BJPS

Brazilian Journal of
Pharmaceutical Sciences
vol. 48, n. 2, apr./jun., 2012

Article

Development and evaluation of ofloxacin orally disintegrating tablets

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Bitter taste of ofloxacin, a broad spectrum bactericidal agent, is masked and orally disintegrating tablets were formulated. The bitter taste is masked by forming complex between drug and weak cation exchange resins, Tulsion 335 and Indion 204. Effect of pH and drug:resin ratio on the drug loading was studied. Maximum drug loading was observed at pH 6. Ratio of 1:2 of drug:resin masked almost complete bitterness of ofloxacin. Formation of complexes was confirmed by IR spectroscopy. Physical characterization of taste masked complexes was carried out. Present work envisages the taste masking of ofloxacin and development of orally disintegrating tablets. The effect of pH and resin quantities on drug loading were studied to find the optimum conditions of drug loading for complete taste masking. Effect of superdisintegrants like sodium starch glycolate, croscarmellose sodium and polyplasdone XL at varying level on physical parameters of compressed tablets was also assessed. The formulations containing 5 % w/w polyplasdone XL showed about 90 % of drug release within 5 minutes. No significant differences were observed in the physical parameters of resinates as well as tablets prepared from Tulsion 335 and Indion 204.

Uniterms: Dispersion time. Indion 204. Ion exchange resin. Ofloxacin. Orally disintegrating tablets. Tableting properties. Tulsion 335. Wetting time.

O gosto amargo de ofloxacina, agente bactericida de largo espectro, é mascarado e formularam-se comprimidos dispersíveis. O sabor amargo é mascarado pela formação de complexo entre o fármaco e resinas de troca catiônica fraca, Tulsion 335 e Indion 204. Efeito do pH e da proporção fármaco: resina sobre a carga de fármaco foi estudada. Carga de fármaco máxima foi observada em pH 6. Proporção 1:2 do fármaco: resina mascarou quase completamente o gosto amargo de ofloxacina. A formação de complexos foi confirmada por espectroscopia no IV. Caracterização física dos complexos de sabor mascarado foi realizada. O presente trabalho preconiza o mascaramento do gosto de ofloxacina e desenvolvimento decomprimidos por via oral, se desintegrando. O efeito do pH e da resina quantidades de carga de fármaco foram estudadas paraencontrar as condições óptimas de carga de fármaco para dissimulação do saborcompleto. Efeito da superdisintegrants como amido glicolato de sódio, croscarmelose sódica e Polyplasdone XL em diferentes níveis de parâmetros físicos de comprimidos também avaliados foi avaliada. As formulações contendo 5 %w/w Polyplasdone XL mostraram cerca de 90% de libertação do fármaco no prazo de 5 minutos. Não foram observadas diferenças significativas nos parâmetros físicos de resinatosbem como comprimidos preparados a partir de Tulsion 335 e Indion 204.

Unitermos: Tempo de dispersão. Indion 204. Resina de troca iônica. Ofloxacina. Comprimidos de desintegração oral. Comprimidos/desenvolvimento/propriedades. Tulsion 335.

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INTRODUCTION

Unpleasant taste mainly bitterness had lead to dilemma for modern pharmaceutical science. This undesirable taste diminishes the acceptance and usefulness of many beneficial, safe and efficacious drugs. Thus elimination or reduction of bitterness is an important mainstay of product evaluation in oral pharmaceutical formulation.

The proven methods for bitterness reduction and inhibition have resulted in improved palatability of the oral pharmaceuticals. Methods of taste masking employ pH sensitive polymers like Eudragit E 100 (aminoalkylmethacrylate copolymers) (Shishu, Kapoor, Kamalpreet, 2009), polyacrylic acid ion exchange resin Indion 204, Indion 214, Indion 234, Indion CRP 244 and CRP 254, Tulsion 335, Amberlite IRP64 (Cation exchange resins) (Venkatesh, Jha, Karki, 2009; Mundada *et al.,* 2008; Avari, Bhalekar, 2008; Pisal *et al.,* 2004; Manek, Kamat, 1981; Tawakkul, 2009; Amin *et al.,* 2005; Leonard, Cooper, 1998; Metcalf, Purdy, 2001).

