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FORMULATION, DEVELOPMENT AND EVALUATION OF AMOXICILLIN FAST DISSOLVING TABLETS

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ABSTRACT
The development of formulation and evaluation of Amoxicillin Trihydrate Fast Dissolving Tablets to improve the bioavailability of Amoxicillin Trihydrate. Amoxicillin Trihydrate is classified as a biopharmaceutics classification system (BCS) Class-I, Class-II and Class-IV Drug according to the dose. Amoxicillin is a hydrophilic drug, increase the solubility and permeability improve the bioavailability and onset of action of Amoxicillin Trihydrate has been done. The drug-excipient compatibility studies were conducted to characterize the drug Amoxicillin Trihydrate present in Fast Dissolving Tablets Delivery System FDTs. The objective of this study was to formulate Amoxicillin Fast Dissolving Tablets to ensure the release of the drug at the sites of its absorption, also to develop a patient-friendly Fast Dissolving Tablets of Amoxicillin to increase the patient's adherence and compliance to the therapy. Amoxicillin was prepared as a Fast-Dissolving Tablets in 500mg dose. Six formulae containing Amoxicillin Trihydrate and various excipients as mannitol, and MCC as diluents, and sodium starch glycolate, croscarmellose sodium, and crospovidone as superdisintegrants in different ratios. Then, each formula was evaluated for precompression parameters, then prepared by direct compression method. Finally, the compressed tablets of each formulation were evaluated for the post compression parameters. All the formulations showed satisfactory tablet properties. Among the 12 formulations the drug release of formulation F12 was found to be 94.78% at 2 minutes. Formulation F12 was the best formulation as it showed a drug release percentage was 94.78% at 2 minutes, due to rapid disintegration and fine dispersion of particles formed after disintegration within 30 seconds.

KEYWORDS: Amoxicillin Trihydrate, Fast dissolving tablets, Superdisintegrants, Antibiotics.

INTRODUCTION
Drug Delivery System FDTs[1-170]
Oral administration is the most popular route due to ease of ingestion, pain avoidance, versatility to accommodate various types of drug candidates, and, most importantly, patient compliance. Also, solid oral delivery systems do not require sterile conditions and are, therefore, less expensive to manufacture. Several novel technologies for oral delivery have recently become available to address the physicochemical and pharmacokinetic characteristics of drugs, while improving patient compliance. Electrostatic drug deposition and coating. The most evident drawback of the commonly used oral dosage forms like tablets and capsules is difficulty in swallowing, leading to patient incompliance particularly in case of pediatric and geriatric patients, but it also applies to people who are ill in bed and to those active working patients who are busy or travelling, especially those who have no access to water. So, oral dispersible tablet can rapidly dissolve or disintegrate in the oral cavity have attracted a great deal of attention. Fast Dissolving Tablets are not only indicated for people who have swallowing difficulties, but also are ideal for active people.

Amoxicillin Trihydrate[121]

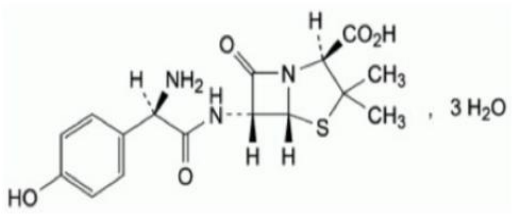

Fig. 1: Chemical Structure of Amoxicillin Trihydrate.

Chemical Name of Amoxicillin Trihydrate: (2S,5R,6R)-6-[[(2R)-2-Amino-2-(4-hydroxyphenyl)acetyl]-amino]-3,3- dimethyl-7-oxo-4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid trihydrate. As shown in Figure 1.

Amoxicillin is a penicillin-class, effective broad-spectrum antibiotic, which is commonly prescribed to children for treatment of pneumonia and other illnesses, including other bacterial infections of the ears, sinuses, throat, urinary tract, skin, abdomen, and blood.

Therapeutic Indications: WHO recommend oral amoxicillin as the first-line treatment for childhood fast-breathing and ches- indrawing pneumonia. Oral amoxicillin is also indicated for the treatment of the following infections in adults and children: Acute bacterial sinusitis, Acute otitis media, Acute streptococcal tonsillitis and pharyngitis, Acute exacerbations of chronic bronchitis, Community-acquired pneumonia, Acute cystitis, Asymptomatic bacteriuria in pregnancy, Acute pyelonephritis, Typhoid and paratyphoid fever, Dental abscess with spreading cellulitis, Prosthetic joint infections, Helicobacter pylori eradication, and Lyme disease Oral amoxicillin is also indicated for the prophylaxis of endocarditis.

Fast Dissolving Tablets FDTs[50-215]

Fast Dissolving Tablets (FDTs) are solid dosage forms containing drugs that disintegrate in the oral cavity within less than 1 minute leaving an easy-to-swallow residue. The European Pharmacopeia adopted the term Fast Dissolving Tablets for a tablet that disperses or disintegrates within <3 minutes in the mouth before swallowing. FDTs is a good choice of drug delivery for pediatric and geriatric patients because it troubleshoots the problem of dysphagia.

In the pharmaceutical industry oral route is considered as the safest and convenient route. Fast Dissolving Tablets (FDTs) are solid dosage forms containing drugs that disintegrate in the oral cavity within less than 1 minute leaving an easy to swallow residue. These dosage form contains superdisintegrants which imparts quick disintegration with presence of saliva and can be swallowed easily. FDTs are the very good choice for the pediatric and geriatric patients. To improve the bioavailability of many drugs, Fast Dissolving drug delivery systems are used extensively. Advanced technologies used for manufacturing Fast Dissolving Tablets are by direct compression method, freeze drying method, sublimation method, mass extrusion and cotton candy process. Taste is the important factor because these tablets disintegrate directly in the mouth. FDTs are evaluated by following parameters like hardness test, friability test, disintegration test and dissolution test.

Oral delivery is currently the gold standard in the pharmaceutical industry where it is regarded as the safest, most convenient and most economical method of drug delivery having the highest patient compliance. Formulation of a convenient dosage form for oral administration, by considering swallowing difficulty especially in case of geriatric and pediatric patient leads to poor patient compliance. To troubleshoot such problems a new dosage form known as orally disintegrating tablet (FDTs), has been developed which rapidly disintegrate & dissolve in saliva and then easily swallowed without need of water which is a major benefit over conventional dosage form. In addition, patients suffering from dysphasia, motion sickness, repeated emesis and mental disorders prefer such preparation because they cannot swallow large quantity of water. Further, drugs exhibiting satisfactory absorption from the oral mucosa or intended for immediate pharmacological action can be advantageously formulated in such type of dosage form. The popularity and usefulness of the formulation resulted in development of several FDT technologies for preparation.

Pharmaceutical Industry Scientists confirm that providing the drug in a fast drug delivery system helps achieve the effective goal of the drug more accurately and reduces the use of large doses. In addition to the patient acceptance of this drug in fast delivery systems, and thus innovating the formulation of medications in this drug delivery systems is considered one of the most important in developing the pharmaceutical industries.

In the present study, it was proposed to formulate Fast Dissolving Tablets FDTs of Amoxicillin Trihydrate by using direct compression technique method, with the aim of reaching high serum concentration of the drug in a short time period. In this study, effort has been made to formulations the Fast Dissolving Tablets using superdisintegrants like sodium starch glycolate, croscarmellose sodium and crospovidone.

MATERIALS AND METHODS

As shown in Table 1.

Table 1: List of Materials Used.

NO	Materials
1	Amoxicillin Trihydrate
2	Sodium Strach Glycolate
3	Microcrystalline Cellulose
4	Crospovidone
5	Croscarmellose Sodium
6	Magnesium Stearate
7	Talc
8	Aerosil
9	Sodium Saccharin
10	Mannitol
11	Dibasic Sodium Phosphate
12	Monobasic Potassium Phosphate (KH2PO4)
13	Calcium Carbonate
14	Orange Flavor
Most materials were a gift sample from (Shaphaco Pharmaceutical Industry Company-Yemen). While other materials were a gift sample from (Biopharm Pharmaceutical Industry Company-Yemen and Shiba Pharmaceutical Industry Company-Yemen).	

The equipment's used as shown in Table 2.

Table 2: The Equipment's Used.

No	Equipment's
1	UV/VIS Spectrophotometer
2	Friability Tester (CPD-300D)
3	Hardness Tester (YPD-200C)
4	Disintegration Tester (ERWEKA)
5	Digital Dissolution Tester (JASCO DT- 810)
6	Moisture Tester
7	Density Tester
8	pH Meter
9	Ultra-sonic
10	Accelerate Stability Study Chamber
11	Electronic Balance
12	Single Punch Tablet Machine

Formulation and Evaluation of Amoxicillin Fast Dissolving Tablets[50-215]

Formulation of Amoxicillin Fast Dissolving Tablets

The Fast Dissolving Tablets that contained a selected solid dispersion were prepared by direct compression method using a single punch tablet machine to produce round tablets with a biconvex surface, tablets were 500mg in weight. 100 tablets were prepared for each formula batch. The formulations were developed by using superdisintegrants. The superdisintegrants (crospovidone, sodium starch glycolate, and croscarmellose sodium) were used in varied concentrations to develop the formulations. All the ingredients of the 12 formulations are shown in Table 3. Each ingredient was passed through a sieve no.18 except mg stearate passed through sieve no.35, the ingredients were co-grounded in a glass pestle motor, then mixed geometrically. The prepared blends were evaluated for mass-volume relationship (bulk density, tapped density, hausner ratio, and compressibility index) and flow properties (Angle of Repose). The prepared blends were compressed using a tablet compression machine.

