



## Nano-emulgel: Emerging as a Smarter Topical Lipidic Emulsion-based Nanocarrier for Skin Healthcare Applications



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**Abstract: Background:** In recent decades, enormous efforts for different drug discovery processes have led to a number of drug molecules available today to overcome different challenges of the health care system. Unfortunately, more than half of these drugs are listed in either BCS (biopharmaceutical classification system) class II/ IV or both are eliminated from the development pipeline due to their limited clinical use. A nanotechnological approach bears much hope and lipoidal fabrication is found to be suitable for the delivery of such drugs. Nanoemulsion based gel *i.e.* nanoemulgel out of different nanolipoidal formulations has been found to be a suitable approach to successful drug delivery through topical routes. In past few years many herbal and synthetic active pharmaceutical ingredients (APIs) has been patented as nano sized emulsified gel for various therapeutic activities.

**Methods:** Nanoemulgel is basically an emulsion-based topical gel formulation, where nano-sized emulsion globules can be prepared with the help of high energy or low energy methods and further converted into nanoemulgel by adding a suitable gelling agent. Nanoemulgel fabrication enlists various kinds of polymeric materials, surfactants and fatty substances of natural, synthetic and semi-synthetic nature with a globule size range from 5 to 500 nm.

**Results:** Nanoemulgel can be applicable to various acute and chronic diseases through topical routes.

**Conclusion:** Nanoemulgel preparations of many recently approved drugs are being used successfully in different areas of health care and have re-defined the significance of topical route of delivery as compared to other routes. However, along with various improvements in the current state of the delivery system, the safety factor needs to be taken into account by toxicological studies of the materials used in such formulations.

**Keywords:** Health care, topical route, BCS class II/IV, bioavailability, nanotechnology, nanoemulgel.

### 1. INTRODUCTION

In the history of ancient medicine, the skin has been extensively used as the most prior organ for the application of various medicaments and subsequently, achieving the desired therapeutic activity. Similarly, in the modern medical practice over the

past decades, Transdermal Drug Delivery System (TDDS) has made an important contribution to health care by providing an attractive alternative to oral drug delivery. Accepting many challenges in the delivery of recently approved drugs, the Transdermal drug delivery has also been advanced and emerged as the first generation, second generation and third generation TDDS. These generations were classified on the basis of size and physicochemical properties of the active pharmaceuti-

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