

Formulation of Nanoparticles of Rabeprazole Sodium for the Treatment of Peptic Ulcer

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Abstract: *In this Paper, A Formula is discovered to be doable to accomplish oral altered - discharge conveyance for Rabeprazole sodium. On contrasting the two plans, nanomicelles showed better supported delivery profile. Dry powder covering of nanomicelles was figured out to be less tedious just as simple and dependable strategy contrasted with other covering strategies. Rabeprazole sodium nanomicelles definition showed exceptionally gentle injuries with interstitial discharge and now and then no injury by any means. The remedial capability of the definitions can be additionally investigated with the assistance of long haul pharmacokinetic and pharmacodynamic concentrates in clinical settings. Additionally, the way that the micronized suspension of the medication and stabilizer didn't generally redesign the medication's disintegrating suggests that the extended separating rate for the nanosuspension is primarily a result of an abatement in molecule size. This paper is show, how to create oral changed delivery conveyance system for Rabeprazole sodium .*

Keywords: Peptic ulcer, nanomicelles, serious adverse events, rabeprazole

1. Introduction

The word 'peptic' comes from the Greek word 'peptikos,' which implies open to preparing. (1) Peptic ulcer illness (PUD), otherwise called ulcer pepticum, is a ulcer (portrayed by mucosal deteriorations equivalent to or more prominent than 0.5 cm) in a zone of the gastrointestinal parcel that is generally acidic and subsequently unbearably excruciating. (2) While corrosive peptic issues are a multifactorial infection, the last fundamental instrument hidden its pathogenesis is the movement of gastric material, which is destructive to the gastric, duodenal, and esophageal mucosa, and the failure of mucosal protect frameworks to reduce those effects. The word 'peptic ulcer' characterizes a sickness where the entire thickness of the gastric or duodenal mucosa weakens because of destructive and pepsin-containing gastric juice

NSAIDs are regularly frequently connected to peptic ulcers (in up to 60 percent of patients, particularly those with complexities like biting the dust). At the point when more forceful treatment is required, explicit COX-2 inhibitors can be thought of, however this doesn't take out the danger of repeat.

Mekonnen et al.,(2020) In his paper, he found that peptic ulcer infection has a high death rate and is agonizing. The universe of plants is an imperative asset for the making of present day antiulcer trained professionals [3]. Patil HP et al., 2018 utilized meager film hydration procedure to plan drug-stacked micelles and improved micellar definition utilizing Response Surface (RSM) strategy [4]. Nuhu et al., (2016) assessed the antiulcer action of Commiphora africana stem - bark removes utilizing ethanol acceptance model in guinea pigs and distinguished phytochemical constituents of the concentrates answerable for the noticed action. A standard enemy of - ulcer specialist, omeprazole was utilized as reference standard [8]. Shaik 48 et al., (2014)

figured Rabeprazole postponed discharge enteric covered tablets. Five plans were created by getting ready center tablets utilizing mannitol as diluents and Crosspovidone as super disintegrant in various extents and changing the sythesis of sub covering and enteric c oating utilizing opadry white and enteric yellow . The center tablets were set up by direct pressure strategy. In the preformulati on examinations the micromeritic properties of the API were surveyed by deciding point of rest, compressibility file, Hausner rat [12].

2. Materials and Methods

In the group of proton siphon inhibitors, rabeprazole is an enemy of ulcer drug. Rabeprazole blocks the covering of gastric cells with H⁺, K⁺-ATPase and portion subordinate mistreats the emission of basal and initiated gastric corrosive. Rabeprazole prevents the digestive system from deteriorating. Rabeprazole can also be used to get rid of bacteria that are linked to ulcers that are resistant to antibiotics. Rabeprazole is a long-acting proton syphon inhibitor that inhibits gastric destructive release by merely inhibiting the H⁺, K⁺-ATPase on the secretory surface of parietal cells.

