ABSTRACT

Now a day’s Nano-particles are widely used in drug delivery system to make treatment fast and sophisticated. Nanoparticles are very small size of particles ranges are of scale 1- 1000 nanometers. These nano particles are studied under the branch of nanotechnology. These are very important in the field of medicine and drug delivery in our day to day life. As we know herbal extract and drug are highly used now a day so in this field also nanotechnology can be useful. Nanotechnology can be used further inside the body for the drug delivery. Nanotechnologies in the way of nano-particles are used in our day to day life in each and every field of life as medicine, computing medicine, sunscreens, Biosensors and enzyme encapsulations. Herbals drug are used widely in cleaning glass, antibacterial socks and sunscreens. When biology combines with the nanotechnology it is expected to revolutionize the biomedical research by exploring the various interesting phenomenon and properties of the nanoparticles (10^-9 m) presents in the herbs extracts. This technology will help to develop the cost effective diagnostic kits and treatment. Nanoparticles based drug delivery system has a great potential over the traditional drug. The nano carriers have been made of safe materials, including synthetic biodegradable polymers, lipids, and polysaccharides. In phyto-formulation research, developing nano dosage forms (Polymeric Nanoparticles [Nanospheres and Nanocapsules], Liposomes, Proliposomes, Solid Lipid Nanoparticles [SLNs], Nanoemulsion, etc.) has large number of advantages for herbal drugs, including enhancement of solubility and bioavailability, protection from toxicity, enhancement of pharmacological activity, enhancement of stability, improving tissue macrophages distribution, sustained delivery, protection from physical and chemical degradation, etc. Use of nanoparticles can bring revolution in the field of treatment of various diseases as cancer and tuberculosis.
**KEYWORDS:** Nanoparticles, drug delivery, herbal drug.

**INTRODUCTION**

From the evolution of human and development of our culture man was curious to know the different uses of herbs and their products as a medicine to cure the diseases. Man is continuously trying to find out best medicine to relieve the diseases.\(^1\) All the developing countries are dependent upon the herbal drug because these are comparatively cheap and easy to available.\(^2\) Now a days scientist and academician are continuously working on the innovative uses of drug components so that in minimum time consuming any disease can be treated. In this basically drug obtained from the herbs and components.\(^7\) some of the scientist also working on the side effects of allopathic drug and benefit of herbal drug over the allopathic medicine.\(^3\) production of herbal drug extract and identification and isolation of drug components is most difficult task. Solubility of drug components, reduction of toxic nature, active absorption of drug and its response is also very hard to study according to these vast variety of herbs in this nature, and each and every herb has different drug components.\(^4,5\) As various secondary metabolites as flavonoids, tannins and terpenoids are always used as medicine but it has some of limitation as it shows low absorption, high molecular size, lack of selectivity and efficacy.\(^6\)

So delivering these therapeutic compound to the target site is a major problem in treatment of various diseases. These all above limitation regarding drug delivery can be overcome by controlling drug delivery system(DDS). This system protects the drug from rapid degradation or clearance and enhances drug concentration in target tissues, therefore lower doses of drug are required.\(^14\) It also decreases the toxic and side effects of drug action. In this context there is a emerging branch nanotechnology have shown the importance of nano particle used in the drug delivery system as a drug carrier. Nanopartical are very small in size approximately 100 nm in one dimension.
This small size particles having various physiochemical and biological properties which enhance reaction are as well as ability to cross the cell and tissue barriers. Now a day’s these nano particle are the best material for biomedical application. The core objective of nanoparticles is to control and Manipulate bio macromolecular constructs and supramolecular assemblies that are critical to living cells in order to improve the quality. These nano particles includes proteins, DNA/RNA, viruses, cellular lipid. By this emergence of nano therapeutics allow a deeper understanding of various human diseases as cancer, cardiovascular disease and genetic disorder.

The contribution of nanotechnology is very advantageous for several medicinal areas, but some of the disadvantages are as high cost , difficult to scaling up process which may lead to lungs diseases, or may cause other disease or even death.\,[9,10] even that various pharmacy companies or industries have become increasingly interested in nano-technological advances because these development provide advantages.\,[8] As the effectiveness of medicinal plant species or herbal medicin depends on the supply of active compounds. Therefore these new nanocarrier should deliver the active components at a sufficient concentration during the entire treatment period and direct it towards the desired target.\,12There are different drug delivery systems based on nanotechnology, such as polymeric nanoparticles,(SLNs)Solid lipid nanoparticles, (LC) Liquid crystals systems, (PSL Cs)precursor system for liquid crystals, liposomes, and microemulsions, dendrimers, polymers, silicon or carbon materials, and magnetic nanoparticles.\,[4,11]
Use of nano career enhance the effectiveness of drug, it also helps in problematic active aspects of formulation .It also increase the solubility and stability of active drug components.

**CONCLUSION**

Nano-particles or nano-carriers as drug delivery systems are designed to improve the pharmacological ad therapeutic properties of conventional drugs. The drug molecules incorporated in to the nanocarrier can protect a drug against the degradation as well as offer maximum targeting to the cell site. It also controlled the release of drug components. These nano particles are able to cross the blood – brain – barrier (BBS) and operate on cellular level. it work very fast comparison to the traditional form of drug. It also help to lower the doses of drug. There are several nanoparticles are under preclinical evaluation trial, only few nanoparticles drugs are available on the pharmaceutical market such as liposomal conjugates(doxorubicin ) or DaunoXome® (Danorubicin). Nanoparticle drug conjugates can be phagocytosed by cells where there intracellular degradation may cause cytotoxic effects.
Other issues includes low drug loading capacity, low loading efficiency and poor ability to
control the size distribution of carriers. Many of the current drug delivery problems.
However, before the ongoing research will bring a clinically useful drug delivery system,
challenges which include developing toxicity testing protocols, improving biocompatibility,
drug loading, targeting, transport and release, controlling interaction with biological barriers,
detecting and monitoring exposure level and assessing the impact on the environment have to
be met.

Due to a number of functional groups on the surface of nanoparticles, the drug can be
attached to the carrier only in a stoichiometric ratio. The oxidative stress and inflammation in
different cell types have been often reported as toxic mechanisms of various types of
nanoparticles. Nanoparticles of diameter 10 nm can remain in cells and induct chronic
inflammatory response and fibrosis of tissue. An additional pharmaceutical market, e.g.,
liposomal conjugates.

For instance, small size and large surface area of nano-particle-based targeting system can
lead to an aggregation, making physical handling difficult. Problem is the lack of knowledge
concerning the distribution of drug carriers and the unpredictability of the process. Thus, in
our opinion, the magnetic targeted drug delivery system is one of the most attractive strategy
target therapy. Magnetic nanoparticles have their unique magnetic properties and they can be
attracted by magnetic fields, thus, acting as drug carriers in a target therapy. In addition,
inorganic magnetic nanoparticles containing the iron and gadolinium serve as an excellent
contrast enhancing agents in MRI (approved by FDA – Food and Drug Administration).

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