Extensive research has been carried out for the development of taste masked dispersible, oro-dispersible (Venkatesh, Jha, Karki, 2009), fast dissolving and mouth dissolving tablets (Amin *et al.,* 2005) using ions exchange resins and pH sensitive polymers (Shishu, Kapoor, Kamalpreet, 2009; Venkatesh, Jha, Karki, 2009). Strong cation exchange resin, Amberlite IRP69 was evaluated for taste masking, improvement of physicochemical properties of actives and subsequently formed resinate for sustaining the drug release (Khan *et al.,* 2007; Junyaprasert, Manwiwattanakul, 2008). The microencapsulated resinates were evaluated for controlled release characteristics (Kadam, Sakarkar, Kawtikwar, 2008). Enteric coating by using different coating materials was also employed to mask the bitter taste of dihydroartemisinin (Shahzad *et al.,* 2011). In addition to this, various superdisintegrants have been employed for the development of dispersible tablets (Damodharan, Manimaran, Suresh Kumar, 2009). Thus, taste masking of oral pharmaceuticals has become potential tool to improve patient compliance and commercial success of product (Nanda, Kandarapu, Garg, 2008; Wagh, Ghadlinge, 2009; Hiremath, Shastry, Shrinath, 2004).

Ion-exchange resins are water-insoluble, cross-linked polymers containing salt-forming groups in repeating positions on the polymer chain. Drug is bound to the resin by repeating exposure of the resin. These complexes reduce the solubility of the drug in saliva but releases drug in stomach so that the bioavailability of the drug is not affected (Banker, Anderson, 1991). Carboxylic resins were reported to have higher exchange capacities (about 10 meq/g) than sulfonic acid resins (about 4 meq/g) or amine resins (Amin *et al.,* 2005). Therefore, Indion 204 and Tulsion 335 were selected as resins for complex preparation.

In the present work, ofloxacin is selected as a suitable candidate due to its major disadvantage of bitterness. The bitterness may be masked to some extent by using sweetening and flavoring agent but it is not satisfactory as an unpleasant aftertaste may still remain in mouth. Thus complete masking of bitterness and formulate it into palatable dosage form especially for pediatric and geriatric patients become necessity. Liquid formulations have the problem of dose accuracy and stability. This problem is not seen in case of solid orals. But the major disadvantage associated with solid oral dosage forms is that the intact unit is difficult to swallow especially in pediatric and geriatric population. These problems can be overcome by formulating the drug into dispersible tablet. Thus in present research work, taste masked orally disintegrating ofloxacin tablets were developed. The weak cation exchange resins, Indion 204 and Tulsion 335 were evaluated at varying proportion to determine taste masking potential and minimum ratio of resin required for taste masking. Effects of different disintegrants at varying levels were studied to develop the formulation with minimum disintegration time. The study also envisaged the effect of pH on drug loading so as to find out the optimum condition of drug binding.

MATERIAL AND METHOD

Material

Ofloxacin was received as research sample from Elder pharmaceuticals Ltd., Navi Mumbai, India. Indion 204 and Tulsion 335 were procured from Ion Exchange India Ltd., Mumbai and Thermax Ltd., Pune respectively. polyplasdone XL (Crospovidone), sucralose and starch 1500 (Pregelatinized starch) were procured from International Specialty Product Ltd., Mumbai, India, Gangwal Chemicals Pvt. Ltd., Mumbai, India and Colorcon Asia Pvt. Ltd., Goa, India respectively. Ac-Di-Sol (Croscarmellose sodium) and Avicel PH 101(Microcrystalline cellulose) were supplied by Signet Chemical Corporation Pvt. Ltd., Mumbai, India. Pearlitol SD 200 (mannitol) and Glycolys (sodium starch glycolate) were provided by Roquette India Pvt. Ltd., Mumbai, India. Peppermint flavor, Aerosil 200 and magnesium stearate were obtained by Keva Flavours Pvt., Ltd, Mumbai, India, Evonik Degussa India Pvt. Ltd., Mumbai, India and Loba Chemie Pvt. Ltd., Mumbai, India respectively. All other chemicals were of analytical grade and were used as received.

Methods

Preparation of drug-resin complexes

The selected drug is basic in nature, with amine functional group, therefore cation exchange resins were selected (Indion 204 and Tulsion 335).

