Development of Artificial surfactant for Alveolar Delivery: Nanotherapeutics for ARDS

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Adult Respiratory Distress Syndrome is a condition which can arise in case of many diseases and traumatic situations for example Tuberculosis, burn injury or drowning conditions. Mostly this condition is addressed by ventilator support which actually worsen the condition. Current therapies available for ARDS are not hundred percent successful and there is a need for the development of new formulations for the same. In the condition of ARDS the lung surfactant present in the alveoli gets inhibited by various physical and chemical reasons. The best possible solution for such a situation could be to replace or replenish the inhibited lung surfactant with the new surfactant. The major problem which is faced in such a situation is the reachability of the formulation to the alveolar site h. This situation can be addressed by utilizing the principle of nanotechnology to formulate therapeutics provided the components of surfactant fulfills other criteria as well such: surface activity, anti-inflammatory properties and antimicrobial nature etc. The present study is about development of nanoformulation against ARDS using naturally derived phospholipids along with essential oils. The first step for this study is to identify the worst inhibitor for lung surfactant in traumatic conditions using Langmuir Blodgett trough. It was fond the RBC membrane were best potent inhibitor for DPPC membrane Further the surface activity of essential oils was measured on the same model. It was found that essential oil from Eucalyptus globulus was having best surface activity in comparison to *Syzygium aromaticum* oil. Further a nano liposomal formulation was prepared with Dipalmitoyl Phosphatidyl Choline and *Eucalyptus globulus* essential oil. It was observed that the prepared formulation could obtain the equilibrium surface tension and the nano liposomes were in the size range of 100-250 nm. The currency study suggested that this formulation could be a potential candidate for treating the ARDS.