# NASAL DROP FORMULATION

**Principle:** Nasal drop solutions are aqueous liquids that are intended to be sprayed or dropped into the nasal cavities. A large surface area for drug absorption is provided by the microvilli present along the pseudo-stratified columnar epithelial cells of the nasal mucosa in the adult nasal cavity, which has a capacity of about 20 mL.

The nasal tissue is highly vascularized, due to which systemic absorption could be possible in an effective way. Bypassing the liver's first-pass metabolism is another benefit of nasal delivery. Intranasal bioavailability has been shown to be as effective as injections for some peptides and small-molecule substances.

However, as a compound's molecular weight rises, bioavailability declines. Proteins made of a greater number of amino acids have low bioavailability. Interestingly some literature suggests that surfactants can enhance the nasal bioavailability of large molecules.[1] In order to maintain normal ciliary function, nasal drops are prepared with similar properties like nasal secretions, therefore the tonicity, pH, and viscosity of the formulation is considered here.

Nasal drops are isotonic and the pH is maintained in the range of 4.5-6.5 with the help of buffers.[1,2] Nasal drops are one of the most simple and convenient drug delivery system. Nasal drops are more conveniently spread than the nasal sprays. However, the lack of dose precision is drawback of this system.[3] It has been reported that nasal drops deposit human serum albumin in the nostrils more efficiently than nasal sprays.

Many drugs for systemic and local action are used by nasal route, mainly for local sympathomimetic action for the reduction of nasal congestion, such as ephedrine and naphazoline. Other than these drugs, antibiotics such as rifampicin also used for the treatment of infections.

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**REQUIREMENTS**

**Apparatus:**

Beaker, Stirrer/glass rod, Measuring cylinder, spatula, balance, and storage bottle.

**Chemicals:**

Rifampin, Hydroxypropyl methylcellulose, Polysorbate, Ascorbic acid, Sodium sulfite and deionized water.

## OBSERVATION TABLE : -

| INGREDIENTS | REQUIRED QTY |
|---|---|
| **Rifampin** | 500mg |
| **Hydroxypropyl methylcellulose** | 625 mg |
| **Polysorbate 80** | 150 mg |
| **Ascorbic acid** | 50 mg |
| **Sodium sulfite** | 200 mg |
| **Purified Water** | 50 mg |

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**PROCEDURE**

For the preparation of ear drops, calculate the required quantity of ingredients and weigh it according to the calculated quantity and add it to the beaker, now heat 40 ml of purified water up to 70$^{o}$C and add it to the HPMC with stirring. After this, allow the mixture to cool at room temperature, followed by adding the remaining ingredients to it with constant stirring so it will be uniformly distributed. Add the sufficient amount of the purified water to it, for making final volume of the nasal drop.

**Use**– the rifampin nasal drop is can be used to treat the susceptible infections in nasal cavity.

**Label**– keep the formulation in clean and dry place, and keep the formulation out of reach of children.