The drug-resin complexes were prepared by the batch process (Kadam, Sakarkar, Kawtikwar, 2008). Known weight of ion exchange resin was taken and slurred in 100 mL of distilled water. An accurately weighed amount of ofloxacin (1 g) was added to the slurry and stirred on magnetic stirrer (2MLB Magnetic Stirrer, Remi Equipments, Mumbai, India) for 5 hours. Resinates obtained were washed with copious amount of water to remove uncomplexed drug. The complexes were dried in a hot air oven (SMC-120, Spectrum Pvt. Ltd., Mumbai, India) at 60 °C for 4 hours and then stored in tightly closed desiccator.

Optimization of drug loading

- Effect of pH on drug loading

A series of solutions were prepared which contained fixed quantity (1g) of resin (Tulsion 335 and Indion 204) in 100 mL distilled water and about 1 g of ofloxacin. The pH was adjusted at 1.2, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0 and 8.0 and stirred on magnetic stirrer for 5 hours. The resinates were collected by filtration, washed with copious amount of water to remove uncomplexed drug and dried at 60 °C and then stored in tightly closed desiccator.

- Effect of drug resin ratio on loading

Three batches were prepared containing drug:resin in the ratio of 1:1, 1:2, 1:3 with Tulsion 335 and Indion 204. The pH was maintained at 6 and stirred for 5 hours. Resinates obtained were separated by filtration, washed with water to remove uncomplexed drug and dried at 60 °C.

- Taste evaluation of complexes (Mundada *et al., 2008*)

The taste of complexes was checked by panel method. For this purpose 10 human volunteers in the age group of 19 to 22 years were selected. The study protocol was explained and written consent was obtained from volunteers. About 100 mg of drug equivalent complex was placed on tongue and taste evaluated after 10 seconds. The taste given by each volunteer was recorded against pure drug using a numerical scale as a bitterness level (3 = Very biter; 2 = Bitter; 1 = Slightly bitter; 0 = Normal). Mean of all the scores given by volunteers for each formulation were taken into consideration for taste evaluation purpose. Minimum mean value of taste evaluation score indicates better taste masking.

- Determination of drug content of complexes (Avari, Bhalekar, 2004)

About 100 mg of complex was accurately weighed and taken in 100 mL volumetric flask. Volume was made with 0.1 N hydrochloric acid. Contents of the flask were sonicated for 20 minutes (3.5L 100, PCi, Mumbai, India). Solution was then filtered. From filtrate, further dilution was made with 0.1 N hydrochloric acid and the absorbance was measured at 294 nm using UV double beam spectrophotometer (Shimadzu 1700 (E) 23, Japan).

FTIR studies

Studies were carried out to confirm the formation of complexes of ofloxacin. The IR spectra of pure drug, Indion 204, Tulsion 335 complexes and their physical mixtures were observed for characteristics peaks (FTIR-8001, Shimadzu, Japan).

Evaluation of physical properties of taste masked complexes

Prepared complexes were evaluated for different physical parameters like moisture content, shape, angle of repose, bulk density, tapped density, compressibility index, Hausner ratio (Avari, Bhalekar, 2004). The complexes were observed under compound microscope (Metzer, India) at 10X magnification for shape determination. Moisture content of resinates was measured using halogen moisture analyzer (MB50C, Citizen Scale India Pvt. Ltd., Mumbai, India) at 105 ^{0}C. Angle of repose of was measured using fixed funnel method. A funnel with 10 mm inner diameter of stem was fixed at a height of 2.5 cm over the platform. About 10 g of sample was slowly passed along the wall of funnel till the tip of the pile formed touches the stem of the funnel. A circle was drawn around the pile base and the radius of powder cone was measured. Angle of repose was calculated from three averages using formula, $\theta = \tan^{-1}(\text{Height/Radius})$. Bulk and tapped density determinations were carried out as per method (Method II) described in United States Pharmacopoeia (USP) 24.

In vitro drug release studies from complexes

The complexes were subjected to *in vitro* dissolution testing using USP dissolution test apparatus type II

(TDT-08L, Electrolab Ltd., Mumbai, India). Weighed quantity of complexes equivalent to 100 mg of ofloxacin were suspended in 900 mL of 0.1 N HCl and quantity of drug released was determined periodically using spectrophotometric method of analysis at 294 nm.