Mixing and Compression Processes: Mixing was performed geometrically, in which all excipients were accurately weighed then all of them with the exception of talc, aerosil, magnesium stearate and orange flavor, were blended with specified quantity of Amoxicillin for 15minutes, while the other excipients were blended for 5 minutes and added to the former excipients. Then each blend was subjected to powder properties examination and that will be shown in the evaluation of precompression parameters section. Finally, each mixture of each formula has been compressed directly into tablets using tablet compression machine to prepare tablets weighing 500mg.

Table 3: Composition of Amoxicillin Formulations FDTs.

Ingredients	Quantity Per Tablet (mg)												Percentage
	Formulation Code												
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	
Amoxicillin Trihydrate	250	250	250	250	250	250	250	250	250	250	250	250	50%
Croscarmellose Sodium	10	25	50	---	---	---	---	---	---	25	---	25	2-10%
Sodium Starch Glycolate	---	---	---	10	25	50	---	---	---	25	25	---	2-10%
Crospovidone	---	---	---	---	---	---	10	25	50	---	25	25	2-10%

MCC	154	139	114	154	139	114	154	139	114	114	114	114	18-25%
Mannitol	30	30	30	30	30	30	30	30	30	30	30	30	6%
Calcium Carbonate	25	25	25	25	25	25	25	25	25	25	25	25	5%
Saccharin Sodium	3	3	3	3	3	3	3	3	3	3	3	3	0.6%
Orange Flavor	20	20	20	20	20	20	20	20	20	20	20	20	4%
Talc	5	5	5	5	5	5	5	5	5	5	5	5	1%
Magnesium Stearate	5	5	5	5	5	5	5	5	5	5	5	5	1%
Aerosil	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	1.5%

Pre-Compression Evaluation of The Powder

Micrometric Properties

Angle of Repose (θ)

Angle of repose is defined as the maximum angle possible between the surface of a pile of the powder and horizontal plane. The frictional force in a loose powder or granules can be measured by angle of repose as shown in Table 4.

$$\tan \theta = h / r$$

$\theta = \tan^{-1} (h/r)$ Where, θ is the angle of repose, h is the height of pile, r is the radius of the base of pile.

Table 4: Relationship Between Angle of Repose and Flow Properties.

Flow Property	Angle of Repose
Excellent	<25
Good	25-30
Passable	40-30
Very Poor	>40

Bulk Density

Bulk density is defined as the mass of a powder divided by the bulk volume. The bulk density of a powder depends primarily on particle size distribution, particle shape, and the tendency of the particles to adhere to one another.

$$LBD = \frac{\text{Weight of the powder (m)}}{\text{Volume of the packing (vo)}}$$

Tapped Density

The measuring cylinder containing a known mass of blend was tapped for a fixed time. The minimum volume (V_t) occupied in the cylinder and the weight (M) of the blend was measured. The tapped density (ρ_t) was calculated using the following formula:

$$\rho_t = M / V_t$$

Compressibility Index

The compressibility index of the granules was determined by Carr's compressibility index as shown in Table 5.

(%) Carr's Index can be calculated by using the following formula:

$$\text{Carr's Index (\%)} = TBD - LBD / TBD \times 100$$

Hausner Ratio

Hausner ratio is an indirect index of ease of power flow. It is calculated by the following formula:

Hausner ratio = ρ_t / ρ_d

Where ρt is tapped density and ρ_d is bulk density. Lower Hausner ratio (<1.25) indicates better flow properties than higher ones (>1.25).

Table 5: Grading of the Powders for Their Flow Properties According to Carr's Index.

Compressibility Index	Flow Properties
5-15	Excellent
12-16	Good
18-21	Fair to Passable
23-35	Poor
33-38	Very Poor
>40	Very Very Poor

Post Compression Parameters

Diameter Test

Diameter test is one of tests which used for determination of the tablets size, it is done by taking ten tablets randomly. Diameter may have obtained by using suitable micrometer.

Thickness Test

The thickness of the tablets was determined by using vernier calipers. Randomly 10 tablets selected were used for determination of thickness that expressed in Mean SD and unit is mm.

Hardness Test

Hardness of tablet is defined as the force applied across the diameter of the tablet in the order to break the tablet. The resistance of the tablet to chipping, abrasion or breakage under the condition of storage transformation and handling before usage depends on its hardness. The hardness of FDTs is generally kept lower than conventional tablets as increased hardness delays the disintegration of the tab. Hardness of tablets (randomly) from whole tablet batch was determined by Monsanto hardness tester. Hardness measured in kg/cm^2.

Weight Variation Test

The weight variation test is carried out in order to ensure uniformity in the weight of tablets in a batch. The total weight of 20 tablets randomly from whole batch was determined and the average was calculated. The individual weights of the tablets were also determined

accurately and allowed deviation rang was calculated from average weight. The tablets pass the USP test if no more than 2 tablets deviate from (average weight ±allowed deviation) and if no tablet differs by more than 2 times the allowed deviation as shown in Table 6.

Table 6: Limits According to U.S.P.

Average Weight of Tablet	%Deviation
80mg or less	±10
More than 80 mg but less than 250 mg	±7.5
250 mg or more	±5

Friability Test

Friability test is the loss of weight of tablet in the container due to removal of fine particles from the surface during transportation or handling. Friabilator was employed for finding the friability of the tablets. For tablets with an average weight of 0.65 g or less take a sample of whole tablets corresponding to about 6.5 g and for tablets with an average weight of more than 0.65 g take a sample of 6 whole tablets. Friabilator is rotated at 25rpm for 4 minutes for 100rounds. The tablets were dedusted and weighed again. The percentage of weight loss was calculated using the formula:

%f= W0-W1/W0*100

%f = Percentage friability

W0 = Initial weight (before test)

W1 = Final weight (after test)

% Friability of tablets less than 1% are considered acceptable.

Disintegration Time Test

Disintegration time test is the process of breakdown of a tablet into smaller particles is called as disintegration. The USP device to rest disintegration was six glass tubes that are "3 long, open at the top, and held against 10" screen at the bottom end of the basket rack assembly. One tablet is placed in each tube and the basket rack is poisoned in 900ml beaker of distilled water at 37± 2°C, such that the tablets remain below the surface of the liquid on their upward movement and descend not closer than 2.5cm from the bottom of the beaker.

***In-Vitro* Dissolution Studies**

Dissolution Parameters: Apparatus: Dissolution tester (JASCO DT-810). Medium: 900 ml Phosphate buffer at (pH 6.8). RPM: 75. Temperature: 37°C ± 0.5°C. Sampling interval: 2,5,10, and 15 minutes. Sample withdrawn: 5 ml. Wavelength: 272.6 nm. Instrument: UV spectroscopy. Preparation of phosphate buffer at (PH 6.8): 0.896 g of NaOH and 6.804 g of KH2PO4 dissolve in sufficient quantity of water, the volume was completed to 1000ml with distilled water and mix well by sonication.

Procedure: *In-vitro* dissolution studies of Amoxicillin Fast Dissolving Tablets perform using dissolution Tester (JASCO DT-810). The volume of dissolution medium phosphate buffer at (pH 6.8) using 900 ml and the temperature maintain at 37°C ± 0.5°C. The speed of the basket set at 75 rpm. One tablet place in each jar of dissolution apparatus. 5 ml of sample from each jar withdrawn at every 2,5,10, and 15 minutes then filter withdrawn samples. the same volume of phosphate buffer replaces to each dissolution jar, so that volume of dissolution medium maintains to 900 ml. The amount of Amoxicillin released from FDTs determine spectrophotometrically at 272.6nm nm using phosphate buffer as blank.

RESULTS AND DISCUSSION

Preformulation Tests of Powder

Micrometric Properties of Amoxicillin

The powder of Amoxicillin was evaluated for the following parameters such as angle of repose, bulk density, tapped density, compressibility index and Hausner ratio. The results are given in Tables 7 and 8.

Table 7: Micrometric Properties of Amoxicillin.

