid (pH 6.75) during said time interval (1,2,4,6 h), the same Petri dishes were removed and clean Fill carefully the same excess liquid with the filter paper, but re-weigh the same tablets[8]. That carbopol reveals, as per the test, the highest swelling table, i.e. F3 formulation but least swelling indicated through F2 formulation containing ethyl cellulose. However, HPMC or Na-CMC displayed greater swell than ethyl cellulose. Carbopol's essence is 'fluffy' and this has begun to swell much more than other polymers. Those swelling indexes were lowered while quantities of cellulose derivatives (HPMC, EC, and Na-CMC) are enhanced. Which imply variants of cellulose provide low index swelling relative with carbopol.

Situations for both the Terbutaline sulphate formulation remained retained in the very same setting. Specific polymer amounts are being used in the formulation of both the buccal tablets. 8 hrs of data on release rate are seen in above tablet.All formulations contained MS 3% of total weight of buccal tablet and lactose was q.s. Carbopol was constant used in all formulation with different ratio[9].

In formulation of F1 to F4, each polymers i.e. HPMC, EC, carbopol, Na-CMC have 100% of total polymer content. In these formulations each polymer affects the release of drug. 84.78% drug release showed by F1 due to hydrophilic nature of HPMC, solvent enter into the buccal tablet easily thus buccal tablet release the drug fast as compare to other polymer. The drug release shown by ethyl cellulose (F2) was 96.93%. It shows the release slow comparison to hpmc. Formulation F3 contained carbopol which showed the drug release 79%. The maximum drug release was shown by formulation F4 that contained Na-CMC that was 93.69%.

Formulation F5 to F9 contained the mixture of HPMC and carbopol in ratio of 1:1, 1:2, 2:1, 1:3, and 3:1 respectively. Drug release showed by F5 was 96.88%. In further formulation (F6) drug release was decreased with 94.03%. F7, F8, F9 was show the drug release 97.01%, 91.06%, and 97.01% respectively[5]. In formulation F10 to F14 HPMC is replaced by EC to check the effect of the drug release. EC and carbopol ratio in these formulation were 1:1, 1:2, 2:1, 1:3, and 3:1 respectively. Drug release was decreased comparison to previous formulations for these formulations (F10-F14). F10-F14 showed the drug release 88.01%, 85.15%, 93.99%, 81.72%, and 93.95% respectively. Which seam that the drug release was decreased by decreasing the concentration of carbopol. Formulation F15 to F19 had Na-CMC and Carbopol in ratio of 1:1, 2:1, 1:2, 3:1, and 1:3 respectively. Drug release of formulations F15 to F18 was 84.80%, 78.88%, 87.79%, and 78.87% respectively and F19 showed the 90.67% drug release that shows drug release was increased by increasing the Na-CMC concentration.

The product content was contained in even a standardized range from each formulation and even the range was 91.08% to 96.16%. The whole collection is appropriate, which follows necessary pharmacopoeia criteria. And in table above the specific drug concentration of every other formulation has been shown. Depending in release rate, drug composition, bioadhesion, swelling index and hardness, that formulation F5 were deemed strongest throughout the entire experiment. Any of those formulations demonstrated that likely to reduce that could cause problems with transportation. Thus hardness was however remembered besides formulation optimization. F5 seems to have all the parameters within the set like SD that match the requirements pharmacopoeia.

