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A REVIEW ON: ANTICANCER POTENTIAL OF GREEN SYNTHESIZED SILVER NANOPARTICLES

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ABSTRACT

Silver nanoparticles are the most vital metallic nanoparticle in nanotechnology field which has an increasing scope in treating the life threatening disease cancer. Silver nanoparticles have been mainly targeted towards the potential applications in cancer diagnosis and therapy. Thismini review is based on silver nanoparticles which are synthesized from various plant extracts that can be used to face the future challenges and in the treatment to prevent from cancer.

Keywords

Cancer, Diagnosis, Nanotechnology, Silver nanoparticles

1. INTRODUCTION

Nanoparticles are cluster of atoms which resembles of microscopic particle with at least one dimension less than 100 nm. Nanoparticles show distinct property according to their size, shape and properties [1]. Nanoparticles that are used most commonly are silver nanoparticles due to its less toxicity. Silver is a noble metal which has been used to make coins and jewelry and this element is resistant to bacteria and is a potential anti-bacterial agent with low toxicity [2]. Silver nanoparticles have grabbed the attention due to its rapid, eco-friendly, non-pathogenic, economical protocol and providing the single step technique for the biosynthetic processes.Silver nanoparticles consist of silver particles about 1-100nm in size. Silver nanoparticles are thenanoparticles which are incorporated in wound dressings, paints,biosensor materials, composite fibers, cosmetics and plastics for their antibacterial properties.Silver nanoparticles are

widely used in industries and wound dressings. Silver nanopraticles have many properties which include magnetic, catalytic,and optical properties [3].Silver nanoparticles can be synthesized by green synthesis using plants and micro-organisms like bacteria,fungi etc.,and by chemical and physical methods. Silver nanoparticles also have antifungal activity, anti-proliferative activity, anti-bacterial activity, pro-apopotic activity and pro-oxidative activity [4]. Silvernanoparticles are widely used for their anti-microbial activity.

All over the world, cancer is considered as a severe disease which severely affects the human population [5]. Cancer is a life threatening disease, which has a constant demand on new therapies to treat and prevent the emerging disease [6]. Cancer is caused by the abnormal uncontrolled cell growthdue to angiogenesis and metastasis.The drugs like carboplatin and oxaliplatin have been used as anti-tumor agents [7]. Recent studies have showed silver nanoparticles showed greater affinity towards cancer.

Synthesis of silver nanoparticles by different methods

Physical method

Some of the most commonly used physical method was evaporation-condensation and laser ablation. Using the evaporation-condensation method different metal nanoparticles such as silver, gold, bismuth, stannous, lead sulfide and cadmium sulfide have been synthesized [8].

Chemical method

Chemical methods have been widely used for the synthesis of Ag-NPs.Chemical methods provide an easy way to synthesize silver nanoparticles in solution by reducing silver nitrate with ethylene glycol in the presence of polyvinylpyrrolidone (PVP), the process is called as polyol process [8].

Biological method

Silver nanoparticles can be synthesized by green synthesis viz., by using bacteria,fungi and plants. Biological methods are helpful in synthesizing silver nanoparticles without the use of any harsh, toxic and expensive chemical substances [9].

Anticancer activity of silver nanoparticles

Although, many platina based drugs have been used for the treatment of cancer. Some of the platinum compound based drugs are toxic which cause side effects such as gastrointestinal and hematological toxicity [10]. Due to the drawbacks of platinum drugs scientists haverecently reported that silver nanoparticles enhance the chemotherapeutic efficacy against multi-drug resistant cancer cells [11].Therefore silver nanoparticles have good effect in treating different

types of cancer.

Table- 1 **Synthesis of silver nanoparticles from different plant source against various cancer cells are listed in the below table;**

SOURCE	TYPE OF CANCER CELLS
Nepetadeflersiana (Lamiaceae)	HeLa cells [12]
Rosa indica (petals)	HCT 15 [13]
Alternantherasessilis	Prostate cancer cell [14]
Murrayakoenigii	*HT 29 colon cancer cell* [15]
Sargassumvulgare	*myoblasticleukaemic HL 60 cell and HeLa cells* [16]
Oleachrysophylla & *Lavanduladentata* leaf extracts	Human colorectal cancer cell line HCT116 [17]
Punicagranatum leaf extract	human cervical cancer cells (HeLa) [18]

Ebtesam Al-Sheddi *et al* has studied and developed the silver nanoparticles from the plant extract *Nepetadeflersiana (Lamiaceae)* of aqueous extract and showed the anti cancer activity against HeLa cells. Kuppusamy *et al* thrivingly synthesized silver nanoparticles by using theethanolicextract of rose (*Rosaindica*) petals foranticancer activity against human colon adenocarcinoma cancer cell line (HCT 15).Jannathul *et al* synthesized silver nanoparticles from *Alternantherasessilis*which showed its activity against prostate cancer cells. Kadheeja*et al* bio-synthesised silver nanoparticles from *Murrayakoenigii, which examined its anticancer activity against the HT 29 colon cancer cell line.Using silver nanoparticles* Govindaraju *et al* has reported *Sargassum vulgare of alginate extract showed the potential against cancer activity in human myoblasticleukaemic HL 60 cell and HeLa cells.*Noha Moslah *et al* studied anticancer activity by synthesized silver nanoparticles in the leaf extracts of *Oleachrysophylla* & *Lavandula dentate* which can be used as the cancer drug.Sonia *et al*using the silver nanoparticle has described the capacity of reducing the cell viability percentage of HeLa cell line from the aqueous leaf extract of *Punicagranatum.*

2. CONCLUSION

Silver nanoparticles are less toxic in nature and it can be used to treat different kinds of cancer cells.The unique morphological characteristics of silver nanoparticles may help toovercome the barrier and diseased target cells. In future silver nanoparticles can be used as eco-friendly, in a safer manner to treat the threatening disease more conveniently.

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