Formulation Code	App Wt	App Vol	Tapp Wt	Tapp Vol	App D	Tapp D	Voids	Porosity %	Bulkiness
F1	11.79	25	11.78	18.8	0.472	0.627	0.248	24.8	2.119
F2	4.83	19	4.82	12.6	0.254	0.383	0.337	33.7	3.937
F3	7.99	25	7.97	18.2	0.319	0.438	0.272	27.2	3.135
F4	5.54	13	5.53	9	0.426	0.614	0.307	30.7	2.347
F5	5.61	21.2	5.60	14.8	0.265	0.378	0.302	30.2	3.773
F6	13.29	25	13.26	19.6	0.532	0.677	0.216	21.6	1.879
F7	11.11	25	11.04	17.6	0.444	0.627	0.296	29.6	2.252
F8	11.81	25	11,79	18.2	0.472	0.648	0.272	27.2	2.119
F9	9.24	25	9.23	20.1	0.369	0.459	0.196	19.6	2.710
F10	9.73	25	9.72	19.8	0.389	0.491	0.208	20.8	2.571
F11	12.14	25	12.11	18.2	0.486	0.665	0.272	27.2	2.057
F12	8.47	25	8.46	19.4	0.338	0.436	0.224	22.4	2.959

The Angle of repose of Amoxicillin formulations range was found to be 18.2-23.32%, which indicated Passable –may hang up flow property. The bulk density range was found to be 0.254-0.532 (g/ml), the tapped density range was found to be 0.378- 0.665(g/ml). The compressibility index range was found to be 19.61-33.68% which

indicates very, very poor flowability. The hausner ratio range was found to be 1.24 -1.51.

Evaluation of Precompression Parameter

Micromeritic Properties

Table 8: Evaluation of Precompression Parameters of Powder Blend.

Formulation Code	Angle of Repose (ɵ)	Compressibility Index (%)	Hausner Ratio	Evaluation of Angle of Repose	Powder Taste
F1	18.2	24.72	1.33	Passable	No Bitterness
F2	20	33.68	1.51	Passable	No Bitterness
F3	18.67	27.17	1.37	Passable	No Bitterness
F4	18.93	30.62	1.44	Passable	No Bitterness
F5	20.15	29.98	1.43	Passable	No Bitterness
F6	21	21.42	1.27	Passable	No Bitterness
F7	23.32	29.19	1.41	Passable	No Bitterness
F8	18.52	27.16	1.37	Passable	No Bitterness
F9	19.44	19.61	1.24	Good	No Bitterness
F10	19.39	20.77	1.26	Good	No Bitterness
F11	16.07	26.92	1.37	Passable	No Bitterness
F12	21.8	22.48	1.29	Passable	No Bitterness

The results in terms of micromeritics properties revealed that the flow property of formulations F9, F10 were good and other formulations were passable as shown in Table 8.

Evaluation of Amoxicillin Fast Dissolving Tablets FDTs

Post Compression Parameters of Amoxicillin Fast Dissolving Tablets FDTs

The prepared tablets were evaluated for various post compression parameters. The results are presented in Tables 9 and 10.

Table 9: Post Compression Thickness Results of Amoxicillin Fast Dissolving Tablets FDTs.

NO	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Mean(X)	3.16	3.21	3.16	3.23	3.19	3.10	3.20	3.32	3.46	3.09	3.22	3.26
SD=X*5%	0.158	0.161	0.158	0.162	0.160	0.155	0.16	0.166	0.173	0.154	0.161	0.163
Lower Range	3.002	3.053	3.002	3.068	3.03	3.945	3.04	3.153	3.283	3.932	3.056	3.099
Higher Range	3.318	3.375	3.318	3.392	3.35	3.255	3.36	3.485	3.629	3.24	3.378	3.425

The diameter of the tablets was measured and found to be in the range of 13.03mm to 13.26mm. All formulations possessed a uniform Diameter. The hardness of the tablets was measured and the values were found in the range of 4.5 to 6.3Kg. The prepared tablets possessed good mechanical strength with sufficient hardness. The thickness of the tablets was measured and were found in the range of 3.09mm to 3.32mm, all the formulations possessed uniform Thickness. The percentage of friability values of the prepared Amoxicillin Fast Dissolving Tablets showed less than 1%. All formulations of Amoxicillin Fast Dissolving Tablets passed the weight variation test since the values are within the acceptable variation limit of the tablet as shown in Table 10.

Table 10: Post Compression Evaluation of Amoxicillin Fast Dissolving Tablets FDTs.

Formulation Code	Average Weight (mg) ±SD	Thickness (mm)±SD	Mean Diameter (mm)	Friability%	Mean Hardness (kg/cm^2)	In-Vitro Disintegration Time (Sec)
F1	505±25.3	3.16±0.158	13.04	0.1	6.3	72
F2	508±25.4	3.21±0.161	13.18	0.4	5.8	22
F3	512±25.6	3.16±0.158	13.18	0.3	5.4	18
F4	512±25.6	3.23±0.162	13.15	0.4	5.2	53
F5	508±25.4	3.19±0.160	13.18	0.4	5.3	36
F6	512±25.6	3.10±0.155	13.16	0.6	5.3	32
F7	509±25.5	3.20±0.16	13.03	0.4	5.3	29
F8	509±25.5	3.32±0.166	13.15	0.4	5.2	30
F9	518±25.9	3.46±0.173	13.26	0.5	5.1	36
F10	503±25.2	3.09±0.154	13.25	0.3	5.1	172

F11	512±25.6	3.22±0.161	13.18	0.4	5.1	47
F12	510±25.5	3.26±0.163	13.07	0.4	4.5	30

As shown in Table 10, the disintegration time of Amoxicillin Fast Dissolving Tablets ranges between 18 to 72 seconds. From the results, it was concluded that the formulation F2, F3 and F12 showed better tableting properties compared to the other formulations.

***In-Vitro* Dissolution Studies**

The in vitro drug release of Amoxicillin FDTs were shown in Table 11.

Table 11: Comparative *In-Vitro* Drug Release Studies of Formulations of Amoxicillin Fast Dissolving Tablets FDTs.

Time (min)	Percentage Drug Release (%)												
	Formulation code												
	F1	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F9**	**F10**	**F11**	**F12**	**Glumox**
2	44.64	53.19	67.65	55.18	50.30	45.79	67.98	76.21	71.11	78.36	81.11	94.78	62.09
5	84.44	89.20	94.74	93.72	96.21	100.53	104.89	111.15	105.60	98.84	108.61	107.42	78.93
10	95.91	94.01	101.50	100.03	96.84	101.28	106.28	111.33	112.27	99.62	111.01	110.15	80.75
15	98.96	95.56	102.16	105.67	98.42	102.14	106.43	111.98	116.96	100.55	112.51	110.15	82.00

As shown in Table 11, Amoxicillin Fast Dissolving Tablets drug release was studied in phosphate buffer pH (6.8) for up to 15 minutes. The drug release of formulations F10, F11 and F12 were found to be 178.36%, 81.11% and 94.78% at 2 minutes. While Glumox was found to be 62.09% at 2 minutes. The highest dissolution rate and the maximum drug release was observed in formulation F12, which was 94.78% at 2 minutes, due to rapid disintegration and fine dispersion of particles formed after disintegration within 30 seconds.

CONCLUSION

Amoxicillin Trihydrate Fast Dissolving Tablets to improve the bioavailability FDTs have a major benefit over the conventional tablets due to their rapid disintegration and dispersion. Amoxicillin is a direct oral antibiotic that is used in the treatment of different infections. In order to ensure the drug release rapidly before reaching the proximal small intestine, and to increase the patient's adherence and compliance to the therapy a Fast Dissolving Tablets of Amoxicillin were formulated. A total of 12 formulations of Fast Dissolving Tablets of Amoxicillin were formulated by direct compression using mannitol, and MCC as diluents, and sodium starch glycolate, croscarmellose sodium, and crospovidone as superdisintegrants then evaluated. Among the 12 formulations the drug release of formulation F12 was found to be 94.78% at 2 minutes. formulation F12 was the best formulation as it showed a drug release percentage was 94.78% at 2 minutes, due to rapid disintegration and fine dispersion of particles formed after disintegration within 30 seconds.

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REFERENCES

1. Vidyadhara Suryadevara, Sasidhar R Lankapalli, Sivaprasad Sunkara, Vikas Sakhamuri, Harika Danda. Dissolution rate enhancement of irbesartan and development of fast dissolving tablets. Egyptian Pharmaceutical Journal., 2016; 15(3): 18-26.
2. Komal K, Kaur T, Singh A, Sharma P. Enhancement of Solubility and Dissolution Rate of Simvastatin by Using Solid Dispersion Technique Along with Different Combination of Polymers. JDDT., 2018; 8(2): 32-40.
3. P Radhika Reddy, P Manjusha Reddy, A Siva Koti Reddy*. Enhancement of Bioavailability of Carbamazepine by Solid Dispersion Technique. International Journal of Research in Pharmacy and Chemistry., 2013; 3(1): 55-61.
4. Abdul Hasan Sathali, A Ramanathan M. Formulation and Evaluation of Ormeloxifene Fast Dissolving Tablets. Asian Journal of Pharmaceutical Research and Development, 2018; 6(3): 17-31.
5. Bhyan B, Bhyan S, Sharma Dk. Development and Characterization of Solid Dispersion To Enhance The Dissolution Profile of Nifedipine with PVP K30 and Poloxamer 407. Int J Res Pharm Sci., 2014; 4(4): 1–6.
6. Bradoo R. Fast Dissolving Drug Delivery Systems. J. Am. Med. Asso., 2001; 4: 27-31.
7. Agarwal V, Kothari BH, Moe DV, Khankari RK. Drug delivery: Fast-dissolve systems. In: Swarbrick J, Encyclopedia of pharmaceutical technology. New York, USA: Informa Healthcare Inc., 2006; 1104–1114.
8. Hughes L. Selecting the right ion exchange resin. Pharma Quality., 2005; 1: 54–56.
9. Jeong SH, Park K. Development of sustained release fast disintegrating tablets using various polymer-coated ion exchange resin complexes. Int. J. Pharm., 2008; 353: 195–204.
10. Venkatesh DP, Geetha Rao CG. Formulation of taste masked orodispersible tablets of ambroxol hydrochloride. Asian J. Pharm., 2008; 2: 261-264.