Formulation of dispersible tablets

Poor compressibility of resinates and excess friability of the compressed tablets shifted direct compression approach to wet granulation. Tablet consist of resinates equivalent to 100 mg ofloxacin. Sodium starch glycolate, Polyplasdone XL and croscarmellose sodium as superdisintegrants. Microcrystalline cellulose, pregelatinized starch and Pearlitol SD 200 were used as diluents. All the ingredients were sifted through No. 30 (600 µ) sieve and dry blended for 10 minutes in double cone blender at 14 ± 2 rpm. The blend was wet granulated using demineralised water as granulating fluid. Wet granules were dried in tray dryer (Neel Enterprises, Mumbai, India) at 60 °C for 4 hours. The granules were sized through No. 20 (850 µ) sieve. Particle size distribution of the sized granules was carried out to get an idea of average particle size distribution using mechanical sieve shaker (Jayant Scientific Industries, Mumbai, India. Superdisintegrants, in varying concentrations, along with Pearlitol SD 200, sucralose (sweetner), Peppermint flavor, Aerosil 200 and magnesium stearate were added extra granularly. The moisture content of the lubricated blend was determined using halogen moisture analyzer at 105 ^{0}C for 5 minutes. Compression was carried out using ten station rotary tablet compression machine (Pilot Press Tablet Machine, Chamunda Pharma Machinery Pvt. Ltd., Ahmedabad, India). The weight of tablets were adjusted to 600 ± 10 mg using 12.8 mm flat faced with break line punches and compressed at hardness of 5-7 kg/cm^2.

Evaluation of dispersible tablets

Prior to compression, lubricated granules were characterized for physical parameters like angle of repose, bulk and tapped densities, % compressibility and Hausner ratio (Reddy, Mutalik, Reddy, 2003; Kuksal, 2006) The properties of the compressed tablet, such as thickness (Digital Vernier Caliper, Mitutoya Corp.), hardness (Mht-20, Monsanto Tablet Hardness Tester, Campbell Electronics, Mumbai, India), friability (EF-1W, Electrolab Ltd., Mumbai), weight variation, disintegration time (ED-2L, Electrolab Ltd., Mumbai.) and content uniformity were determined using reported procedure. The content was determined as described for complexes. Tablets were also evaluated for in vitro dispersion time (Mohire, Yadav, Gaikwad, 2009); wetting time, water absorption ratio and uniformity of dispersion test (Jacob, Shirwaikar, 2009).

In vitro dissolution studies

Tablets were subjected to *in vitro* dissolution testing as per procedure and conditions described for in vitro dissolution of taste masked complexes.

TABLE I - Composition of ofloxacin orally disintegrating tablets (600 mg) containing sucralose 1 %w/w, peppermint flavor 1%w/w, Aerosil 0.5%w/w and magnesium stearate 1%w/w

Ingredients (mg)	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Intra granular												
Tulsion 335	200	200	200	200	200	200	-	-	-	-	-	-
Indion 204	-	-	-	-	-	-	200	200	200	200	200	200
Sodium starch glycolate	6	9	-	-	-	-	6	9	-	-	-	-
Croscarmellose sodium	-	-	6	9	-	-	-	-	6	9	-	-
Polyplasdone XL	-	-	-	-	6	9	-	-	-	-	6	9
Microcrystalline cellulose	171	159	171	159	171	159	171	159	171	159	171	159
Pregelatinized starch	18	18	18	18	18	18	18	18	18	18	18	18
DM water	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.
Extra granular												
Pearlitol SD 200	72	72	72	72	72	72	72	72	72	72	72	72
Sodium starch glycolate	12	21	-	-	-	-	12	21	-	-	-	-
Croscarmellose sodium	-	-	12	21	-	-	-	-	12	21	-	-
Polyplasdone XL	-	-	-	-	12	21	-	-	-	-	12	21

