Formulation And Evaluation of Irbesartan Nanoemulsion

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***Abstract*—Irbesartan, a Biopharmaceutics Classification System (BCS) class II antihypertensive drug, suffers from poor aqueous solubility and a high dosing frequency that limit patient compliance.**

Method: In the present study, an Irbesartan-loaded oil-in-water nanoemulsion was developed by the ultrasound emulsification method to improve drug solubilization and reduce dosing frequency. A total of two nanoemulsion batches were formulated and compared: Batch MY1, stabilized using the synthetic polymeric surfactant Pemulen-Tr1, and Batch MY2, stabilized using the natural surfactant gum acacia. Batch MY1 was optimized using a 3^2 full factorial design comprising eight formulations (MY1-1 to MY1-8), with the amount of oil (Capryol 90), amount of Pemulen-Tr1, and sonication time as independent variables, and particle size, polydispersity index (PDI), and zeta potential as response variables.

Result :Among the eight batches, formulation MY1-8, containing 1 mL of Capryol 90 as the oil phase and 15 mg of Pemulen-Tr1 as the polymeric surfactant, sonicated for 6 minutes, was identified as the optimized formulation, showing the smallest particle size (264.6 nm), lowest PDI (0.225), and a zeta potential of -40.2 mV, indicative of good physical stability.

Conclusion:These findings indicate that Pemulen-Tr1, at a concentration of 15 mg per batch, is an effective polymeric stabilizer for producing a stable, sub-300 nm Irbesartan nanoemulsion with improved dissolution characteristics.

***Index Terms*—Irbesartan; Nanoemulsion; Pemulen-Tr1; Factorial design; Bioavailability**

I. INTRODUCTION

NANOEMULSION

Future developments in biotechnologies, drug therapies, cosmetics, and diagnostics could be greatly aided by a class of dispersed particles called nanoemulsions, which are currently used in pharmaceutical and biomedical aids. The elements of the particle determine a wide range of shapes that they take on. Because of developments in nanoemulsion technology, pharmaceutical companies in the future are probably going to use this medium much more frequently.

Advantages

1. Nano emulsions are thermodynamically stable systems that can self-emulsify.
2. Quickens the absorption rate.
3. Enhances bioavailability
4. Removes variations in absorption.
5. Lipophilic and hydrophilic medicines can both be transported via nano emulsions.
6. The substance can be delivered through a variety of methods, including topical, oral, and intravenous.

Disadvantages

1. The stability of nanoemulsions is affected by environmental factors including pH and temperature.
2. Restricted ability to dissolve materials with high melting points.
3. A non-toxic surfactant is required for medicinal applications.
4. The stabilization of the nano droplets requires the use of co surfactants and surfactants in high concentrations.

Components of Nanoemulsion

Main three components of Nanoemulsions are as follows:

• Oil
• Surfactant
• Co-surfactant

Types of nanoemulsion

Fundamentally, there are two forms of nanoemulsions: O/W emulsions and W/O emulsions, with the latter

being the best delivery method from a dermatological standpoint. There is also the double emulsion (water-oil-water or oil-water-oil-water) [1], but these trickier systems won't be covered in the sections that follow. Here is a discussion of the essential differences between the two types of nanoemulsion systems.

Water in oil (W/O)

The term "water in oil nanoemulsion" (W/O) refers to a class of emulsion in which surfactants scatter water droplets of Nano scale in organic medium [2]. Any particular sort of emulsion preparation must take hydrophile-lipophile balance into account (HLB). A semi-empirical scale called HLB helps formulators choose surfactants. The non-ionic surfactants hydrophilic to lipophilic part ratio is shown to provide the "optimal emulsion" and prevent flocculation or coalescence [3]. . The best surfactants for creating W/O nanoemulsions are those with a final HLB value of 4-6.

Application of nanoemulsion.

1. Because of its extremely small droplet size, nanoemulsion never exhibits difficulties with creaming and sedimentation. Even with micro emulsion, these issues are extremely typical with traditional emulsion. In essence, both issues are related to the effect of gravitational force on the emulsion droplet. Yet, because nanoemulsion droplets are so small, there is less gravitational force acting on them, which prevents emulsion from creaming and sedimenting.
2. Once more, Nano emulsion's small droplet size prevents droplets from coalescing. Droplets coalesce during the coalescence process, increasing in size and creating a big droplet that is what causes the emulsion to become unstable. Yet, the Nano emulsion’s tiny droplet size prevents coalescence between them as well as deformation and subsequent surface fluctuation.
3. When compared to micro emulsions, nanoemulsions have a far higher dispersibility because the smaller droplet size precludes flocculation, which causes the system to disperse without separation.
4. Due to the enormous surface area of the droplets in nanoemulsion formulation, active chemicals can penetrate skin quickly. Even occasionally, it is discovered that nanoemulsion easily penetrates through rough skin. This property of nanoemulsion reduces the additional use of specialized penetration enhancer, which is the cause of formulation incompatibility.
5. In comparison to microemulsion, nanoemulsion formulation required less surfactant. For instance, 5–10% surfactant is adequate to prepare nanoemulsions but 20–25% surfactant is needed to prepare microemulsions. Again, the need of surfactants can be reduced with the use of nanoemulsions.