11. Ahmed IS, Nafadi MM, Fatahalla FA. Formulation of fast dissolving ketoprofen tablet using freeze drying in blisters technique. Drug Dev. Ind. Pharm., 2006; 32: 437-442.
12. Allen LV, Wang B, Devies JD. Rapidly dissolving Tablets. US patent., 2000; 6: 066-337.
13. Masaki K. Intra buccally disintegrating preparation and production thereof. US patent., 1995; 5: 466-464.
14. Dobetti L. Fast-melting tablets: Developments and technologies. Pharm. Tech. Drug Delivery., 2001; 8: 44-50.
15. Harmon TM. Orally Disintegrating Tablets: A valuable life cycle management strategy. Issue of Pharmaceutical Commerce., 2007; 1-4.
16. Kuno Y, Kojima M, Ando S, Nakagami H. Effect of preparation method on properties of orally disintegrating tablets made by phase transition. Int. J. Pharm., 2008; 355: 87–92.
17. Kalvimoorthi V. formulation and in-vitro evaluation of Amoxycillin clavulanate potassium tablet. IJAPBS., 2012; 1(3): 96-99.
18. Patel N, Natarajan R, Rajendran NN, Rangapriya M. Formulation and Evaluation of Immediate Release Bilayer Tablets of Tolmisartan and Hydrochlorthiazide. IJPSN., 2011; 4(3): 1477.
19. Jadhav RT, Payal H Patil, Pratibha R Patil. Formulation and evaluation of bilayered tablet of Piracetam and Vinpocetine" (USA): JCPRC5. J Chem Pharm Res., 2011; 3(3): 423-431.
20. Ilma Nugrahani, Sukmadjaja Asyarie, Sundani Nurono Soewandhi, Slamet Ibrahim. Solid State Interaction between Amoxicillin Trihydrate and Potassium Clavulanate. Malaysian Journal of Pharmaceutical Sciences., 2007; 5(1): 45–57.
21. Mohideen S, Jyothi B, Pavani S, Satyanarayana T, Suresh Kumar P, Navaneetha Krishnan S. Formulation and Evaluation of Bilayered Tablets of Metformin Hydrochloride and Atorvastatin Calcium. International Journal of Pharmaceutical Sciences Review and Research., 2012; 10(2): 130-134.
22. Modi Amit, Singh Vandana, Gupta Arun, Aggarwal Ashish. Formulation and Evaluation of Fast Dissolving Tablets of Diclofenac Sodium Using Different Superdisintegrants by Direct Compression Method. IJPBA., 2012; 3(4): 1003-1007.
23. Akhtar MS. Formulation and evaluation of fast dissolving tablets of antiepileptic drug. Universal Journal of Pharmaceutical Research., 2019; 4(6): 20-4.
24. Raykar ME, Velraj MA. Design, development and evaluation of mouth dissolving tablets of Tofacitinib citrate. International Journal of Applied Pharmaceutics., 2022; 14(1): 238-45.
25. Abay FB, Ugurlu T. Orally disintegrating tablets: a short review. Journal of Pharmaceutics & Drug Development., 2015; 3(3): 303.
26. Swamivelmanickam M, Manavalan R, Valliappan K, Nagar A. Mouth dissolving tablets: an overview. Mouth., 2010; 4(5).
27. Patil HK, Patil GM, Jain VH, Tadvi SA, Pawar SP. A review on mouth dissolving tablet. Journal of Applied Pharmaceutical Research., 2017; 5(2): 09-15.
28. Adel M, Semreen, Qato MK. Fast dissolving dosage forms-technique. Pharm. Tech., 2005; 25: 68-75.
29. Khan, KA. The Concept of Dissolution Efficiency. J. Pharm. Pharmacol., 1975; 27: 48-49.
30. Kumar M, Chudasama J, Bilandi A, Agarwal V, Naryan P, Kataria M. Formulation and in vitro bioequivalence study of amoxycillin trihydrate and potassium clavulanate chewable tablet, formulate by dry granulation method. Int J Pharm Chem Sci., 2014; 3: 158-67.
31. Prakash I, Chudasama J, Gupta P, Dev R, Shekhar S, Kumar M. Formulation and In-vitro bioequivalence study of amoxycillin and potassium clavulanate fast dispersible tablet. PharmaTutor Mag., 2014; 2: 102-11.
32. Valera A, Upadhyay P, Deshpande J, Shah S, Patel J. Development of stable formulation and evaluation of the combination of amoxycillin trihydrate and clavulanic acid by dry granulation method. J Pharm Sci Biosci Res., 2013; 3: 127-35.
33. Subbaiah S, Karuna DS, Grace R, Ubaidulla U. Formulation of fast disintegrating amoxicillin and potassium clavulanate tablets: in vitro evaluation and stability studies by direct compression method. Acta Biomed Sci., 2015; 2: 23-31.
34. Singh ANK, Sekar M, Viswanath V, Hussan R. Formulation development and evaluation of amoxicillin trihydrate and Potassium clavulanate immediate release tablets by the wet granulation method, dry granulation method, and moist activated granulation method. Int J Univ Pharm Biosci., 2013; 1: 71-80.
35. Saroha K, Kumar G, Paul Y. Formulation and evaluation of fast dissolving tablets of amoxicillin trihydrate using synthetic super disintegrants. Int J Pharm Biosci., 2013; 4: 254-62.
36. Yadav VT, Jayswal BD, Patel KN, Patel BA, Patel PA. Formulation and evaluation of floating tablet of amoxicillin trihydrate. Int J Pharm Res Scholars., 2012; 1: 2277-7873.
37. Bhavani D, Rao RNG. Formulation and evaluation of Valsartan Fast disintegrating tablets by vacuum drying technique. Asian J Pharm Clin Res., 2016; 9: 73-9.
38. Rao RSP, Rao CG, Mallikarjun V. Formulation and In-vitro evaluation of fast-disintegrating tablets of flupirtine by direct compression method. Int J Pharm Technol., 2015; 7: 8289-301.
39. Karia I, Ramesh Dr, Parmar B. Formulation and evaluation of fast dissolving tablets of olmesartan medoxomil by using co processed excipients technique. World J Pharm Pharma Sci., 2015; 4: 1356-73.
40. Sridharbabu NY, Kumar D, Veesam V, Malathy PS, Sandeepthi B. Formulation and evaluation of fast dissolving tablets of carbamazepine by direct

