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Development of a green and sustainable commercial manufacturing process

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The development of an innovative and sustainable commercial manufacturing process of an API (active pharmaceutical ingredient) will be presented. The presentation will highlight key chemistry innovations and detail their impact on producing a more efficient, more productive, higher yielding, and greener manufacturing process. In addition, the presentation will highlight the positive impact of a streamlined process on reducing overall manufacturing time and energy consumption.

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Green synthesis of polymeric nanoparticles

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Green synthesis of nanoparticles is an area of intense scientific and technological interest. Here, a green method is presented for the preparation of nanoparticles using natural honey as the stabilizing agent. Stabilizing agents play an important role in the formation of non-aggregatory, stable nanoparticles and it prevent agglomeration during storage. For biomedical application it is necessary that the coating agent should be nontoxic and well tolerated by living cells. Several synthetic reagents have been used to prevent aggregation and keeping the particles in suspension, including various polymers like Polyethylene Glycol (PEG), Poly (Vinylpyrrolidone) (PVP) etc. Compared to polymeric surfactants honey has the advantage that it is nontoxic in nature. Highly stable non-aggregatory nanoparticles of 10-100nm size were prepared in aqueous medium. Milk protein casein, human serum albumin, alginic acid, chitosan and curcumin nanoparticles were prepared by this method. Synthesized nanoparticles were characterized by Scanning Electron Microscopy, Transmission Electron Microscopy and Dynamic Light Scattering. Interaction of honey with polymer was studied by FTIR. Applications of these nanoparticles in drug delivery, tissue engineering and water purification were also investigated. The synthesized nanoparticles gave a sustained release of rifampicin and curcumin. Alginic acid nanoparticles were found to be highly efficient in removing heavy metals, dyes and microbes from contaminated water. Curcumin nanoparticles, incorporated into alginic acid sheet found application in wound dressing. This work demonstrates a simple, eco-friendly method for the synthesis of versatile nano and micro particles that can be used for various applications like drug delivery, tissue engineering and water purification.

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