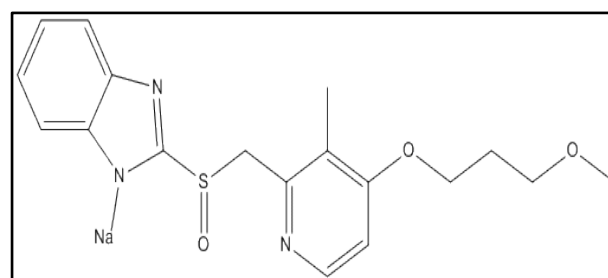


Figure 1: Structure of Rabeprazole

Overabundance measure of rabeprazole sodium was broken down in 10 ml refined water till a soaked arrangement was

acquired. The soaked arrangement of rabeprazole sodium was mixed for 48 hrs on attractive stirrer at 100rpm and room temperature (at $25 \pm 1^\circ\text{C}$). At that point the example was centrifuged for 10 min at 10,000 rpm. Clear supernant was gathered utilizing 0.22 μm needle channel and examined utilizing UV spectrophotometer at scope of 204 nm. The bright spectrophotometric strategy was chosen for the assessment of saxagliptin. An adequate measure of rabeprazole sodium test was disintegrated in 100 mL of refined water and broke down utilizing UV spectrophotometer in the reach 200 to 400 nm and the λ_{max} was resolved.

The dissolvable dissipation strategy developed nano concept. At room temperature, the drug was disintegrated in a methanol solution (6-7 ml). This was filled with 10-12 ml water containing varying quantities of Lutrol F-68, which was held at a temperature of $24\text{--}30^\circ\text{C}$ and then blended at high speed for 1 hour to allow the unpredictable dissolvable to vanish (Remi, High speed stirrer, India.). Natural solvents are expanded by a needle that is inserted directly into a surfactant-containing bath. Using a UV/noticeable spectrophotometer with a maximum wavelength of 204 nm, the centralization of free drug in the supernatant fluid was calculated.

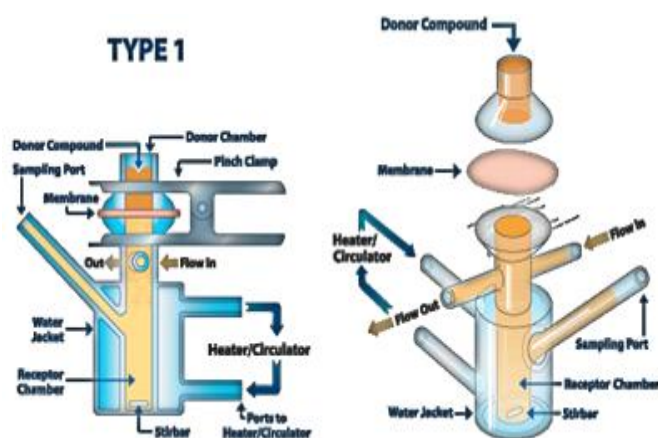


Figure 2: Schematic representation of modified diffusion cell apparatus

3. Results

The demographic and clinical characteristics of the safety analysis set are shown in Table 1. No characteristics differed between the rabeprazole 10- and 5-mg groups. The heterogeneities in the history of drugs for ulcer prevention, the presence of *H. pylori*, and eradication history were similar between the groups.

The UV spectroscopic analysis was performed as per method. The wavelength of Rabeprazole sodium was determined to be 204 nm and was utilized for further quantitative analysis.