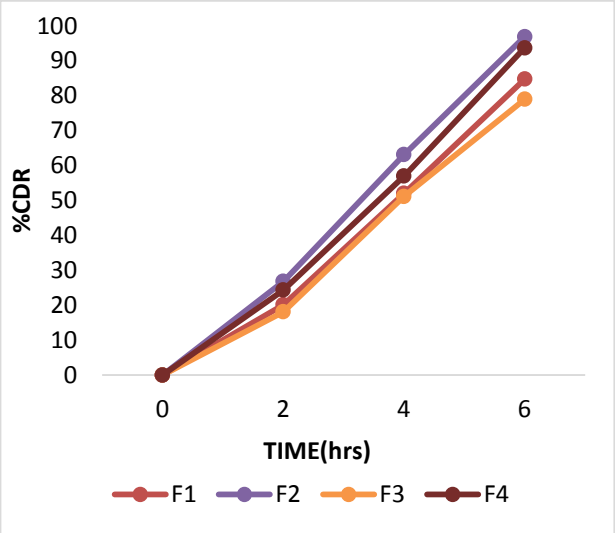


**Figure 10: Drug release curve (F1-F4)**

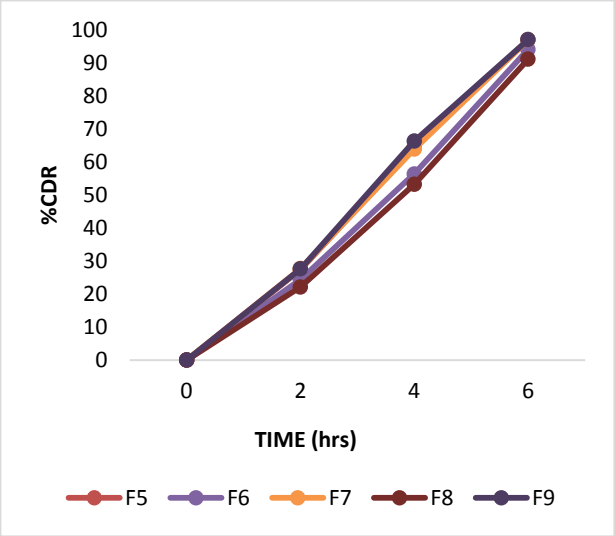


**Figure 11: Drug release curve (F5-F9)**

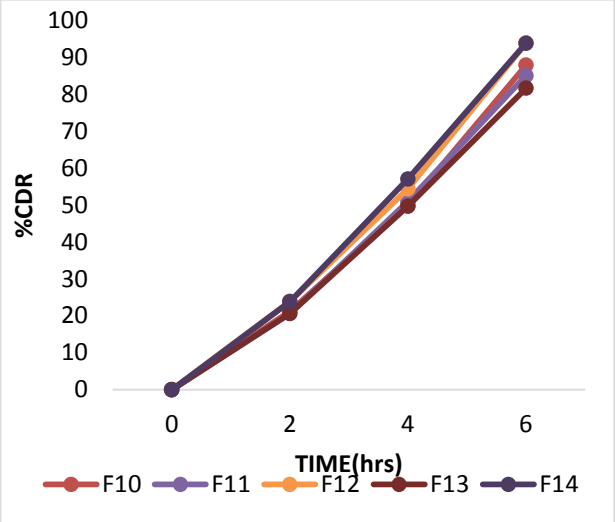


**Figure 12: Drug release curve (F10-F14)**

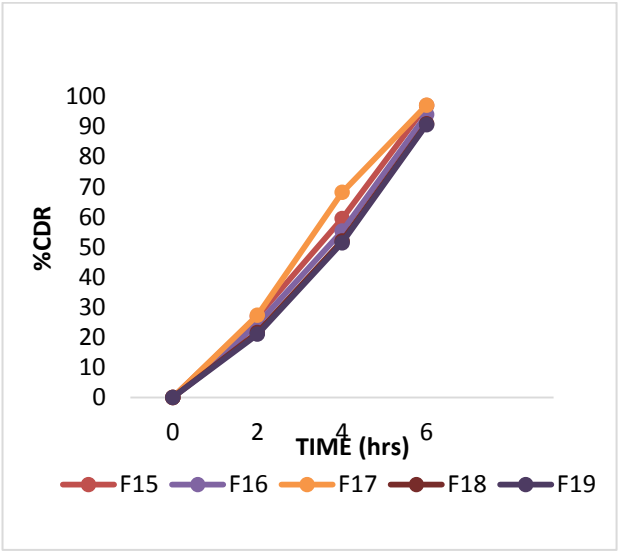


**Figure 13: Drug release curve (F15-F19)**

**Table No. 5: Data of release kinetics**

| Form. | Zero order | | First order | | Higuchi | | Korsmeyer peppas | |
|---|---|---|---|---|---|---|---|---|
| | $R^2$ | $K_0$(-) (1/S) | $R^2$ | $K_1$(-) M/L.S | $R^2$ | $K_H$ | $R^2$ | n |
| F1 | 0.870 | 32.08 | 0.261 | 0.385 | 0.870 | 34.62 | 0.893 | 1.04 |
| F2 | 0.871 | 34.46 | 0.005 | 0.044 | 0.871 | 34.28 | 0.919 | 0.78 |
| F3 | 0.894 | 28.05 | 0.221 | 0.263 | 0.894 | 27.93 | 0.916 | 0.85 |
| F4 | 0.915 | 37.31 | 0.103 | 0.236 | 0.915 | 38.26 | 0.869 | 1.00 |
| F5 | 0.880 | 33.74 | 0.008 | 0.056 | 0.880 | 34.26 | 0.914 | 0.78 |
| F6 | 0.889 | 33.64 | 0.043 | 0.117 | 0.889 | 33.25 | 0.911 | 0.79 |
| F7 | 0.890 | 34.98 | 0.003 | 0.036 | 0.890 | 34.30 | 0.903 | 0.78 |
| F8 | 0.889 | 32.88 | 0.080 | 0.156 | 0.889 | 32.20 | 0.910 | 0.80 |
| F9 | 0.885 | 35.47 | 0.002 | 0.026 | 0.885 | 34.30 | 0.904 | 0.78 |
| F10 | 0.882 | 31.52 | 0.086 | 0.165 | 0.882 | 31.12 | 0.922 | 0.82 |
| F11 | 0.895 | 30.89 | 0.008 | 0.055 | 0.895 | 30.11 | 0.906 | 0.83 |
| F12 | 0.892 | 33.84 | 0.111 | 0.181 | 0.892 | 33.24 | 0.899 | 0.79 |
| F13 | 0.890 | 30.11 | 0.153 | 0.216 | 0.890 | 28.90 | 0.917 | 0.85 |
| F14 | 0.866 | 33.64 | 0.038 | 0.111 | 0.866 | 33.22 | 0.917 | 0.79 |
| F15 | 0.916 | 35.43 | 0.024 | 0.099 | 0.916 | 34.32 | 0.875 | 0.77 |
| F16 | 0.918 | 33.65 | 0.042 | 0.113 | 0.918 | 33.25 | 0.872 | 0.77 |
| F17 | 0.930 | 35.85 | 0.0008 | 0.016 | 0.930 | 34.35 | 0.859 | 0.77 |