II. MATERIAL AND METHOD

List of Instruments used

Table 1: List of Instruments used

Sr. No.	Instruments	Model	Make
1.	Magnetic stirrer	Magnetic stirrer with hot plate	Bionics Instruments, Haryana.
2.	Ultraturrax	IKA T25 Digital Ultra Turrax	Cole Parmer
3.	Probe sonicator	PKS-250FM	PCI Analytics, Mumbai.
4.	Particle size	ZS90	Malvern Pnanlytical Ltd,UK.
6.	Zeta potential	ZS90	Malvern Pnanlytical Ltd,UK.
7.	DSC	DSC7020	Hitachi High Tech Science Corporation, Japan.

Preformulation Study

Solubilty Screening of Oils:

In order to determine which oils have a superior solubility potential for Irbesarton, a solubility screening of oils was conducted. The steps for solubility screening of oils were to take 1 ml of oil in a clean test tube and add 10 mg of Irbesarton to the oil, after which the test tube was placed in a sonic bath and

the time was adjusted. Next, we examine Irbesarton solubility in oils. Initially, 10 mg of the medication was dissolved in the oil, so the solubility screening was stopped. However, 10 mg more of the drug was dissolved in the oil, so the cycle was continued until the drug was no longer soluble in oil.

Solubility Screening of Surfactants:

To determine which surfactants have a superior solubility potential for Irbesarton, a screening for surfactant solubility was conducted. The steps for solubility screening of surfactants were to add 10 mg of Irbesarton to 1 ml of clean oil before placing the test tube in a sonic bath and adjusting the time. Next, we examine Irbesarton solubility in surfactants. Initially, 10 mg of the drug was dissolved in the oil, so halt solubility screening; however, 10 mg of the drug was dissolved in the surfactants, so add 10 mg more of the drug and repeat this cycle until the drug is no longer soluble in the surfactants.

Drug:- Irbesartan

- Irbesartan is an angiotensin receptor blocker used to treat hypertension, delay progression of diabetic nephropathy, and treat congestive heart failure.
- Irbesartan is an angiotensin receptor blocker (ARB) indicated to treat hypertension or diabetic nephropathy.7,8 It can also be used as part of a combination product with hydrochlorothiazide for patients not well controlled or not expected to be well controlled on monotherapy. Unlike angiotensin converting enzyme inhibitors, ARBs are not associated with a dry cough.
- Brand Name:-
  Avalide, Avapro, Ifirmacombi, Karvea, Karvezide
- Molecular Formula:- $C_{25}H_{28}N_6O$
- Molecular weight:- 428.5294
- Mechanism of action:- Irbesartan prevents angiotensin II binding to the AT1 receptor in tissues like vascular smooth muscle and the adrenal gland.7,8 Irbesartan and its active metabolite bind the AT1 receptor with 8500 times more affinity than they bind to the AT2 receptor.7,8 Irbesartan's prevention of angiotensin II binding causes vascular smooth muscle relaxation and prevents the secretion of aldosterone, lowering blood pressure. Angiotensin II would otherwise bind to the AT1 receptor, inducing vasoconstriction and aldosterone secretion, raising blood pressure.
- Absorption:-Irbesartan is 60-80% bioavailable with a Tmax of 1.5-2hours.7,8 Taking irbesartan with food does not affect the bioavailability. In one study, healthy subjects were given single or multiple oral doses of 150mg, 300mg, 600mg, and 900mg of irbesartan.5 A single 150mg dose resulted in an AUC of 9.7±3.0µg\•hr/mL, a Tmax of 1.5 hours, a half life of 16±7 hours, and a Cmax of 1.9±0.4µg/mL.
  - Volume of distribution:- The volume of distribution of irbesartan is 53-93L.
- Protein binding:- Irbesartan is 90% protein bound in plasma, mainly to albumin and α1-acid glycoprotein.
- Metabolism:- Irbesaran is largely metabolized by glucuronidation and oxidation in the liver.7,8. Irbesartan can be glucuronidated by UGT1A3 to the M8 metabolite, oxidized to the M3 metabolite, or hydroxylated by CYP2C9 to one of the M4, M5, or M7 metabolites.4, 3 The M4, M5, and M7 metabolites are all hydroxylated to become the M1 metabolite, which is then oxidized to the M2 metabolite.4,3 The M4 metabolite can also be oxidized to the M6 metabolite before hydroxylation to the M2 metabolite.4,3 Finally, the minor metabolite SR 49498 is generated from irbesartan by an unknown mechanism.
- Route of administration:-20% of a radiolabelled oral dose of irbesartan is recovered in urine, and the rest is recovered in the feces.10 <2% of the dose is recovered in urine as the unchanged drug.
- Half life:- The terminal elimination half life of irbesartan is 11-15 hours.
- Clearance:-Total plasma clearance of irbesartan is 157-176mL/min while renal clearance is 3.0-3.5mL/min..