RESULTS AND DISCUSSION

The batch method was preferred for the preparation of resinates because of its convenience. Time to reach equilibrium was determined by stirring the drug and resin at various time intervals (1 to 7 hours) and it was found that 5 hours is optimum period. The loading of ofloxacin onto ion exchange resin is an equilibrium process which depends upon the presence of cationic form of the drug in solution. The presence of cationic form was influenced by pH of the solution; therefore loading efficiency depends on pH. To investigate this behavior the pH of drug-resin solution was varied keeping the drug resin in the ratio of 1:1. Ofloxacin-Ion exchange resin complexation involves the exchange of ionizable drug and metal ions in resin, which in turn depends on the pKa of drug and resin. Such a mode of complexation between amino group of ofloxacin and $–COO^- K^+$ functionality of Tulsion and Indion can be affected by the pH of the reacting media. The complexation was enhanced with increasing pH from 1 to 6. A maximum of 95.51 ± 1.42% w/w and 94.15 ± 2.08 % w/w drug loading was obtained for Tulsion 335 and Indion 204 respectively at pH 6 (i.e., at pKa of ofloxacin). As shown in Figure 1, as pH increased above 6, the percentage drug loading decreased. The pH of the solution affects both solubility and the degree of ionization of drug and resin. The results can be attributed to the fact that ofloxacin hydrochloride has a pKa between 6.08 hence will have maximum solubility and complete ionization near to this pH value. The decreased complexation at lower pH is due to excess H^+ ions in the solution, which have more binding affinity to the $–COO^-$ groups of resin and compete with the drug for binding (Pisal *et al.,* 2004). Since maximum loading of ofloxacin on both the resins, Tulsion 335 and Indion 204 was seen at pH 6, it was selected for complexation of ofloxacin. Effect of drug:resin ratio on drug loading is shown in Figure 2. Results revealed that as the drug:resin ratio increased, the % drug loading was increased. Drug loading was increased from about 88% w/w to 95% w/w when drug:resin ratio was increased from 1:1 to 1:2 for both the resins. Beyond 1:2 drug:resin ratio, ofloxacin loading was remained constant. Both the resins have shown similar behavior for drug loading.

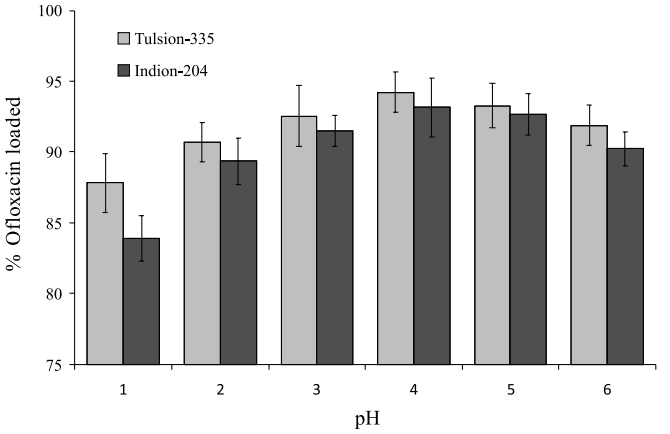

FIGURE 1 - Effect of pH on drug loading. Mean ± SD (n = 3).

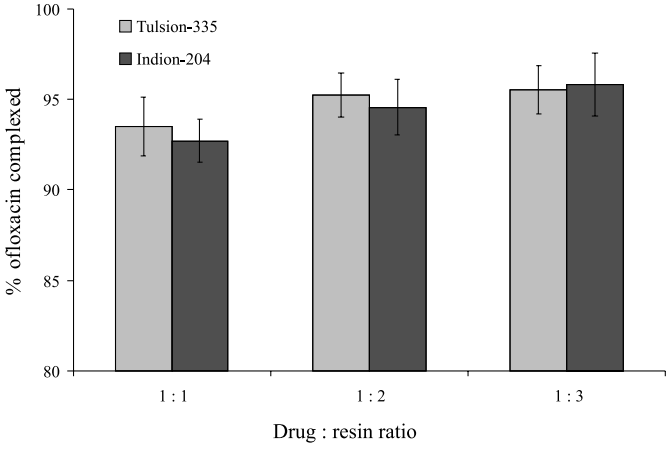

FIGURE 2 - Effect of drug:resin ratio on drug loading. Mean ± SD (n = 3).

