

## Title: Air-Pressure Mediated Microneedle Manufacturing

Author: Mohammad A. Ali, Grazia Stagni

Affiliation: Div of Pharmaceutical Sciences, Long Island University, Brooklyn

### Abstract:

One of the newest approaches to optimize transdermal drug delivery is the use of arrays of dissolving microneedles (MN) to bypass the stratum corneum barrier and increase amount of drug delivered.

Fabrication of dissolving microneedle (MN) involve casting of a gel or solution vehicle into a mold by centrifugation or vacuum for proper mold filling. Problems of using centrifugation include slipping of vehicle to one side of the mold, loss of gel due to overflow, weight variation and non-uniform mold filling. On the other hand, vacuum filling causes swelling of the polymer and vehicle tends to come out of the needle cavity. Thus, translation of these processes to commercial scale is difficult. Also, higher temperature involved for drying may damage temperature sensitive drugs and biomolecules.

In the present study, we have evaluated and demonstrated the use of air-pressure in mold casting and *in-situ* drying of microneedle formulation within the mold with no involvement of heat throughout the process.