Oil:- Capryol 90

- Synonym:-Propylrnr glycol monocaprylate (type II) NF, Propylrnr glycol caprylate; Octanoic acid, monoester with 1,2-propanediol.
- Product description: Cpryol 90 (propylrnr glycol monocaprylate) is a nonionic water insoluble surfactant used as cosurfactant in oral lipid-based formulaytion SEDDS and SMEDDS.

Cosurfactant and solubilizer in topical dosage forms. Propylene glycol is a colorless, viscous liquid. It is miscible with water, alcohol and many solvents.

- IUPAC name:- 2-hydroxypropyl octanoate
- CAS:-23794-30-14

- Molecular Weight:- 202.294 g/mol
- HLB:- 6
- Specifications:-

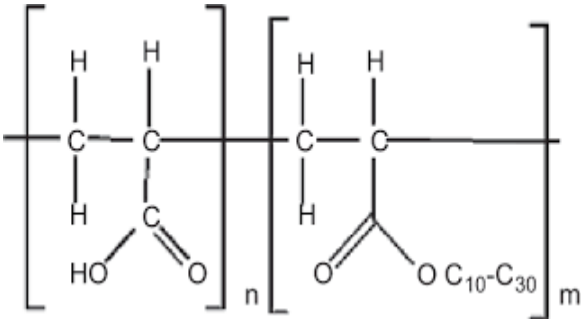
Specifications	Limits
Appearance	Clear liquid
PG monoesters	90.0% min
Free PG	5.0% max
Water	1.0% max

- Pharmaceutical Applications

Propylene Glycol is a colorless, viscous liquid. It is miscible with water alcohol and many solvents. This versatile PO (propylene oxide) derivative has wide range of applications including industrial solvents, paint and coating solvents, polyesters and alkyl resins, heast transfer fluids, plasticizers, detergents and surfactants and bactericide. USP grade is used in foods, pharmaceutical, personal care products. Fatty acid esters of propylene glycol are used as biodegradable enhancers in solvents and penetration enhancer in drug delivery systems. They are used as a lipophilic emulsifier and emulsion stabilizers in food and personal care.

Surfactant:- Pemulen-Tr1

- Synonym:-
- Chemical structure:-



- IUPAC Name:- Acrylates/C10-30 Alkyl Acrylate Crosspolymer
- Molecular Formula:- *C6H9NO2*
- CAS:- 138789-85-2
- Physical description:-

A major oil-in-water emulsifier, PemulenTM TR-1 NF polymer may emulsify up to 20 to 30% oil by weight. Unlike many of the Carbopol® polymers, it is an emulsion former rather than an emulsion stabiliser. Emulsions made from Pemulen polymers produce an occlusive layer on the skin and deliver topical medications as luxurious-feeling, low-irritancy lotions and creams. Ionic topical gels with great clarity can also be made with Pemulen TR-1 NF polymer

- Viscosity:-. cP, 25°C
- HLB Value:- 4.3
- Pharmaceutical classification:- High molecular weight, crosslinked copolymer of acrylic acid and a hydrophobic C10-30 alkyl acrylate co-monomer.
- Absorption Distribution and Excretion:-
- Uses:- Used as emulsifier or surfactant.
- *Industry Uses:-* Use as surfactant.

Solubilty Screening of Oils:-

In order to determine which oils have a superior solubility potential for Irbesarton, a solubility screening of oils was conducted. The steps for solubility screening of oils were to take 1 ml of oil in a clean test tube and add 10 mg of Irbesarton to the oil, after which the test tube was placed in a sonic bath and the time was adjusted. Next, we examine Irbesarton solubility in oils. Initially, 10 mg of the medication was dissolved in the oil, so the solubility screening was stopped. However, 10 mg more of the drug was dissolved in the oil, so the cycle was continued until the drug was no longer soluble in oil.