Statistical analysis was done by using non parametric Kruskal-Wallis test followed by Dunn pos-hoc test for

TABLE II - Evaluation of taste of complexes

Volunteer		1	2	3	4	5	6	7	8	9	10	Mean
Pure Drug		3	3	3	3	3	3	3	3	3	3	3
Drug-Tulsion 335 complex	1 : 1	3	3	2	3	3	2	3	2	2	3	2.6
	1 : 2	1	0	0	0	1	0	0	0	1	0	0.3*
	1 : 3	0	0	1	0	0	0	0	1	0	0	0.2*
Drug-Indion 204 complex	1: 1	2	3	3	2	3	2	3	2	3	3	2.6
	1 : 2	0	1	0	0	0	1	0	1	0	1	0.4*
	1 : 3	0	0	0	0	0	0	1	1	0	0	0.2*

3 = Very bitter; 2 = Bitter; 1 = Slightly bitter; 0 = Normal

the comparison between pure drug and test formulations. *P<0.001 was considered as significant.

Results of taste evaluation by panel method as shown in the Table II revealed that Tulsion 335 and Indion 204 mask the bitter taste of drug completely at 1:3 and almost completely at 1:2 ratios. Thus, ratios (1:2) at which, complexes mask the bitter taste of drug completely with the aid of sweetener and flavor were considered for further studies. Results of physical properties of taste masked complexes are shown in Table III.

Particle size distribution shown uniform distribution of granules. NMT 78% of particle were found below No. 80 (850 µ) sieve. Angle of repose is an indication of interparticle frictional force of a sample that in turn may affect its flowability. It has been reported that material having angle of repose ≤30° have good flowability. The angle of repose was found to be less than 30° suggesting that granules have good flowability. This is a very critical parameter, as flow property may affect the die filling; tablet weight and drug content present in the tablet, and is important for compression of tablets.

Bulk density is an indication of packing properties of material. Variations in the bulk density can cause change in die fill volume. The bulk density of powder depends primarily on particle size distribution, particle shape and frequency of particles to adhere together. The particles may pack in such a way so as to leave large gaps between their surfaces resulting in a light powder of low bulk density. On the other hand, the smaller particles may pack between the larger ones to form a heavy powder or one of high bulk density.

It has been reported that bulk density less than 1.25 g/cm^3 indicate good flowability (Wells, 1988). It is evident from table III that complexes have shown bulk density in the range 0.56-0.57 (g/cm^3) which indicates good compression properties.

Carr's compressibility index i.e. % compressibility and Hausner ratio indicates the packing ability of powders. When compressibility index values ranges from 5 to 16 and Hausner ratio closer to 1.25, the materials have acceptable flow property and packing ability. The results have shown that the complexes possessed good flow properties and packing ability.

IR spectrum of Tulsion 335 and ofloxacin complex as well as Indion 204 and ofloxacin complex show absence of peak at 3397 cm^{-1} in drug-resin complex corresponds to complexation of amine group in the drug with resin. The absence of peaks 2685-3044 cm^{-1} due to dimerization of carboxylic acid groups in the drug-resin complex denotes that breaking of acid dimmers during complexation, which signifies that drug-resin complex formation. Amino group of drug was interacted with

TABLE III - Physical properties of taste masked complexes

Parameter	Drug-Tulsion 335 Complex	Drug-Indion 204 Complex
Shape	Irregular	Irregular
Moisture content	7.48% w/w	9.32% w/w
Angle of Repose (q)	27.7°	28.06°
Bulk density (g/cm^3)	0.57 ± 0.05	0.56 ± 0.03
Tap density (g/cm^3)	0.68 ± 0.03	0.66 ± 0.04
Carr's index (%)	16.18	15.15
Hausner Ratio	1.19	1.18

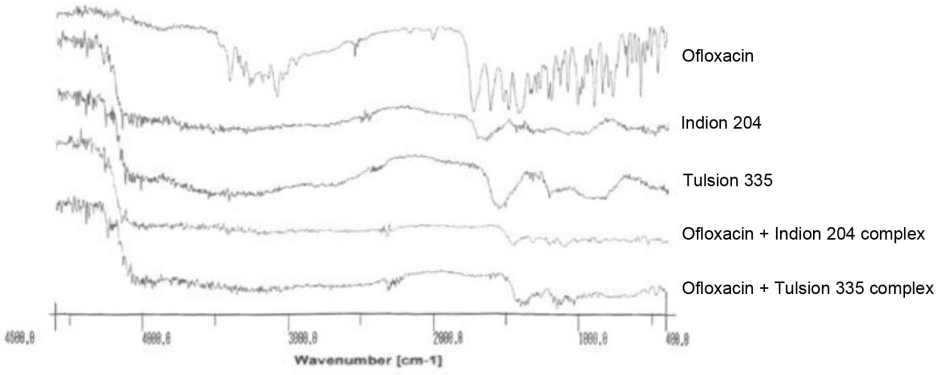

FIGURE 3 - FT-IR spectra of ofloxacin, Indion 204, Tulsion 335 and complex of ofloxacin with Indion 204 and Tulsion 335.

