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A Review on Role of Biotechnology on conservation of Biodiversity

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ABSTRACT

Biodiversity refers to the variety of flora and fauna in a given region on earth as a whole. The greater the variety of flora and fauna, the better it is for the survival of different species. This is because it helps in the process of food chain. It is the degree of variations of life forms and considered at three main levels including species diversity, genetic diversity and ecosystem diversity. The advancement in technology and various other activities such as industrialization, deforestation, growing pollution, global warming and the ever growing population of human beings are some of the reasons for lowered biodiversity. We are losing numerous species of plants, animals, marine creatures, insects and other organisms each year. Biodiversity conservation is of global concern which requires a holistic approach. One of the tools used to enhance biodiversity is biotechnology. Biotechnological tools are proving valuable for effective and efficient conservation efforts of agricultural plant genetic resources and presently used for the conservation, evaluation, and utilization of biodiversity particularly for important crops. It covers a variety of techniques and applications that allow changes and improvements in living organisms to provide desirable products for man's use. It provides new options for collection, multiplication and short- to long-term conservation of biodiversity, using *in vitro* culture techniques. Biotechnology including tissue culture, establishment of DNA banks, cryopreservation, micropropagation, somatic embryogenesis, conventional breeding, transgenic crops, and genomics, are all quite useful for conserving and propagating biodiversity in many unique ways.

Keywords: Biotechnology; Biodiversity ; Conservation; invitro technique; Tissue culture; Cryopreservation; Transgenic crops; Somatic embryogenesis.

INTRODUCTION

Biodiversity alludes to the assortment of widely varied vegetation in a given locale on earth overall. The more noteworthy the assortment of greenery, the better it is for the endurance of various species. This is on the grounds that it helps during the time spent evolved way of life. It is the level of varieties of living things. It incorporates variety among creatures, plants, microorganisms, the hereditary variety among them and all their

perplexing collections of networks and biological systems. The term biodiversity' was first utilized by Dasmann in 1968. There are three degrees of biodiversity-hereditary, species and biological system assorted variety. Every one of the parts has its own organization, structure and capacity (Redford and Richter, 2001; Noss, 2005). Biodiversity gives the premise to environments and their administrations, whereupon all individuals in a general sense depended (Cardinale et al., 2012).

The headway in innovation and different exercises, for example, industrialization, deforestation, developing contamination, a worldwide temperature alteration and the consistently developing populace of individuals are a portion of the explanations behind brought down biodiversity (Opdam & Wascher 2004). We are losing various types of plants, creatures, marine animals, creepy crawlies and different life forms every year. As indicated by the Food and Agriculture Organization of the United Nations (FAO), it is assessed that three-quarter of the hereditary assorted variety in agrarian yields have been lost in the course of the only remaining century because of different reasons, for example, mix of various farming creation frameworks and globalization. Losing the species or assorted variety inside the species is disadvantageous since we may lose the qualities that are critical for biotic/abiotic stress obstruction, improving harvests and adjustment to evolving atmosphere. For handling of evolved way of life, nourishing requirements, cleaner air, better development of harvests, for clinical reasons we have to ration biodiversity. One of the devices used to improve biodiversity is biotechnology. Biotechnology covers an assortment of procedures and applications that permit changes and upgrades in living life forms to give attractive items to man's utilization. Biotechnology is by and by utilized for the protection, assessment, and use of biodiversity especially for significant yields. According to the UN Convention on Biological Diversity, Article 2, biotechnology is "any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use". Advances made in plant biotechnology especially in areas of tissue culture and molecular biology are proving valuable in characterization, evaluation, utilization and conservation of biodiversity. A few biotechnological approaches are significant elements to preserve, break down and distinguish hereditary assorted variety of uncommon and jeopardized plants, for example, unique atomic marker methods beginning from biochemical, physiological and DNA based markers (Khan et al., 2012). Use of biotechnology (especially hereditary building) to improve the yield plants, restorative plants, domesticated animals, and microorganisms and to get new items from different natural frameworks is a quickly developing part. This segment is required to contribute up to half of the world economy in not so distant future. The boss and basic crude material for biotechnology is the differentiated living world which comprises the biodiversity. The current survey will examine the worldwide effect of biodiversity, and utilization of biotechnology to monitor, keep up and improve biodiversity.