Solubility Screening of Surfactants

To determine which surfactants have a superior solubility potential for Irbesarton, a screening for surfactant solubility was conducted. The steps for solubility screening of surfactants were to add 10 mg of Irbesarton to 1 ml of clean oil before placing the test tube in a sonic bath and adjusting the time. Next, we examine Irbesarton solubility in surfactants. Initially, 10 mg of the drug was dissolved in the oil, so halt solubility screening; however, 10 mg of the drug was dissolved in the surfactants, so add 10 mg more of the drug and repeat this cycle until the drug is no longer soluble in the surfactants.

Experimental Design

Table 2:2^3 Factorial design applied to Irbersartan nanoemulsion.

Batch code	Factor-1	Factor-2	Factor-3
A-Amount of Oil (ml)	B-Amount of Pemulen-Tr1		C-Sonication Time
MY1-1	0.5	10	3
MY1-2	1	10	3
MY1-3	0.5	15	3
MY1-4	1	15	3
MY1-5	0.5	10	6
MY1-6	1	10	6
MY1-7	0.5	15	6
MY1-8	1	15	6

PREPERATION OF IRBESARTAN NANOEMULSION.

Accurately weighed oil is taken in a beaker, heated to the point of boiling, stirred with a magnetic stirrer, and 10 mg of a drug is dissolved in the oil. Next, Surfactants Phosal are added to the first beaker of the oil phase, followed by 20 ml of water in the second beaker of the aqueous phase, and synthetic surfactant Pemulen-Tr1 is added and dissolved. One beaker should be used to combine the oil and aqueous phases. A magnetic stirrer should be placed within the beaker, and the temperature should be kept at or above the oil's boiling point throughout the entire operation. After magnetic stirring, the bid is withdrawn from this solution and Ultraturax is utilised to combine and emulsify the bid on a power setting of 9400 for 15 minutes. After the solution has been emulsified by the Ultraturax, place it in a new beaker, attach a probe sonicator, and adjust the power 60 for 5 minutes. After performing probe sonication, nanoemulsion was created. The mixture was chilled at room temperature before being poured into a container and kept in a cool area.

III. RESULTS AND DISCUSSION

1. Oils and Surfactants screening:

The main objectives of oils and surfactants screening was to identify the oils and surfactants solubility potential of mefenamic acid.

Table 3: Solubility of Irbesartan in different oils and surfactants.

Sr. No.	Name of Solid Lipid	Solubility of drugs (mg/ml)
1.	Almond oil	10
2.	Coconut oil	20
3.	Oleic acid	30
4.	Capryol 90	30
3.	Myglyol 840	10
4.	Myglyol 812N	20
5.	Tween 20	20
6.	Tween 80	10
7.	Span 20	10
8.	Span 80	10

2. Formulation optimization, data analysis model variation;-

Table 4: Responses obtained for studied parameters from experimental batches.

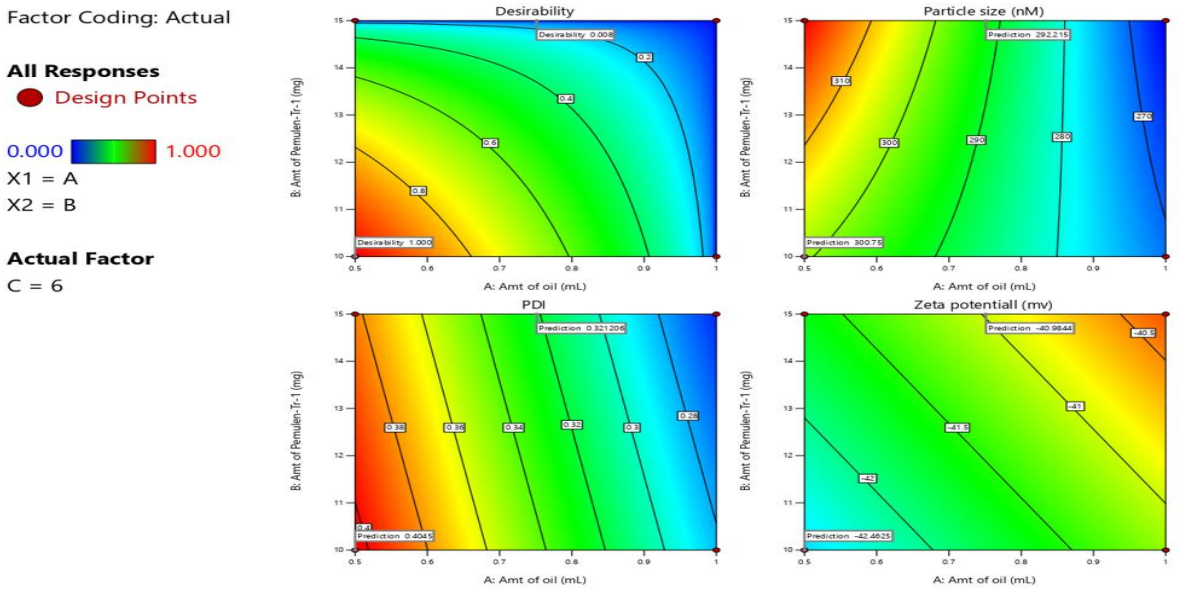
Batch code	Response-1	Response-2	Response-3
	Particle size	PDI	Zeta potential
MY1-1	290.8	0.388	-41.8
MY1-2	288.8	0.31	-43.1
MY1-3	320.1	0.401	-40.1
MY1-4	290.8	0.321	-43.1
MY1-5	301	0.399	-42.3
MY1-6	270.8	0.288	-41.3
MY1-7	320.1	0.388	-41.8
MY1-8	264.6	0.255	-40.2