carboxylic group of Tulsion 335 and Indion 204. Drug content in the taste masked complexes was fund in the range of 98.4 to 99.2%.

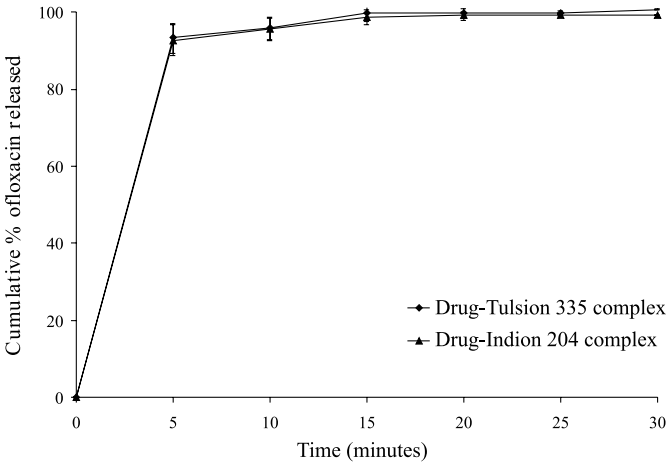

FIGURE 4 - *In vitro* drug release profile of complexes. Mean ± SD (n = 3).

In vitro dissolution studies of drug:resin complexes (1:2) in 0.1 mL 0.1 N HCl at 50 rpm using USP type II dissolution test apparatus shown more than 80% drug release within 5 minutes. Both the complexes have shown almost similar release profiles with F_2 (similarity) factor value of 95.1 (Figure 4). The prepared powder blends of various formulations were evaluated for physical parameters which have shown excellent flow properties. The moisture content values of blends were in the range of 2.13 - 2.58% w/w for all formulations. Tablets of all the batches pass the test for friability and weight variation. Also the compressed tablets were evaluated for various physical parameters; results are depicted in Table IV.

Tablets of all the batches pass the test of uniformity of dispersion. The results revealed that the tablets of batches (F6) formulated with 5% w/w of Polyplasdone XL has shown remarkably less wetting time, disintegration time and dispersion time. CDER (Center for Drug Evaluation and Research) recommend that orally disintegrating tablets be considered solid oral preparations that disintegrate rapidly in the oral cavity, with an in-vitro disintegration time of approximately 30 seconds or less, when based on the United States Pharmacopeia (USP) disintegration test method or alternative. Formulation batches containing Polyplasdone XL (3% w/w and 5% w/w) have shown desired disintegration time. Figure 5 and 6 show in vitro ofloxacin release from the taste masked compressed tablets containing Tulsion 335 and Indion 204 respectively. Tablets containing Sodium starch glycolate and croscarmellose sodium shown remarkably decrease in drug release at each time point during dissolution studies as compared to Polyplasdone XL at 3% w/w level. Whereas when Polyplasdone XL was used at 5% w/w concentration, tablets released nearly 90% of drug within 5 minutes which can be correlated to the results obtained for wetting time, disintegration time and in vitro dispersion time. The F_2 value for formulation batches containing 5% w/w Polyplasdone XL (F6 and F12) was found to be 93.9 which conclude the comparable release profiles for both the resins. Also, in vitro drug release data of tablets matched with that obtained for complexes.