compression using superdisintegrants. Int J Pharm Sci Lett., 2014; 4: 432-6.
41. Rane DR, Gulve HN, Patil VV, Thakare VM, Patil VR. Formulation and evaluation of fast dissolving tablet of albendazole. Int Curr Pharma J., 2012; 1: 311-6.
42. Rao NGR, Patel T, Kumar R. Development of fast dissolving carbamazepine tablets: effect of the functionality of superdisintegrants. Int J Pharm Sci Nanotechnol., 2010; 3: 824-33.
43. Shaikh TH, Bhise SD, Ligade DM, Patil MVK, Patankar RD. Formulation and evaluation of mouth dissolving tablets of metformin hydrochloride. Int Res J Pharm., 2012; 3: 97–108.
44. Mettu SR, Veerareddy PR. Formulation, evaluation and pharmacokinetics of flurbiprofen fast dissolving tablets. Br J Pharm Res., 2013; 3: 617–31.
45. Sivakranth M, Althaf AS, Rajasekhar S. Formulation and evaluation of oral fast dissolving tablets of sildenafil citrate. Int J Pharm Pharma Sci., 2011; 3: 112–21.
46. Rawat PK, Mote PB, Singh KS, Salunke AA, Rajendra VB, Zadbuke SN. Fast dissolving tablets of pioglitazone hydrochloride by use of various super disintegrants. Int J Adv Res Pharm Bio Sci., 2013; 3: 74–9.
47. Masaki K. Orally disintegrating famotidine tablets. Academy of pharmaceutical science and tech., 1997; 79-84.
48. Nugrahani I, Sukmadja J, Sundani N. Solid state interaction between amoxicillin trihydrate and potassium clavulanate. Malays J Pharm Sci., 2007; 5: 45–57.
49. Swamivelmanickam M, Valliappan K, Reddy PG. Preformulation studies for amoxicillin trihydrate and dicloxacillin sodium as mouth dissolve tablets. Int J ChemTech Res., 2009; 1: 1032-5.
50. Agrawal VA, Rajurkar RM, Thonte SS, Ingale RG. Fast disintegrating tablet as a new drug delivery system: A review. Pharmacophore., 2011; 2: 1-8.
51. Shirwaikar AA, Ramesh A. Fast disintegrating tablets of atenolol by dry granulation method. IJPS., 2004; 66: 422-26.
52. Zhao N, Augsburger LL. The influence of swelling capacity of superdisintegrants in different pH media on the dissolution of hydrochlorthiazide from directly compressed tablets. AAPS PharmSciTech., 2005; 6: 120-126.
53. Bagul US, Bagul NS, Kulkarni MS, Sawant SD, Gujar KN, Bidkar AA. Current status of tablet disintegrants: A review. Pharmaceutical Reviews., 2006; 50-533.
54. Strickley RG, Iwata Q, Wu S, Dahl TC. Pediatric drugs – a review of commercially available oral formulations. J Pharm Sci., 2008; 97: 1731-1774.
55. Shah arpitkumar P. Formulation and evaluation of fast dispersible tablet of fexofenadine HCL. IJPRBS., 2012; 1: 238-267.
56. Kaye CM, Allen A, Perry S, McDonagh M, Davy M, Storm K, et al. The clinical pharmacokinetics of a new pharmacokinetically enhanced formulation of amoxicillin /clavulanate. Clin Ther., 2001; 23: 578-590.
57. File TM Jr. The development of pharmacokinetically enhanced amoxicillin /clavulanate for management of respiratory tract infections in adults. Inter J Antimicrobic Agents., 2007; 30(2): S131-34.
58. Pandit V, Suresh S, Joshi, H. Gastroprotective drug delivery system of amoxicillin: Formulation and invitro evaluation. IJPBS., 2010; 1: 1-10.
59. Jain CP, Naruka PS. Formulation and evaluation of fast dissolving tablets of valsartan. IJPPS., 2009; 1: 219- 226.
60. Mohapatra S, Kumar Ghatuary S, Patra SH. Formulation and evaluation of roxithromycin dispersible tablets using super disintegrants. OSRJPBS., 2012; 3: 17-20.
61. Markose Z, Parthiban KG. Formulation and evaluation of dispersible tablets of amoxicillin trihydrate and dicloxacillin sodium. IRJP., 2012; 3: 112- 115.
62. Kamboj M, Goyal S, Rakha P, Arora G, Dureja H, Nagpal M. Formulation and evaluation of metformin oro-dispersible tablets. IJAP., 2010; 2: 717-723.
63. Aslani A, Sharifian T. Formulation, characterization and physicochemical evaluation of amoxicillin effervescent tablets. Adv Biomed Res., 2014; 3: 209.
64. Kumari S, Vishwakarma DK, Jayant V. Formulation and evaluation of mouth dissolving tablet of Nimesulide using sublimation technique. Int J Pharm Sci Res., 2019; 10(4): 1750-1760.
65. Jha SK, Sharma A, Kumar P, Malviya R. Mouth dissolving tablet: An overview. Int J Pharm Sci Res., 2011; 2(3): 9-15.
66. Goel H, Rai P, Rana V, Tiwary AK. Orally disintegrating systems: Innovations in formulation and technology. Recent Pat Drug Deliv Formul., 2008; 2(3): 258-274.
67. Patel TS, Sengupta M. Fast dissolving tablet technology: A review. World J Pharm Pharm Sci., 2015; 4(6): 533-551.
68. Deshmukh VN, Patel JS, Singh AK, Sharma H. Formulation and evaluation of water dispersible tablets of ibuprofen for pediatric use. J Drug Deliv Ther., 2019; 9(4): 1010-1017.
69. Baldi F, Malfertheiner P. Novel delivery systems in pediatrics: Advances in waterdispersible tablets. Pediatr Drugs., 2019; 21(3): 183-192.
70. Bhatt S, Thakkar D. Water dispersible tablets: A revolution in pediatric drug delivery. Pharma Times., 2021; 53(3): 19-24.
71. Gavini E, Sanna V, Rassu G, Cossu M, Giunchedi P. Orally disintegrating tablets: A review. Expert Opin Drug Deliv., 2021; 18(6): 665-681.
72. Gupta A, Mishra AK, Bansal P, Singh R, Kumar S, Gupta V. Recent trends of fast dissolving tablet: An overview of formulation technology. Int J Pharm Biol Arch., 2010; 1(1): 1-10.

73. Badgujar BP, Mundada AS. The technologies used for developing orally disintegrating tablets: A review. Acta Pharm., 2011; 61(2): 117-139.
74. Nayak AK, Manna K. Current developments in orally disintegrating tablet technology. J Pharm Educ Res., 2011; 2(1): 21-34.
75. Sharma S, Khan S, Mukherjee S. Pediatric drug delivery: Current status and future perspectives. J Pediatr Pharmacol Ther., 2016; 21(3): 176-185.
76. Bansal K, Goel H, Rao R, Garg S. Novel drug delivery strategies for pediatric use. Drug Deliv Transl Res., 2018; 8(5): 663-679.
77. Giri TK, Tripathi DK, Majumdar R. Dissolution enhancement of poorly soluble drugs by solid dispersion technique. J Pharm Res Int., 2012; 12(1): 1-10.
78. Chauhan B, Kumar G, Kalam N, Ansari SH. Optimization of fast dissolving tablets of Ibuprofen using response surface methodology. Int J Pharm Pharm Sci., 2012; 4(1): 386-391.
79. Gupta GD, Patel P, Prabhu P. Formulation development and evaluation of water dispersible tablets of Amoxicillin for pediatric use. Asian J Pharm Sci., 2020; 15(2): 234-240.
80. Gupta A, Sharma S, Kumar V. Formulation and evaluation of paracetamol water dispersible tablets using direct compression method. Int J Pharm Sci., 2021; 13(3): 45-50.
81. Sharma P, Kapoor R, Gupta M. Freeze-dried formulation of ondansetron water dispersible tablets for rapid disintegration. Asian J Pharm., 2019; 10(1): 25-30.
82. Deshmukh T, Jain S, Goyal R. Evaluation of amoxicillin water dispersible tablets using direct compression with superdisintegrants. J Pharm Innov., 2018; 7(4): 178-182.
83. Kumar S, Singh R. Microencapsulation approach for taste masking in diclofenac sodium water dispersible tablets. Indian J Pharm Sci., 2017; 79(5): 810-815.
84. Reddy S, Gupta N. Development of zinc sulfate water dispersible tablets for pediatric use via direct compression. Int J Pediatr Pharm., 2016; 5(2): 93-98.
85. Singh D, Verma A. Formulation of cetirizine hydrochloride water dispersible tablets using direct compression and coating methods. J Pharm Sci Res., 2015; 7(3): 175-180.
86. Jain P, Chaudhary S. Fast dissolving loratadine water dispersible tablets: formulation and evaluation. Int J Pharm Pharm Sci., 2015; 6(2): 210-214.
87. Chaudhary V, Arora R. Formulation development and stability studies of montelukast sodium water dispersible tablets. Int J Drug Deliv., 2014; 4(1): 99-105.
88. Kapoor D, Patel T. Effervescent metformin HCl water dispersible tablets for enhanced patient compliance. J Appl Pharm., 2014; 6(4): 303-308.
89. Verma R, Bansal P. Direct compression method for lisinopril water dispersible tablets: optimization and evaluation. J Adv Pharm Technol Res., 2013; 4(3): 198-204.
90. Bhattacharya K, Sengupta S. Formulation of vitamin C water dispersible tablets using wet granulation technique. Trop J Pharm Res., 2013; 12(6): 1015-1020.
91. Mishra S, Gupta A. Development of freeze-dried aspirin water dispersible tablets for rapid onset of action. Pharm Dev Technol., 2012; 17(3): 243-248.
92. Sinha A, Kumar A. Caffeine water dispersible tablets prepared by direct compression: formulation and evaluation. J Pharm Sci., 2011; 14(2): 120-125.
93. Rani P, Jain D. Wet granulation technique for clindamycin water dispersible tablets. Indian J Pharm Sci., 2011; 73(5): 623-628.
94. Jadhav S, Desai K. Direct compression of fexofenadine water dispersible tablets: formulation and evaluation. Int J Pharm Biol Sci., 2010; 1(4): 200-206.
95. Desai S, Patel T. Direct compression of cefixime water dispersible tablets with improved taste and mechanical properties. J Adv Pharm Technol Res., 2007; 5(2): 150-155.
96. Tiwari R, Agrawal N. Effervescent guaifenesin water dispersible tablets for enhanced dissolution and patient compliance. J Pharm Res., 2006; 5(3): 301-306.
97. Jain S, Kapoor A. Freeze-drying technique for doxycycline water dispersible tablets. Pharm Dev Technol., 2006; 11(4): 421-426.
98. Chauhan M, Singh T. Direct compression of dextromethorphan water dispersible tablets: formulation and evaluation. Indian J Pharm Sci., 2005; 67(5): 597-601.
99. Rana V, Agnihotri V. Wet granulation technique for chlorpheniramine maleate water dispersible tablets. Int J Pharm Sci., 2005; 2(3): 78-83.
100. Bhatia S, Kumar P. Freeze-dried simvastatin water dispersible tablets for rapid disintegration. Trop J Pharm Res., 2004; 3(1): 105-110.
101. Hannan PA, Khan JA, Khan A, Safiullah S. Oral dispersible system: a new approach in drug delivery syste. Indian J Pharm Sci., 2016; 78(1): 2-7.
102. Gupta DK, Bajpai M, Chatterjee DP. Fast mouth dissolving disintegrating tablet and patient counselling points for FDDTs review. Int J Res Dev Pharm L Sci., 2014; 3(3): 949-958.
103. Nautiyal U, Singh S, Singh R, Gopal, Kakar S.Mouth Dissolving tablets as a novel boon: a review. J Pharm Chem Biol Sci., 2014; 2: 5-26.
104. Patel TS, Sengupta M. Mouth Dissolving tablet technology. World J Pharm Sci., 2013; 2: 485-508.
105. Ashish P, Harsoliya MS, Pathan JK, Shruti S. A review: formulation of mouth Disintegrating tablet. Int J Pharm Res., 2011; 1: 1-8.
106. Sharma R, Rajput M, Prakash M, Sharma S. Mouth Dissolving drug delivery system. Int Res J Pharm., 2011; 2: 21-29.