For the optimization purpose we used Design Expert software (Version 13.0.0.5), and the obtained data is summarized below

2^3 Full factorial design

Table.5 : Experimental design and responses

	Factor 1	Factor 2	Factor 3	Response 1	Response 2	Response 3
	A:Amt of oil	B:Amt of Pemulen-Tr-1	C:Sonication Time	Particle size	PDI	Zeta potentiall
	mL	mg	min	nM		mv
MY1-1	0.5	10	3	290.8	0.388	-41.8
MY1-2	1	10	3	288.8	0.31	-43.1
MY1-3	0.5	15	3	320.1	0.401	-40.1
MY1-4	1	15	3	290.8	0.321	-43.1
MY1-5	0.5	10	6	301	0.399	-42.3
MY1-6	1	10	6	270.8	0.288	-41.3
MY1-7	0.5	15	6	320.1	0.388	-41.8
MY1-8	1	15	6	264.6	0.255	-40.2



Graph 1 : The graph represents the numerical optimization contour plots generated using Response Surface Methodology (RSM) with Design-Expert® software. The optimization was performed to evaluate the combined influence of Factor A (Amount of oil, mL) and Factor B (Amount of Promovit™, mg) on the

critical quality attributes of the formulation, while Factor C was maintained at a constant level of 6.

The optimization study was carried out using a desirability function approach to identify the optimum levels of the independent variables for achieving the desired formulation characteristics. The contour plots illustrate the interactive effects of Factor A (Amount of oil) and Factor B (Amount of Promovit™) on the responses, namely particle size, polydispersity index (PDI), and zeta potential, while keeping Factor C constant at 6.

The desirability plot (upper left) indicates that the overall desirability was highest (desirability = 1.0) in the lower-left region of the design space, corresponding to relatively lower concentrations of both oil and Promovit™. As the levels of both factors increased, the overall desirability gradually decreased, indicating that formulations prepared at higher concentrations were less likely to satisfy the predefined optimization criteria.

The particle size contour plot (upper right) demonstrates that particle size was influenced by both formulation variables. An increase in the amount of oil and Promovit™ resulted in a gradual increase in particle size, whereas lower levels of these variables produced comparatively smaller particles. The optimized formulation was predicted to exhibit a particle size of approximately 292 nm, indicating suitability for nanoscale drug delivery.

The PDI contour plot (lower left) shows that the polydispersity index was primarily affected by the amount of oil. Increasing the oil concentration led to a decrease in PDI values, suggesting a narrower particle size distribution and improved formulation homogeneity. The optimized formulation was predicted to have a PDI of approximately 0.31, reflecting acceptable uniformity of the nanoparticle population.

The zeta potential contour plot (lower right) reveals that both formulation variables significantly affected the surface charge of the nanoparticles. The optimized formulation exhibited a zeta potential of approximately −40.6 mV, indicating excellent electrostatic stability and a low tendency for particle aggregation during storage.

Overall, the optimization study identified an experimental region that simultaneously produced minimum particle size, low PDI, and high absolute zeta potential, resulting in a formulation with maximum overall desirability (D = 1.0). These findings demonstrate that the selected levels of formulation variables are suitable for preparing a stable and uniform nanoparticulate drug delivery system.

Characterization of Irbesartan:-

1 Z-average, PDI, and zeta potential:-

PSA AND ZETA

MY1-8

According to Table 2,, the batch IS-NE had the lowest size (Z-Average) and PDI, which were 264.6 r.nm and 0.225, respectively. Figures 9.2 and 9.3, which demonstrate the Z-average (nm) of IBS-NE (Batch MY1-8) in terms of number percentage and intensity, respectively. One of the typical applications of dynamic light scattering (DLS) is the classification of particles, emulsions, or molecules that have been dispersed or dissolved in a liquid.