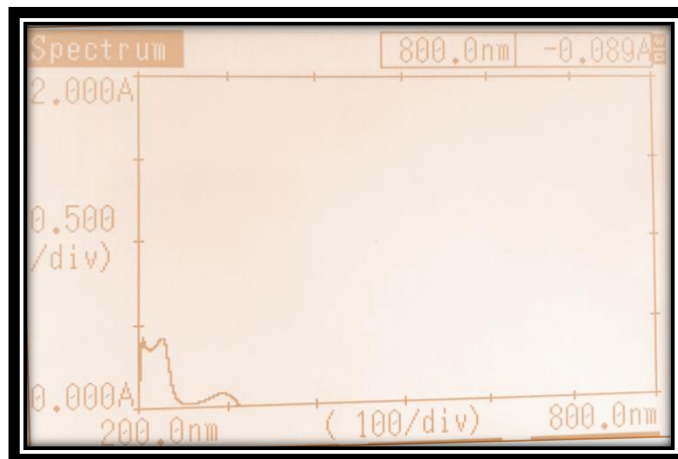


Figure 3: UV Spectroscopy of Rabeprazole sodium

The standard plot of Rabeprazole sodium was set up in phosphate cradle (pH 7.2) and the bright spectrophotometric technique was utilized to dissect Rabeprazole sodium at the frequency of 204 nm which showed great linearity in the arrangement of 1–10 $\mu\text{g/ml}$ fixation as demonstrated in the table underneath.

S.No.	Concentration ($\mu\text{g/ml}$)	Mean absorbance \pm S.D. (n = 3)
1.	1.5 $\mu\text{g/ml}$	0.221 \pm 0.001
2.	2.5 $\mu\text{g/ml}$	0.345 \pm 0.001
3.	3.5 $\mu\text{g/ml}$	0.455 \pm 0.001
4.	4.5 $\mu\text{g/ml}$	0.495 \pm 0.003
5.	5.5 $\mu\text{g/ml}$	0.535 \pm 0.003
6.	6.5 $\mu\text{g/ml}$	0.695 \pm 0.003
7.	7.5 $\mu\text{g/ml}$	0.785 \pm 0.003
8.	8.5 $\mu\text{g/ml}$	0.845 \pm 0.003
9.	9.5 $\mu\text{g/ml}$	0.895 \pm 0.002
10.	10.5 $\mu\text{g/ml}$	0.975 \pm 0.002

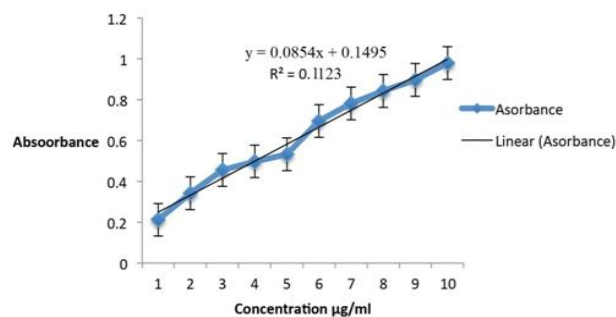


Figure 4: Calibration curve of Rabeprazole sodium by UV spectrophotometry

Table 2: Independent variables and respective levels for Rabeprazole sodium polymeric loaded polymeric nanomicelles

Name	Type	Min.	Mean	Std Dev
Drug (D)	Numeric	1.00	5.51	3.30
Polymer (P)	Numeric	1.00	4.99	4.10

The potential mixes of all elements at various degrees of full focal composite plan, have been concentrated in completely randomized request. An appropriate polynomial condition including the individual fundamental impacts and communication factors was chosen dependent on the assessment of a few factual boundaries, like the different relationship coefficient (r^2), changed various connection

coefficient (changed r^2) utilizing the Design-Expert programming (11.0.5.0) Trial Version as demonstrated in table. Here, the best fitted model was picked as a suitable measurable model to enhance of the polymeric nanomicellar plan.

This paper demonstrates the definition is like water with no particulate matter present in the improved polymeric nanomicelles. The improved polymeric nanomicellar detailing showed smooth surface morphology, with circular shape and no collection as demonstrated in Fig.