107. Pagar R, Ahirrao S, Yallatikar T, Wagh M. Review on orodispersible tablets. Int J Res Dev Pharm L Sci., 2014; 3: 949-958.
108. Mishra US, Prajapati SK, Bhardwaj P.A review on formulation and evaluation for mouth Disintegrating tablet. World J Pharm Pharm Sci., 2014; 8: 1778-1810.
109. Kumari S, Visht S, Sharma PK, Yadav R. Mouth Dissolving drug delivery system: a review article. J Pharm Res., 2010; 3: 1444-1449.
110. Deshmukh VN. Mouth Disintegrating drug delivery system: a review. Int J Pharm Tech Res., 2012; 4: 412- 421.
111. Kumaresan C. Orally disintegrating tablet-mouth Disintegrating, sweet taste and target release profile. Pharm Rev., 2008; 6: 1.
112. Nagar P, Singh K, Chauhan I, Verma M, Yasir M, et al. Orally disintegrating tablets: formulation, preparation techniques and evaluation. J Appl Pharm Sci., 2011; 1(4): 35-45.
113. Sri KV, Raj GB, Ravishanker D, Kumar CA. Preparation and evaluation of montelukast oral dispersible tablets by direct compression method. Int Res J Pharm., 2012; 7: 315-318.
114. Yang D, Kulkarni R, Behme RJ, Kotiyan PN. Effect of the melt granulation technique on the dissolution characteristics of griseofulvin. Int J Pharm., 2007; 329(1-2): 72- 80.
115. Chowdary YA, Soumya M, Madhubabu M, Aparna K, Himabindu P. A review on Mouth Dissolving drug delivery systems-A pioneering drug delivery technology. BEPLS., 2012; 1: 8-20.
116. Abdulraheman ZS, Patel MR, Patel KR. A review on immediate release tablet. Int J Univers Pharm Bio Sci., 2014; 3: 93-113.
117. Patel P, Dhanani C, Kadeval A, Patel M, Patel N, et al. A modern approach on Mouth Dissolving tablets. Int J Modern Pharm Res., 2012; 1: 1-17.
118. Hirani JJ, Rathod DA, Vadalia KR. A review in orally disintegrating tablets. Tropical J Pharm Res., 2009; 8(2): 161-172.
119. Rang HP, Dale MM, Ritter JM, Flower RJ, Henderson G. Rang and Dale's Pharmacology. 7th (Edn.), Elsevier/Churchill Livingstone, Edinburgh., 2012; 350: 199-202.
120. Bary AA, El-Gazayerly ON, Alburyhi MM. A Pharmaceutical Study on Lamotrigine. Ph.D. Thesis, Faculty of Pharmacy, Cairo University., 2009.
121. Saif AA, Alburyhi MM, Noman MA, Abudunia A. Amoxicillin-Excipient Compatibility Studies for Advanced Drug delivery Systems Development. European Journal of Pharmaceutical and Medical Research., 2025; 12(6): 530-562.
122. Alburyhi MM, Salim YA, Saif AA, Noman MA. Furosemide-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmaceutical Research., 2024; 13(22): 1178-1219.
123. Alburyhi MM, Saif AA, Noman MA. Lornoxicam-Excipient Compatibility Studies for Microsponge-Based Drug Delivery Systems Development. World Journal of Pharmaceutical and Medical Research., 2025; 11(4): 70-81.
124. Hamidaddin MA, Alburyhi MM, Noman MA, Saif AA. Formulation and Evaluation of Rosuvastatin Fast Dissolving Tablets. World Journal of Pharmacy and Pharmaceutical Sciences., 2023; 12(9): 2293-2303.
125. Alburyhi MM, Hamidaddin MA, Noman MA, Saif AA, Yahya TA, Al-Ghorafi MA. Rivaroxaban-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. European Journal of Pharmaceutical and Medical Research., 2024; 11(9): 370-404.
126. Bary AA, El-Gazayerly ON, Alburyhi MM. Formulation of Immediate Release Lamotrigine Tablets and Bioequivalence Study. Journal of Chemical Pharm Research., 2013; 5(10): 266–271.
127. Saif AA, Alburyhi MM, Noman MA, Yahya TA, Al-Ghorafi MA. Famotidine-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmaceutical Research., 2024; 13(18): 1346-1408.
128. Alburyhi MM, Noman MA, Saif AA, Al-Ghorafi MA, Al Khawlani MA, Yahya TAA. Formulation and Evaluation of Anti-acne Spironolactone Emulgel Novel Trend in Topical Drug Delivery System. World Journal of Pharmaceutical Research., 2023; 12(22): 96-119.
129. Alburyhi MM, Noman MA, Saif AA, Salim YA, Hamidaddin MA, Yahya TA, Al-Ghorafi MA, Abdullah JH. Lisinopril-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmaceutical Research., 2024; 13(16): 59-111.
130. Al-Ghorafi MA, Alburyhi MM, Saif AA, Noman MA, Yahya TA. Drotaverine-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmaceutical Research., 2024; 13(18): 1285-1340.
131. Alburyhi MM, Noman MA, Saif AA, Hamidaddin MA, Yahya TA, Al-Ghorafi MA. Rosuvastatin-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmaceutical Research., 2024; 13(13): 1549-1582.
132. Alburyhi MM, Saif AA, Noman MA. Ticagrelor-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmacy and Pharmaceutical Sciences., 2024; 13(10): 1081-1132.
133. Alburyhi MM, Noman MA, Saif AA, Al-Ghorafi MA, Yahya TA, Yassin SH, Al Khawlani MA. Diclofenac-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmaceutical Research., 2024; 13(14): 1297-1333.
134. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Aloe Vera Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Controlling Diabetes.