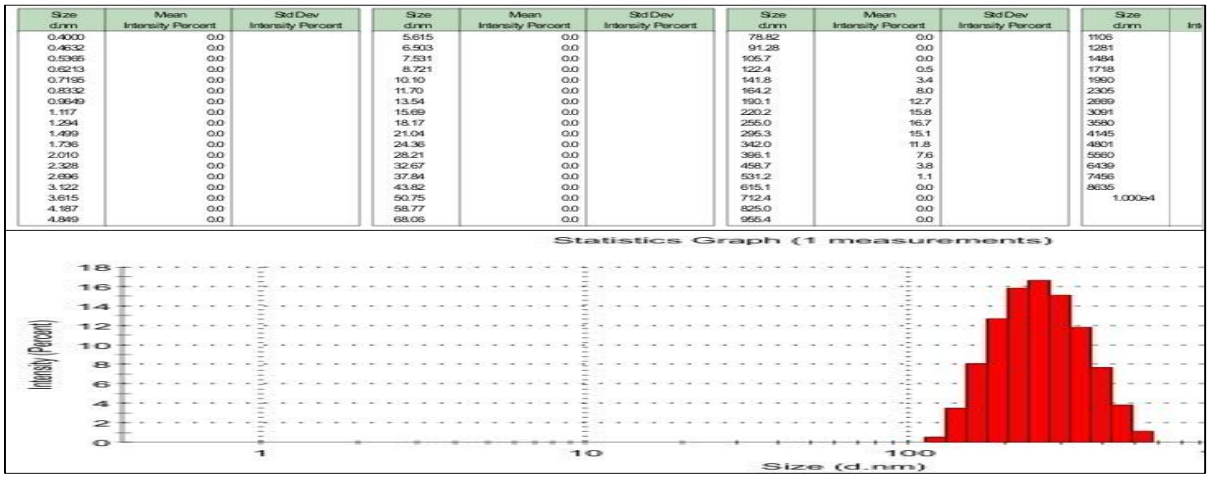


Fig1:. Particle size distribution of Batch MY1-8

Figure 2. shows that 16.7 (% Mean number) particle had size 255.0 nm, followed by 15.8 (% Mean number) corresponding to 220.2 nm, 15.1 (%Man number) particles of 295.3 nm, 12.7 (% Mean number) particles of 190.1, 11.8 (% Mean number) particles of 342.0 nm, 8.0(% Mean number) 164.2 nm, 7.6 (% Mean number) particles of 396.1 nm. As shown, the Z-average was 104.0 (r.nm). The Polydispersity Index is adjusted to exclude values below 0.05 and has no dimensions. When utilising severely monodisperse criteria, the Polydispersity Index is adjusted so that values below 0.05 are rarely occasionally seen. It has no dimensions. Values above 0.7 frequently imply that the sample has an extremely wide size distribution.

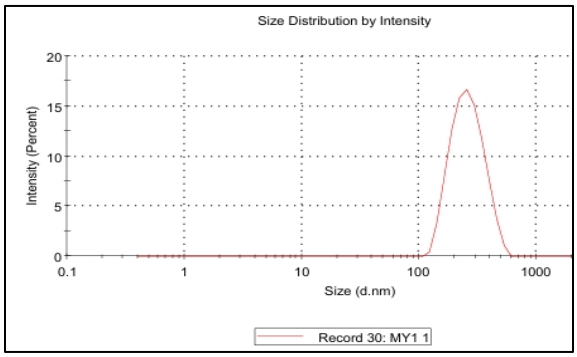


Fig.2:Particle size and PDI of Batch-MY1-8

As noted the designed NE had narrow size distribution with PDI value of 0.225.

Zeta Potential

For monitoring the behaviour of dispersive systems in liquids, colloid chemists employ the zeta potential. Furthermore, the zeta-potential characterises the electrical double layer on the solid/liquid interface, which is crucial for flotation and flocculation processes. The stability of colloidal dispersions can be predicted using ZP. For electric repulsion to be effective, the zeta potential must be strong (>30 mv).

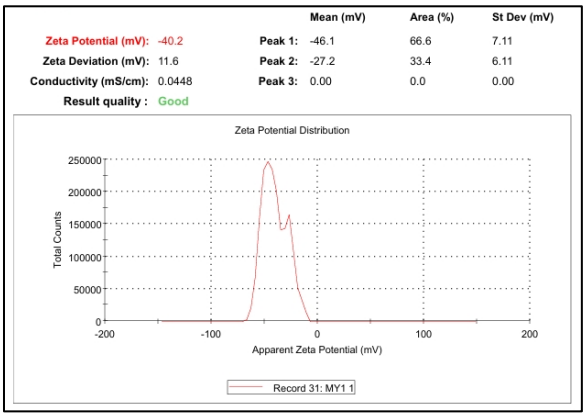


Fig. 3 Zeta potential of Batch-MY1-8

As portrayed in (**Figure.** 4), IS-NE (Batch MY1-8) had a zeta-potential of -40.2 mV suggesting substantial physical stability.