Conservation of biodiversity

Biodiversity preservation is of worldwide concern which requires an all encompassing methodology. Perceiving the need of protection of biodiversity, the United Nations arranged Convention on Biodiversity (CBD) and embraced it in 1992. The CBD is an exhaustive way to deal with biodiversity protection of both wild and trained species. It focuses on preservation at the hereditary, species and biological system levels.

Applications of biotechnology for conservation of biodiversity

Despite the fact that it is for the most part accepted that biotechnology effectsly affects biodiversity, however in truth biotechnology offers new methods for improving biodiversity. As indicated by the rules of International Union for Conservation of Nature, both in situ and ex situ strategies are notable and applied for the preservation. In situ preservation technique is the most significant strategy, as it is normal and absolutely relies upon the plants in their living structures in their characteristic living space and permitting regular advancement (Ashmore et al., 2011). So, in situ protection includes the upkeep and security of common territories, while ex situ preservation includes the protection or proliferation of an animal types assortment, clone or hereditary material of plant species either in greenhouse, or during the time spent seed banks or utilizing some semi-characteristic natural surroundings condition. Being a normally received procedure of preservation, in situ protection confronted a few issues because of limited and divided living space, environmental change, impractical

utilization of plant assets, assault of pathogenic life forms and obtrusive species in regular habitat while ex situ strategy is increasingly successful and progressively logical in light of its method for protection which is manageable with rules, guideline and embraced system in counterfeit way (Al-Eisawi 2003; Reed et al., 2011). It is currently perceived that ex situ procedures can be productively used to supplement in situ strategies, and they may speak to the main alternative for moderating certain exceptionally imperiled and uncommon species (Ramsay et al., 2000).

Micropropagation

Tissue subculture strategies are of exceptional interest for the collection, multiplication and storage of plant germplasm (Bunn et al., 2007). Such techniques permit propagating plant fabric with high multiplication rates in an aseptic surroundings. Micropropagation refers to in vitro mass manufacturing of plant propagules from any plant part or cellular. It assists within the fast, season impartial, continuous propagation, maintenance and garage of uncommon and endangered plants by way of the use of any plant components as explant supply (Sarasan et al., 2006; Chandra et al., 2010). Such propagules are used to elevate entire plant life. Through micropropagation, elite clonal cloth can be very hastily elevated.

Somatic Embryogenesis and Organogenesis

The development of somatic embryo by means of the differentiation of a single somatic cell or tissue to regenerate big variety of vegetation on the same time is very typically used technique of somatic embryogenesis in plant tissue subculture. Somatic embryogenesis and organ development through organogenesis from various tradition of explants are the maximum commonly used technique implemented to regenerate several endangered vegetation for the reason of conservation (Sadeq et al., 2014 a). Culture of explant in appropriate way of life media facilitates to regenerate whole plants both through following direct or indirect way of somatic embryogenesis. In case of direct manner of somatic embryogenesis, plant life immediately increase from explants without any intervening step of callus induction (mass of unorganized cells) and dedifferentiation of callus in the direction of prepared boom of plant life as found in oblique manner of somatic embryogenesis.

Induction of somatic embryos from the classy explants in specialised lifestyle media and their germination into complete plantlet following several steps wherein extraordinary plant growth regulators play essential function (Sadeq et al. , 2014b).

Genetically modified crops

The use of GM crops can positively impact agricultural species biodiversity if the GM crops enable the management of weeds and insect pests in a more specific way than chemical herbicides and pesticides. In particular, the adoption of insect-resistant Bt crops, expressing highly specific Bt proteins, represents an opportunity to replace broad-spectrum insecticides use.