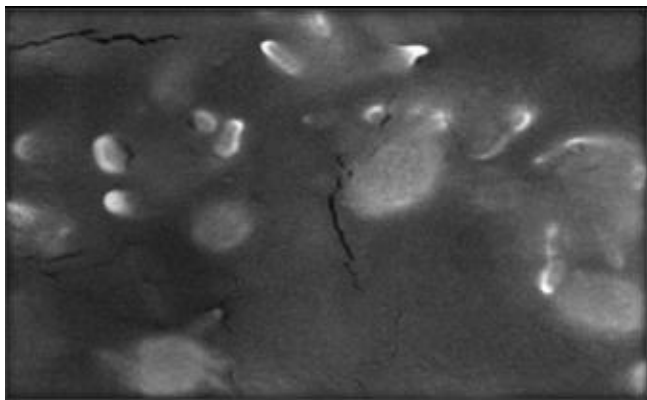


Figure 5: FESEM

Rabeprazole sodium-stacked polymeric nanomicelles showed a mean molecule size of 152.8 nm and PDI of 0.250. A PDI estimation of 0.1 to 0.25 shows a genuinely tight size circulation. The zeta possible estimations of upgraded detailing was discovered to be - 15.1 mV.

The thickness of the upgraded rabeprazole sodium stacked polymeric nanomicelles (PNM 12) was estimated by brookfield viscometer as referenced. The pH of the advanced rabeprazole sodium stacked polymeric nanomicelles (rbz 10) was discovered to be 7.23 ± 0.73 which is inside adequate scope of 7.07 to 7. The % drug substance of the enhanced rabeprazole sodium stacked polymeric nanomicelles was discovered to be 99.70 %.

The thermogram showed an endothermic top at 100.11°C . A sharp endotherm ($T_{\text{peak}} = 106.69^\circ\text{C}$) was noticed for streamlined polymeric nanomicelles (rbz 10), showing no particular top in the improved detailing which was because of the ensnarement of the medication in the polymer lattice.

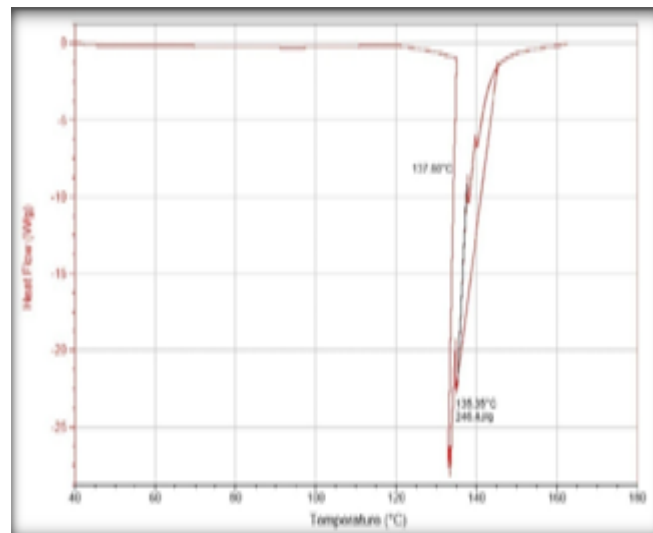


Figure 7: Thermogram

Stability Study

The outcomes showed that there was no staying of dots, no stamped change in drug discharge profile and no adjustments in appearance and rate drug substance of nanoformulations.

4. Conclusion

In the disintegration study, the Rabeprazole sodium nanomicelles showed controlled - discharge conduct over a 12 hr period. Taking everything into account, these system were discovered to be doable to accomplish oral altered - discharge conveyance for Rabeprazole sodium. On contrasting the two plans, nanomicelles showed better supported delivery profile.

Additionally, the way that the micronized suspension of the medication and stabilizer didn't generally redesign the medication's disintegrating suggests that the extended separating rate for the nanosuspension is primarily a result of abatement in molecule size. Hence, the created plan, after fundamental examinations of clinical preliminaries, has the promising potential for an endeavor to totally destroy fix ulcer.

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