DSC

Thermal analysis used in differential scanning calorimetry to ascertain the physical and chemical characteristics of medicines and polymers. Heat released or absorbed during such a shift can be measured using DSC. The methods by which the quantity of heat needed to raise the temperatures of a sample and a reference object is measured in relation to temperature. The Batch-MY1 and Pemulen-Tr1.

MY-1

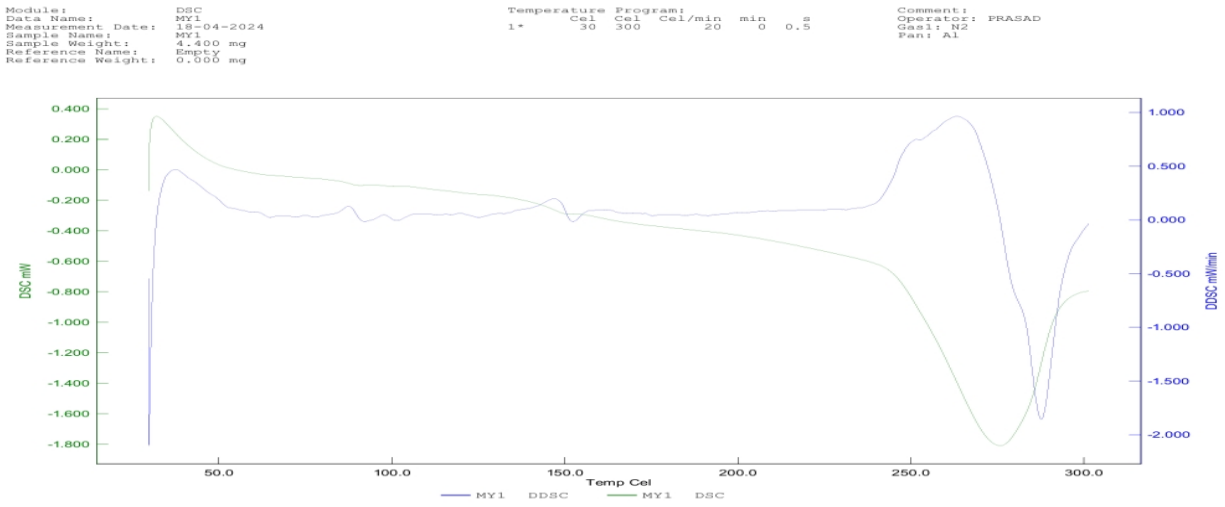


Fig. 4: DSC curve of Batch-MY1-8

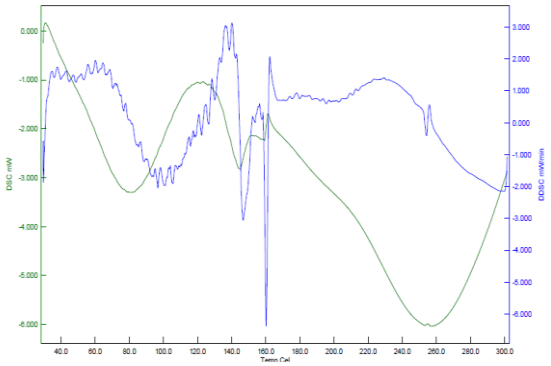
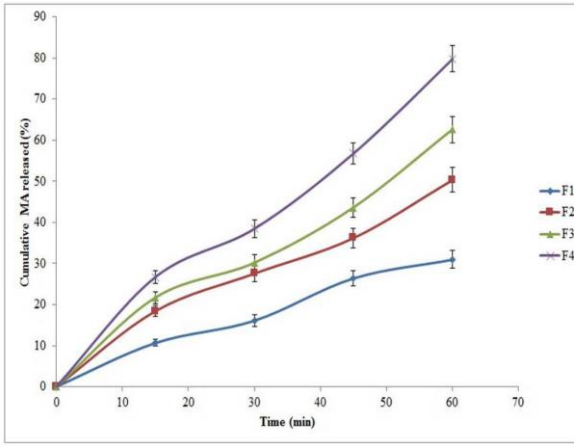


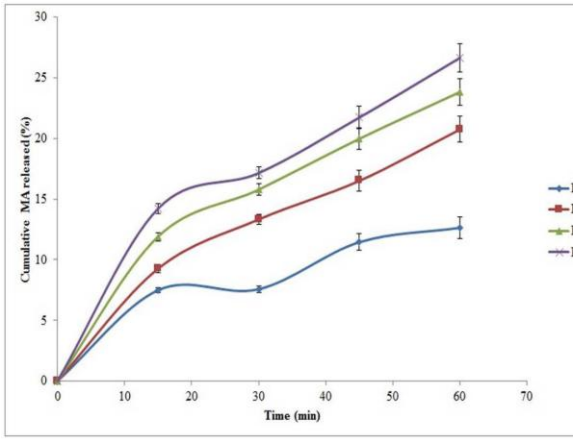
Figure. 5: DSC curve of Pemulen Tr-1.