TABLE IV - Characterization of ofloxacin orally disintegrating tablets. All values indicate mean ± SD (n=10)

Formulation Code	Wetting time (sec)	Water absorption ratio	% Drug content	*In vitro* disintegration time (sec)	*In vitro* dispersion time (sec)
F1	282 ± 4	83 ± 4	97.9 ± 0.9	112 ± 6	94 ± 3
F2	257 ± 3	79 ± 2	98.5 ± 1.1	97 ± 3	83 ± 2
F3	148 ± 4	69 ± 1	96.4 ± 0.7	55 ± 5	48 ± 3
F4	94 ± 7	62 ± 2	99.0 ± 0.4	41 ± 2	33 ± 2
F5	52 ± 2	47 ± 4	98.7 ± 0.8	31 ± 3	24 ± 2
F6	33 ± 3	44 ± 2	99.6 ± 0.5	22 ± 3	19 ± 3
F7	342 ± 9	78 ± 3	97.1 ± 0.6	121 ± 5	98 ± 3
F8	314 ± 5	72 ± 1	98.7 ± 0.5	109 ± 6	92 ± 4
F9	153 ± 2	69 ± 2	99.2 ± 0.8	65 ± 7	53 ± 4
F10	95 ± 3	65 ± 3	99.5 ± 0.2	49 ± 8	39 ± 2
F11	48 ± 2	58 ± 3	97.5 ± 1.6	37 ± 4	29 ± 3
F12	29 ± 2	38 ± 1	100.2 ± 0.3	28 ± 5	21 ± 1

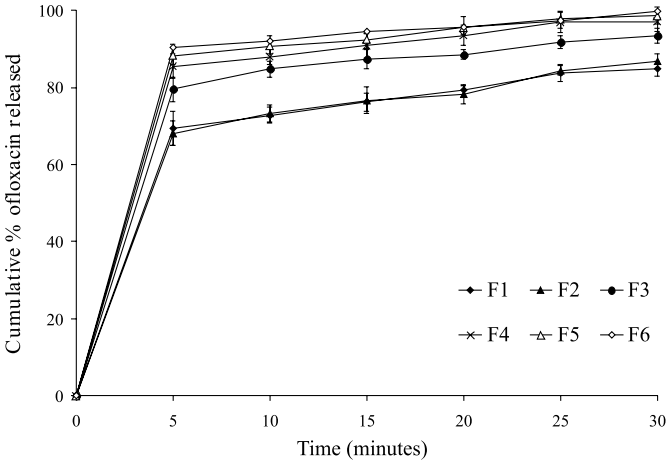

FIGURE 5 – *In vitro* drug release profile of ofloxacin orally disintegrating tablets containing Tulsion 335 resin. Mean ± SD (n = 3).

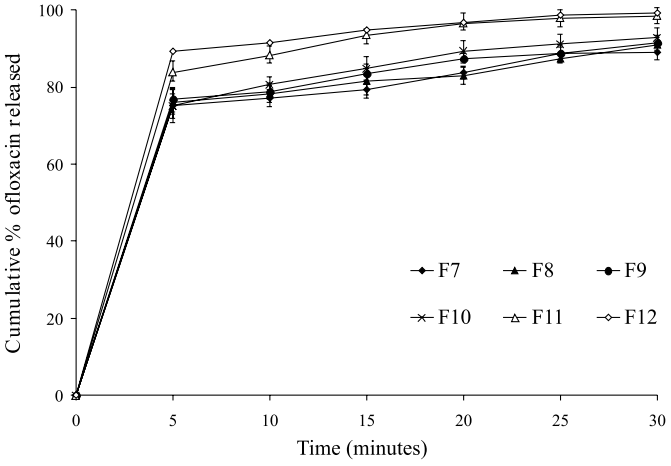

FIGURE 6 – *In vitro* drug release profile of ofloxacin orally disintegrating tablets containing Indion 204 resin. Mean ± SD (n = 3).

CONCLUSION

Taste masked orally disintegrating ofloxacin tablets were formulated for more palatable and compliance disintegration in oral cavity using Tulsion 335 and Indion 204 effectively masked bitter taste of ofloxacin. The maximum drug loading was found at pH 6 which increased proportionately with increase in amount of resin. The formulations containing Polyplasdone XL as disintegrant shown tablets with desired physical parameters and about 90% of drug was released within 5 minutes when Polyplasdone XL used at 5% w/w level.

ACKNOWLEDGEMENT

Authors would like to thank Elder Pharmaceuticals Ltd. (Navi Mumbai, India) for providing drug sample. We are also thankful to Dr. Shoma Sen, Associate Professor, Department of English, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur for reviewing the article.

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Received for publication on 13th April 2011
Accepted for publication on 13th April 2012