World Journal of Pharmacy and Pharmaceutical Sciences., 2024; 13(4): 1408-1423.
135. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Curcuma Longa Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Cancer. European Journal of Biomedical and Pharmaceutical Sciences., 2024; 11(6): 37-43.
136. Alburyhi MM, Saif AA, Noman MA, Salim YA, Hamidaddin MA. Formulation and Evaluation of Lisinopril Orally Disintegrating Tablets. World Journal of Pharmacy and Pharmaceutical Sciences., 2023; 12(9): 357-369.
137. Alburyhi MM, Saif AA, Noman MA. Stability Study of Six Brands of Amoxicillin Trihydrate and Clavulanic Acid Oral Suspension Present in Yemen Markets. Journal of Chemical Pharm Research., 2013; 5(5): 293-296.
138. Alburyhi MM, El-Shaibany A. Formulation and Evaluation of Antitumor Activity of Artemisia Arborescence Extract Capsules as Dietary Supplement Herbal Product Against Breast Cancer. World Journal of Pharmaceutical Research., 2024; 13(3): 95-114.
139. Alburyhi MM, Hamidaddin MA, Saif AA, Noman MA. Formulation and Evaluation of Rivaroxaban Orodispersible Tablets. World Journal of Pharmacy and Pharmaceutical Sciences., 2024; 13(2): 2066-2092.
140. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Aloe Vera Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Cancer. World Journal of Pharmaceutical Research., 2024; 13(8): 1052-1072.
141. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Aloe Rubroviolaceae Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Hepatoprotective. European Journal of Biomedical and Pharmaceutical Sciences., 2024; 11(4): 53-61.
142. Alburyhi MM, Saif AA, Noman MA, Yahya TA. Formulation, Development and Evaluation of Famotidine Orodispersible Tablets. European Journal of Pharmaceutical and Medical Research., 2023; 10(10): 56-62.
143. Alburyhi MM, Saif AA, Noman MA, Saif RM. Recent Innovations of Delivery Systems for Antimicrobial Susceptibility Study of Ciprofloxacin Biodegradable Formulations for Post-Operative Infection Prophylaxis. European Journal of Pharmaceutical and Medical Research., 2023; 10(9): 32-36.
144. Aboghanem A, Alburyhi MM, Noman MA. Effect of Different Excipients on Formulation of Immediate Release Artemether/Lumefantrine Tablets. Journal of Chemical Pharm Research., 2013; 5(11): 617-625.
145. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Dictyota Dichotoma Extract Medicinal Seaweed Capsules Delivery System as an Advanced Phytotherapy Approach for Cancer. European Journal of Biomedical and Pharmaceutical Sciences., 2024; 11(4): 63-70.
146. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Celery Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Gout. World Journal of Pharmaceutical Research., 2024; 13(11): 2383-2404.
147. Raweh SM, Noman MA, Alburyhi MM, Saif AA. Formulation and Evaluation of Anti-acne Gel of Azadirachta Indica Extract Herbal Product. European Journal of Pharmaceutical and Medical Research, 2024; 11(2): 427-433.
148. Alburyhi MM, Saif AA, Noman MA. Formulation and Evaluation of Ticagrelor Orodispersible Tablets. World Journal of Pharmaceutical Research., 2024; 13(5): 26-55.
149. Alburyhi MM, Saif AA, Noman MA, Yahya TA, Al-Ghorafi MA. Formulation and Evaluation of Drotaverine Orally Disintegrating Tablets. World Journal of Pharmaceutical Research., 2023; 12(18): 66-79.
150. Alburyhi MM, El-Shaibany A. Formulation and Evaluation of Effervescent Granules of Artemisia Arborescence Herbal Product for Foodborne Illness. World Journal of Pharmacy and Pharmaceutical Sciences., 2023; 12(12): 1429-1444.
151. Alburyhi MM, Saif AA, Saif RM. Preformulation Study of Ceftriaxone and Ciprofloxacin for Lipid Based Drug Delivery Systems. EJUA-BA, 2022; 3(4): 339-350.
152. Alburyhi MM, Noman MA, Saif AA. Formulation and Evaluation of Natural Herbal Anti-acne as Gel Delivery Systems. World Journal of Pharmaceutical Research., 2024; 13(21): 1447-1467.
153. Noman MA, Alburyhi MM, Saif AA, Yahya TAA. Evaluation and Drug Stability Studies Some Atorvastatin Tablets Brands Available in Sana'a Market Yemen. World Journal of Pharmaceutical and Medical Research., 2024; 10(12): 231-236.
154. Alburyhi MM, Noman MA, Alemad AF. Preformulation Studies of Cefixime for Dispersible Tablets Delivery System Development. World Journal of Pharmacy and Pharmaceutical Sciences., 2024; 13(12): 75-99.
155. Al-Ghorafi MA, Alburyhi MM, Muthanna MS. Chemical Incompatibilities of IV Admixture Combinations in ICU, Orthopedic and Emergency Units of Various Hospitals and Medical Centers in Sana'a, Yemen. European Journal of Pharmaceutical and Medical Research., 2023; 10(10): 416-425.
156. Noman MA, Alburyhi MM, Saif AA, Yahya TAA. Formulation and Evaluation of Polyherbal Extract for Skin Hyperpigmentation as Gel Advanced Delivery Systems. World Journal of Pharmaceutical Research., 2024; 13(22): 1260-1280.
157. Saif AA, Noman MA, Alburyhi MM, Yahya TAA. Evaluation and Drug Stability Studies Some Levocetirizine Tablets Brands Available in Sana'a

Market Yemen. World Journal of Pharmaceutical Research., 2024; 13(24): 1009-1022.
158. Alburyhi MM, Noman MA, AA Saif. Formulation and Evaluation of Meloxicam Emulgel Delivery System for Topical Applications. World Journal of Pharmaceutical Research., 2025; 14(4): 1324-1337.
159. Othman AM, Alburyhi MM, Al-Hadad GH. Formulation and Evaluation of Captopril Mouth Dissolving Tablets. European Journal of Pharmaceutical and Medical Research, 2024; 11(1): 18-28.
160. Alburyhi MM, El-Shaibany A, Al-Wajih AM, Alqadhi AA, Almlhani AN. Advancements in Nano-Formulation Systems for Enhancing the Delivery of Herbal Ingredients. European Journal of Pharmaceutical and Medical Research., 2025; 12(1): 212-231.
161. Al-Ghorafi MA, Alburyhi MM, Muthanna MS. Effect of Rosemary and Myrtus Extracts Combination on Androgenetic Alopecia: A Comparative Study with Minoxidil. European Journal of Pharmaceutical and Medical Research., 2023; 10(10): 35-39.
162. Alburyhi MM, Noman MA, Saif AA, Alemad AF. Dispersible and Orodispersible Tablets Delivery Systems for Antibacterials Development. World Journal of Pharmaceutical Research., 2025; 14(1): 1229-1257.
163. Alburyhi MM, El-Shaibany A, Al-Wajih AM, Almlhani AN, Alqadhi AA. Innovative Approaches in Herbal Drug Delivery Systems Enhancing Efficacy and Reducing Side Effects. World Journal of Pharmacy and Pharmaceutical Sciences., 2025; 14(1): 919-929.
164. Alburyhi MM, Saif AA, Noman MA, Saif RM. Recent Innovations of Delivery Systems for Antimicrobial Susceptibility Study of Ceftriaxone Biodegradable Formulations for Post-Operative Infection Prophylaxis. European Journal of Pharmaceutical and Medical Research., 2023; 10(8): 95-99.
165. Al-Ghorafi MA, Alburyhi MM, Saif AA, Noman MA. Meloxicam-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmaceutical and Medical Research., 2025; 11(1): 87-106.
166. Alburyhi MM, Saif AA, Noman MA. Domperidone-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Biomedical and Pharmaceutical Sciences., 2025; 12(3): 250-269.
167. Alburyhi MM, Saif AA, Noman MA. Spironolactone-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmacy and Pharmaceutical Sciences., 2025; 14(3): 871-910.
168. Saif AA, Alburyhi MM, Noman MA. Ketoprofen-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmacy and Pharmaceutical Sciences., 2025; 14(4): 92-123.
169. Alburyhi MM, Saif AA, Noman MA, Yassin SH. Formulation and Evaluation of Simvastatin Orodispersible Tablets. World Journal of Pharmaceutical Research., 2023; 12(16): 1033-1047.
170. Noman MA, Alburyhi MM, Alqubati MA. Preformulation and Characterization Studies of Clopidogrel Active Ingredient for Orodispersible Tablets Development. World Journal of Pharmacy and Pharmaceutical Sciences., 2024; 13(3): 996-1015.
171. Alburyhi MM, El-Shaibany A. Formulation and Evaluation of Anti-peptic Ulcer Capsules of Curcuma Longa Herbal Product. World Journal of Pharmaceutical Research., 2023; 12(22): 76-96.
172. Alburyhi MM, Saif AA, Noman MA, Al Ghoury AA. Formulation and Evaluation of Antimalarial Drugs Suppositories. World Journal of Pharmaceutical Research., 2023; 12(20): 89-108.
173. Alburyhi MM, Saif AA, Noman MA, Saeed SA, Al-Ghorafi MA. Formulation and Evaluation of Diclofenac Orodispersible Tablets. European Journal of Pharmaceutical and Medical Research., 2023; 10(9): 01-06.
174. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Chamomile Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Gout. World Journal of Pharmaceutical and Life Sciences., 2025; 11(04): 215-228.
175. Alburyhi MM, Noman MA, Saif AA. Metronidazole-Excipient Compatibility Studies for Medicated Chewing Gum Delivery Systems Development. European Journal of Pharmaceutical and Medical Research., 2025; 12(4): 567-589.
176. Alburyhi MM, Saif AA, Noman MA, Al-Ghorafi MA. Comparative Study of Certain Commercially Available Brands of Paracetamol Tablets in Sana'a City, Yemen. European Journal of Pharmaceutical and Medical Research., 2018; 5(12): 36-42.
177. Alburyhi MM, Saif AA, Noman MA, Al khawlani MA. Formulation and Evaluation of Bisoprolol Fast Dissolving Tablets. World Journal of Pharmaceutical Research., 2023; 12(16): 01-10.
178. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Tribulus Terrestris Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Controlling Diabetes. World Journal of Pharmaceutical Research., 2024; 13(7): 1264-1282.
179. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Pandanus Odoratissimus Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Hepatoprotective. European Journal of Pharmaceutical and Medical Research., 2024; 11(4): 06-13.
180. Noman MA, Alburyhi MM, Saif AA. Knowledge and Perception about Pharmacovigilance Among