In Vitro Drug Release Study

The in vitro drug release profile of MA from all the Nano formulations was carried out using diffusion cell. The release rate of MA from the formulations was found to be increased significantly with an increase in concentration in the formulation ($p < 0.05$). Hence, the maximum release was observed in the formulation MF4 (79.76%), and the minimum one was found in the formulation MF1 (30.98%). The maximum drug release profile of MA from the formulation MF4 was possible due to the lowest particle size of MF4 compared with the other formulations studied



Graph 2: In vitro drug release of IBS from the nanoemulsions MY1-1–MY1-4.



Graph 3: In vitro drug release of IBS from the nanoemulsions MY1-5–MY1-8.

Stability Study

Stability studies were performed on the optimized formulation F4 as per ICH guidelines. The samples were placed in the stability chamber. The particle size, PDI, and % release were determined at 1, 2, and 3 months. The results of the stability studies are summarized in Table. The results showed no significant changes in particle size, PDI, and % release of the optimized formulation MF4, suggesting that the medicated optimized nanosuspension of MA was sufficiently stable. The stability of nanosuspensions has already been proved previously in the literature. Several drugs, such as cyadox, aprepitant, and azoxystrobin, were found to be stable when formulated into nanosuspension formulations. Hence, the results of the stability evaluation were in accordance with the literature.

Table. 1,2 Particle size, PDI, and release data for the optimized formulation F4 for a 3-month stability study as per ICH guidelines; Temp: Temperature,RH: Relative humidity.

Time (Month)	Temp/RH(25±2°C/60±5%)			Temp/RH(40±2°C/75±5%)		
	Particle Size(nm)	PDI	Release(%)	Particle Size(nm)	PDI	Release(%)
1.	264.6	0.225	79.23	264.6	0.225	79.59
2.	265.1	0.260	80.43	265.20	0.268	79.56
3.	265.90	0.295	79.45	266.02	0.299	78.56

Morphology investigation:

In Figure, the surface morphology of the Iesartan nanoemulsion is shown. The NLC was rounded when it was identified. However, compared to PSA measurements, the stated AFM diameter seemed much smaller.

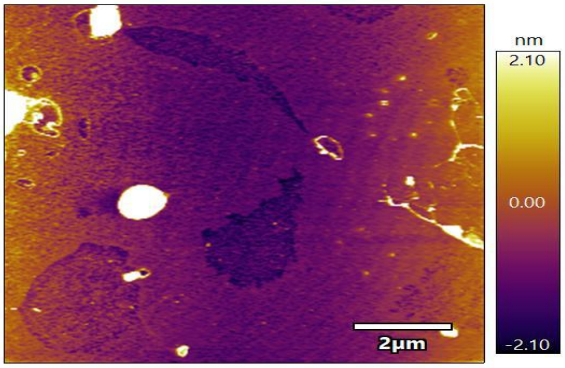


Figure 2: AFM peak of Irbesartan nanoemulsion.

IV. SUMMARY AND CONCLUSION

Irbesartan nanoemulsion was successfully prepared by ultrasound emulsification method. Irbesartan are antihypertensive agent and hypertension was common disorder in India and the dose frequency of Irbesartan was high. So we formulated Nanoemulsion of Irbesartan because these are reduced dose quequency and improve patient compliance. Irbesartan nanoemulsion we formulated two batches MY1 by using synthetic surfactant such as Pemulen-Tr1 and My2 by using natural surfactant such as gum acacia, displayed Particle size, Zeta potential and PDI of Batch-MY1 was 264.6, -40.2, 0.225 and displayed Particle size, Zeta potential and PDI of Batch-MY2 was 142.8, -33.8, 0.167 Irbesartan nanoemulsion (Batch MY1-8) was found stable at different temperature conditions over a period of three months. The designed nanoemulsion found to follow Higuchi release, and estimated release exponent confirmed Zero order type of drug release. Designed, nanoemulsion showed improved dissolution rate in comparison to the pure drug. Finally, it could be concluded that the designed nanoemulsion process the potential to entrap the poorly water-soluble drug

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