Cryopreservation

Cryopreservation is one of the biotechnological approach of ex situ plant conservation and applicable for long term storage of plant genetic fabric. Cryopreservation is extremely useful method to preserve rare, endangered, threatened plant species (Dussert et al., 1997; Zhao et al., 2008; Paunescu, 2009). Cryopreservation is the preservation of dwelling cells, tissues organs and microorganisms at ultralow temperature (normally that of liquid nitrogen, −196 °C). Under cryogenic storage, the organic material can be conserved for prolonged intervals, because at liquid nitrogen temperature, all metabolic activity and cell divisions are stopped and cells will no longer go through genetic adjustments in the course of garage, which can also arise when they are maintained by serial subculturing. Furthermore, cryopreserved cells are stored in a small extent, requiring very limited maintenance.

Molecular marker

DNA-primarily based molecular markers were used extensively for a wide range of applications in food crops and horticultural plant life. These packages consist of study of genetic variation, cultivar identity, cross-breeding research, identification of disease-resistant genes, identity of quantitative-trait loci, variety evaluation of distinctive germplasms, intercourse identification of dioeceous vegetation, phylogenetic evaluation, and so forth. Recently, the application of DNA-based molecular markers is being explored within the field of nutraceuticals (Wang, et al., 2001 and Tusa et al., 2002).

Plant Tissue culture

Plant tissue culture (PTC) is a very powerful method of cloning of plant material and to increase sickness-loose clean plant inventory. It is a quick, season unbiased and efficient in vitro approach to propagate plants beneath sterile micro surroundings. Different strategies in PTC can also offer sure advantages over conventional techniques of propagation for assembly, proliferation, protection and garage of plant genetic sources (Bunn et al., 2007). Tissue culture techniques can be applied in germplasm conservation of important plants species of economic and medicinal values. It can be applied for regenerating different clean disease-free stock of plants in the field of agriculture, horticulture, floriculture and pharmaceutical industry (Fischer et al., 2004). It is also used to preserve somatic embryos which can be applied in the medium and long-term conservation process.

Transgenic farm animals

Creation of transgenic harvests and creatures is another utilization of biotechnology in biodiversity preservation. Transgenic crops are bound to increment agriculture biodiversity and help keep up local biodiversity as opposed to jeopardize it. Such yields may end up being exceptionally helpful to the ranchers and can be of business esteem.

Invitro Production of embroys

In vitro undeveloped organism creation is another route in biodiversity preservation. Techniques utilized in the creation of incipient organisms in vitro incorporate parting and cloning of undeveloped organisms, marker-helped determination, sexing of undeveloped organisms and move of new qualities into an undeveloped organism. Incipient organism Culture and Transfer strategy is utilized to bring treated undeveloped organisms into substitute mothers. Sometimes firmly related species can be utilized to create the posterity of an imperiled species.

DNA banks

DNA banking is used to conserve genetic material, especially that of organisms that face extinction. It can be used to compare and analyze DNA samples. The National Institute of Agrobiological Sciences (NIAS) DNA Bank, for example, collects the DNA of agricultural organisms, such as rice and fish, for scientific research. Most DNA provided by DNA banks is used for studies to attempt to develop more productive or more environmentally friendly agricultural species. Some DNA banks also store the DNA of rare or endangered species to ensure their survival.

Seed Banks

Seed banks are the most efficient and effective method of ex situ conservation for the majority of endangered species. In seed banks, genetic fingerprints are used to establish the origin of a seed or the relatedness of one plant variety to another.

CONCLUSION

Biodiversity is the very premise of human endurance and monetary turn of events. Consistently expanding loss of biodiversity has represented a genuine danger to the endurance of humankind. The survey presents the utilization of biotechniques procedure to look after biodiversity. Biotechnology speaks to an apparatus for upgrading hereditary decent variety in crop species through the presentation of novel qualities. This doesn't focus on the single transgene embedded, however depends on the way that helpful characters would now be able to be embedded in an assortment of harvests that have been disregarded due to the impediments of customary rearing techniques, which neglected to improve the qualities (Slabbert, 2004; Gressel, 2004). A wide scope of biotech items have demonstrated that biotechnology has been exceptionally beneficial for ranchers and the general public particularly in the fields of agribusiness and medication. Biotechnology applications offer chances to make significant advances in our insight into the assorted variety of the absolute most significant yields (Taylor and Francis, 1999).

Conflict of interest

The author declares that there is no conflict of interest.

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