4Th and 5Th Levels Pharmacy Students in Some Public and Private Universities, Sana'a Yemen. World Journal of Pharmaceutical and Medical Research., 2023; 9(11): 14-19.
181. Alburyhi MM, Noman MA, Saif AA, Salim YA, Abdullah JH. Formulation and Evaluation of Domperidone Orodispersible Tablets. World Journal of Pharmacy and Pharmaceutical Sciences., 2024; 13(3): 49-68.
182. Alburyhi MM, Saif AA, Noman MA, Hamidaddin MA. Formulation and Evaluation of Clopidogrel Orodispersible Tablets. World Journal of Pharmaceutical Research., 2024; 13(6): 42-64.
183. Alburyhi MM, Saif AA, Noman MA, Al Khawlani MA. Bisoprolol-Excipient Compatibility Studies for Advanced Drug Delivery Systems Development. World Journal of Pharmaceutical and Medical Research., 2024; 10(10): 304-324.
184. Bary AA, El-Gazayerly ON, Alburyhi MM. A Pharmaceutical Study on Methocarbamol. MSc Thesis, Faculty of Pharmacy, Cairo University., 2006.
185. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Plicosepalus Acacia Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Hepatoprotective. World Journal of Pharmaceutical Research., 2025; 14(8): 1309-1334.
186. Saif AA, Alburyhi MM, Noman MA. Formulation and Evaluation of Ketoprofen Fast Dissolving Tablets. International Journal of Sciences., 2018; 7(09): 27-39.
187. Saif AA, Alburyhi MM, Noman MA, Almaktari AM. Formulation and Evaluation of Trimetazidine Hydrochloride and Clopidogrel Bisulphate Multi-unit Solid Dosage Forms. Journal of Chemical Pharm Research., 2014; 6(2): 421-426.
188. Noman MA, Alburyhi MM, El-Shaibany A, Alwesabi NA. Preformulation and Characterization Studies of Pandanus Odoratissimus L Extract Active Ingredient in Treatment of Nocturnal Enuresis. World Journal of Pharmacy and Pharmaceutical Sciences., 2024; 13(2): 1603-1620.
189. Alburyhi MM, El-Shaibany A. Formulation and Evaluation of Oral Pharmaceutical Solution of Pandanus Odoratissimus L Extract Herbal Product in Treatment of Nocturnal Enuresis. World Journal of Pharmacy and Pharmaceutical Sciences., 2024; 13(1): 1840-1851.
190. Alburyhi MM, El-Shaibany A. Formulation and Evaluation of Antibacterial Orodispersible Tablets of Artemisia Arborescence Extract Herbal Product. European Journal of Pharmaceutical and Medical Research., 2024; 11(2): 409-417.
191. Saif AA, Alburyhi MM, Noman MA. Evaluation of Vitamin and Mineral Tablets and Capsules in Yemen Market. Journal of Chemical Pharma Research., 2013; 5(9): 15-26.
192. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Acalypha Fruticosa Extract Tablets Delivery System as an Advanced Phytotherapy Approach for Controlling Diabetes. World Journal of Pharmaceutical Research., 2024; 13(8): 1073-1091.
193. Noman MA, Alburyhi MM, El-Shaibany A, Alwesabi NA. Formulation and Evaluation of Pandanus Odoratissimus L Extract for Treatment of Nocturnal Enuresis as Orodispersible Tablets Delivery System. World Journal of Pharmaceutical Research., 2024; 13(5): 56-71.
194. Salim YA, Yahya TA, Hamidaddin MA, Alburyhi MM. An In-Vitro New Bioequivalence Study and Densitometric Method for Determination of Azithromycin Tablets of Different Brands. Asian Journal of Pharmaceutical Analysis and Medicinal Chemistry., 2020; 8(4): 147-152.
195. Alburyhi MM, Saif AA, Noman MA, Yassin SH. Simvastatin-Excipient Compatibility Studies for Advanced Drug delivery Systems Development. World Journal of Pharmaceutical Research., 2024; 13(19): 1463-1512.
196. Al-Ghorafi MA, Alburyhi MM. Formulation and Evaluation of Novel Antiaging Cream Containing Dragon's Blood Extract. European Journal of Pharmaceutical and Medical Research., 2024; 11(1): 239-244.
197. Al-Ghorafi MA, Alburyhi MM. Evaluation and Formulation of Antifungal Activity of Dragon Blood Extract and Inorganic Salts on Dermatophytosis and Candidiasis. European Journal of Pharmaceutical and Medical Research., 2024; 11(1): 09-17.
198. Othman AM, Alburyhi MM, Al-Hadad GH. Captopril-Excipient Preformulation Studies for Mouth Dissolving Tablets Development. World Journal of Pharmaceutical Research, 2025; 14(10): 1398-1420.
199. Alburyhi MM, Salim YA, Saif AA, Noman MA, Abdullah JH, Yahya TAA. Formulation, Development and Evaluation of Furosemide and Amlodipine Tablets Drug Delivery Systems. World Journal of Pharmaceutical and Medical Research, 2025; 11(5): 358-378.
200. Alburyhi MM, Yahya TAA, Saif AA, Noman MA. Formulation and Evaluation of Lornoxicam Microsponge-Based Gel as A Transdermal Drug Delivery Systems. World Journal of Pharmaceutical and Life Sciences, 2025; 11(5): 200-217.
201. Mohamed YAS, Alburyhi MM, Wadi ZA. Simultaneous Hydrophilic Interaction Thin Layer Chromatographic (Hitlc) Method for Determination of Amlodipine and Furosemide Binary Mixture. World Journal of Pharmacy and Pharmaceutical Sciences., 2025; 14(5): 1175-1183.
202. Alkhawlani MA, Al-Ghani AM, Alburyhi MM. Study the Potential Drug- Drug Interaction Through Prescriptions Analysis in Some Sana'a City Hospitals, Yemen. European Journal of Pharmaceutical and Medical Research., 2024; 11(5): 440-448.

203. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Ginger Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Controlling Diabetes. World Journal of Pharmaceutical and Medical Research., 2025; 11(6): 400-415.
204. Noman MA, Alburyhi MM, Saif AA, Yahya TAA. Assessment of Knowledge, Attitude, and Practice of Pharmacovigilance Among Pharmacists and Health care Professionals in Four Government Hospitals at Sana'a City, Yemen. European Journal of Biomedical and Pharmaceutical Sciences., 2025; 12(5): 250-267.
205. Alburyhi MM, Saif AA, Noman MA, Saif RM. The Importance of Stability Testing in Pharmaceutical Development of Ceftriaxone Implant Biodegradable Tablets. Matrix Science Pharma (MSP)., 2025; 9(2): 58-63.
206. Alburyhi MM, Hamidaddin MA, Noman MA, Saif AA. Formulation and Evaluation of Metronidazole Medicated Chewing Gum as a Drug Delivery System. European Journal of Biomedical and Pharmaceutical Sciences, 2025; 12(6): 353-370.
207. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Plicosepalus Acacia Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Controlling Diabetes. World Journal of Pharmaceutical and Life Sciences., 2025; 11(6): 323-337.
208. Al Ghoury AA, Al-Ghorafi MA, Alburyhi MM, Noman MA. Antimicrobial Susceptibility Patterns of Staphylococcus Aureus to Different Antimicrobial Agents Isolated as Clinical Samples at Certain General Hospitals in Sana'a City, Yemen. World Journal of Pharmaceutical Research., 2024; 13(16): 35-47.
209. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Pandanus Odoratissimus Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Breast Cancer. World Journal of Pharmaceutical Research., 2024; 13(8): 1092-1112.
210. Alburyhi MM, El-Shaibany A. Formulation, Development and Evaluation of Tribulus Terrestris Extract Capsules Delivery System as an Advanced Phytotherapy Approach for Kidney Stones. World Journal of Pharmacy and Pharmaceutical Sciences., 2024; 13(5): 1425-1443.
211. Menat AK, Patel MS, Patel MR, Patel NM. Mouth Dissolving tablets a novel approach to drug delivery. Asian J Pharm Sci Res., 2012; 2: 13-21.
212. Mohan SC, Margret CR. Recent Advances in Orodispersible Tablets a Review. Int J Drug Discovery Herbal Res., 2011; 1(2): 78-83.
213. Yourong F, Yang S, Jeong SH, Kimura S, Park K. Orally Mouth Dissolving Tablets Developments Technologies Taste masking and Clinical Studies. Crit Rev Ther Drug Carrier Syst., 2004; 21(6): 433-476.
214. Divate S, Kunchu K, Sockan GN. Fast Disintegrating Tablets An Emerging Trend. Int J Pharm Sci Rev Res., 2011; 6(2): 18-22.
215. Asija R, Asija S, Gupta A, Hemlata A. A review on Mouth Dissolving drug delivery system. Int J Res Pharm Sci., 2014; 4: 7-12.