Nano fertilizers and their bioapplications: Mini Review of the literature
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Abstract

Monthapiperita L. An evergreen herb plant with a pungent aroma and belongs to the Umbelliferae family. The mint is 30 to 90 cm long and the wide stems are scattered with fibrous roots. The leaves are characterized by a sharp tip, serrated edges and red veins. They may be slightly iridescent, 9 cm long and 1.5-4 cm wide. The stem is green and the leaves are arranged in pairs opposite and covered with thin hair from one side and the color ranges from dark green to purple and blue and sometimes light yellow and blue flowers and grouped in clusters and other side. Nano fertilizers are the science that deals with matter at the scale of 1 billionth of a meter and are also the study of manipulating matter at the atomic and molecular scale. Recently particulate systems have been used as a physical approach to alter and improve the quality of human life.

Key words: plant, nano fertilizers, materials, health, molecular

Introduction

The plant’s need for nutrients causes disruption in many metabolic and physiological processes within the plant as it plays a major role in plants evolution (Aziz et al., 2010). Nano fertilizers are the best in this field because they have unique properties. Carbon-based nanoparticles and metals-based are the most common in terms of use and study (Prasad et al., 2012). Nanomaterials are those that have at least one dimension and are less than 100 nanometers. The transformation of materials into the nanoscale will change their physical, chemical, biological and catalytic activities. The surface area of most nanoscale materials increases their chemical activities and show new properties in nanoparticles such as: increased solubility and chemical functions and the ability to penetrate the cell membrane, as nanoparticles are easily absorbed by the plant and more efficiently than conventional chemical fertilizers (Aziz et al., 2010)

Nanotechnology is a new scientific approach involving the use of materials and tools capable of manipulating the physical and chemical properties of matter at molecular levels (Fakruddin et al.,...
At present, nanotechnology is gradually being moved away from experimental in practical fields (Baruah and Dutta, 2009). For example, the development of slow emancipated / controlled fertilizers, pesticides and herbicides on the basis of nanotechnology is critical to stimulating the development of environmentally friendly and sustainable agriculture. In fact, nanotechnology has provided the means to exploit nanostructures or nanostructured materials, Fertilizer carriers or release vectors, or controlled release to build so-called "Smart Fertilizer" as new means to improve nutrient efficiency by plant and reduce environmental protection costs (Manjunatha et al., 2016).

Nanoparticles (NPs) are generally acceptable as substances with at least two dimensions between 1 - 100 nm (Ball, 2002). Nanoparticles are located in a transition zone between individual molecules and materials of corresponding size, so they have unique characteristics that are distinct from their molecular or cumulative or large counterparts (Singha et al., 2015). The unique properties of nanoparticles include a very large surface area, high surface energy, and quantitative quantum confinement. Nanomaterials are characterized by their high hardness and their large surface size and the presence of large numbers of atoms on their outer surface that increase their hardness and resistance to stress, as well as having a lower degree of fusion than they do in their natural state (Nel et al., 2006).

In general, nanotechnology is part of new technologies that are still in their early stages of development, and the main difference between them and other technologies is the size of the materials and structures used In this technology, if the difference in this technology is to be with other technologies, the basic elements can be mentioned as an important criterion, but the area of nanoparticle use is very diverse. Nano-powders are a mixture of particles with dimensions ranging from 1 to 10 nm.

Nanotechnology has the potential to increase food quality, raise global food production, protect plants, detect plant and animal diseases, and monitor plant growth and waste reduction for "sustainable amplification" (Khan and Rizvi, 2017).

The applications of nanotechnology in agriculture also include fertilizers to increase plant and plant growth and sensors to monitor soil quality and pesticides for pest and disease management. The aim of using nanomaterials (NMs) in agriculture is to improve the efficiency and sustainability of agricultural practices by developing fewer inputs and generating less waste In comparison to traditional products and approaches, fertilizers are vital for plant growth and development. Most of the added fertilizers remain unavailable to plants due to several factors such as Leaching and Degradation by hydrolysis, solubility and decomposition. The addition of traditional fertilizers at a high and long-term rate in agriculture has caused major environmental issues around the world (Conley et al., 2009). From the perspective of sustainable agriculture, the application of modern nanotechnology in agriculture is an important factor for significantly improving crop productivity (Lal, 2008).

Nanofertilizers are known as nanomaterials that can provide nutrients to plants or help to increase the activity of traditional fertilizers without direct contact with crops. These materials have unique properties of very small size ranging from 8 μm to 10 nm, Traditional physical and chemical laws (Das
et al., 2004; DeRosa et al., 2010). Nano-encapsulated nutrients are characterized by effective release properties of nutrients and chemical fertilizers based on their need to regulate plant growth and promote target activity (Nair et al., 2010). Also, engineered nanoparticles (ENPs) are able to enter plant cells and leaves, and can also transfer DNA and chemicals in plant cells (Galbraith et al., 2007; Torney et al., 2007). This area of research provides a biotechnology platform for targeting gene manipulation and expression in specific plant cells. In light of this, different research is being carried out on the delivery of targeted drugs for the diagnosis of communicable diseases on both plants and animals. Research in the field of nanotechnology requires discovery New applications for the precise distribution of chemicals, proteins and nucleotides as a result of the genetic transformation of crops (Scrnis and Lyons, 2007).

References