| F18 | 0.917 | 32.88 | 0.078 | 0.153 | 0.917 | 32.17 | 0.871 | 0.79 |
| F19 | 0.921 | 36.44 | 0.165 | 0.293 | 0.921 | 37.02 | 0.830 | 0.92 |

However, these data were managed in zero order, first order, higuchi model or korsmeyerpeppe sequence for drug release kinetics during the decomposition cycle. The regression model was determined in combination with the zero-order equation of 0.880, the first-order equation of 0.008, but the higuchi model of 0.880, for the standardized formulation F5. Only their dissolution data have been subject to a well-known exponential function (Korsmeyerpeppas equation), but they can also be used to explain the drug release action on the polymer network. As shown in this model the fickian release value of "n<0.45 suggests, n>0.45 but n<0.89 for non-fickian (anomalus) release and n>0.89 indicates super case II"Commonly leads towards polymeric chain erosion but (non-fickian) anomalous transport consists of a mixture of

both dissemination or erosion regulated product release. This same value 'n' which is illustrated in table 7. That best formulation (F5) showed non-fickian method of drug release based on n value.

## CONCLUSION

"Terbutaline sulphate buccal tablets Bioadhesive polymer mixture HPMC K100 M, ethyl cellulose, carbopol 934-p, and Na-CMC" were actually launched. Carbopol has been reported to be a quite useful polymer to adhere to that and swell. This same aim of the present research (article) would be to formulate the buccal tablet of Terbutaline sulfate through growing the drug's bioavailability but achieving high bioavailability was quite beneficial as well as simple to use avoids the first pass metabolism and enzymatic degradation.

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