Tri –revolutionary Nanotechnology
In The Hands Of Humanity

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ABSTRACT

Nanotechnology is now becoming a developing field of sciences with the help of technology. It proves itself a ground breaker stream, and indicates its positive impact on different fields of all three revolutions i.e. agriculture, marines & milk. By this technology we can reduce the adverse impact or circumstances in all the three phases.

2010 report regarding to Nanotechnologies and nanosciences, defines it as "the study of phenomenon and processes at molecular & nano level , which shows the difference in properties at mass scale'' .

By the understanding of nano techniques and nano sciences with the tri-revolutionary manipulations in all the three green, blue & white phases, which shows & proves rapid development of all sectors with the simultaneous increment in R & D.

Keywords: Nanotechnology, Impacts, Agriculture, Dairy, Marine

1. Introduction

In the field of nanotechnology regarding to the green, blue & white sectors some potential applications are enhanced recently and the unique feature about this is the production of desired product as in supports of sustainable development.

About 20 of the countries, viz.: united states , china along with India , now initiates the National Nanotechnology Programs which results in the per annum collective investment about $4 billion at globally as discussed in (Fig. 1).

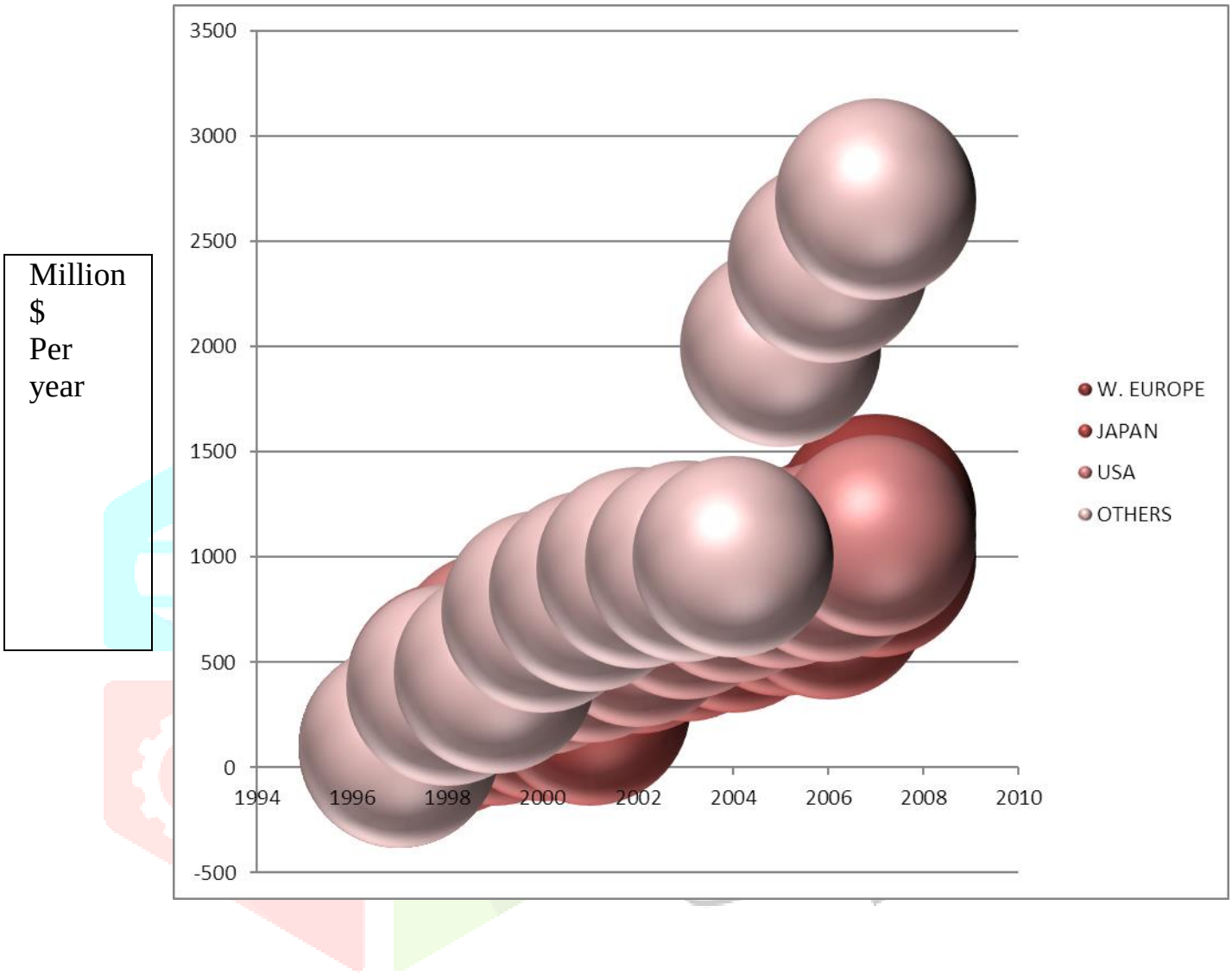

Figure 1. Investment in nanotechnology by governments between (1997---2005) (~estimation)

2. Green Nanotechnology

It refers to the agricultural nanotechnology (Fig. 2) with many inputs for monitoring as well as curing the green phase.

2.1. Agricultural's severity

Sustainable severity & intensification is a concept which leads the production of agricultural crops with the primarily aim of yield without any environmental damage [1].

It can improve the yield by,

- Using nanopesticides and nanofertilizers.

- Improvement in the quality of soil by the nanozeolites and hydro gels.
- Enhancement of plants growth using nanomaterials (SIO_2,TIO_2) [10].
- Nanosensors' monitoring.

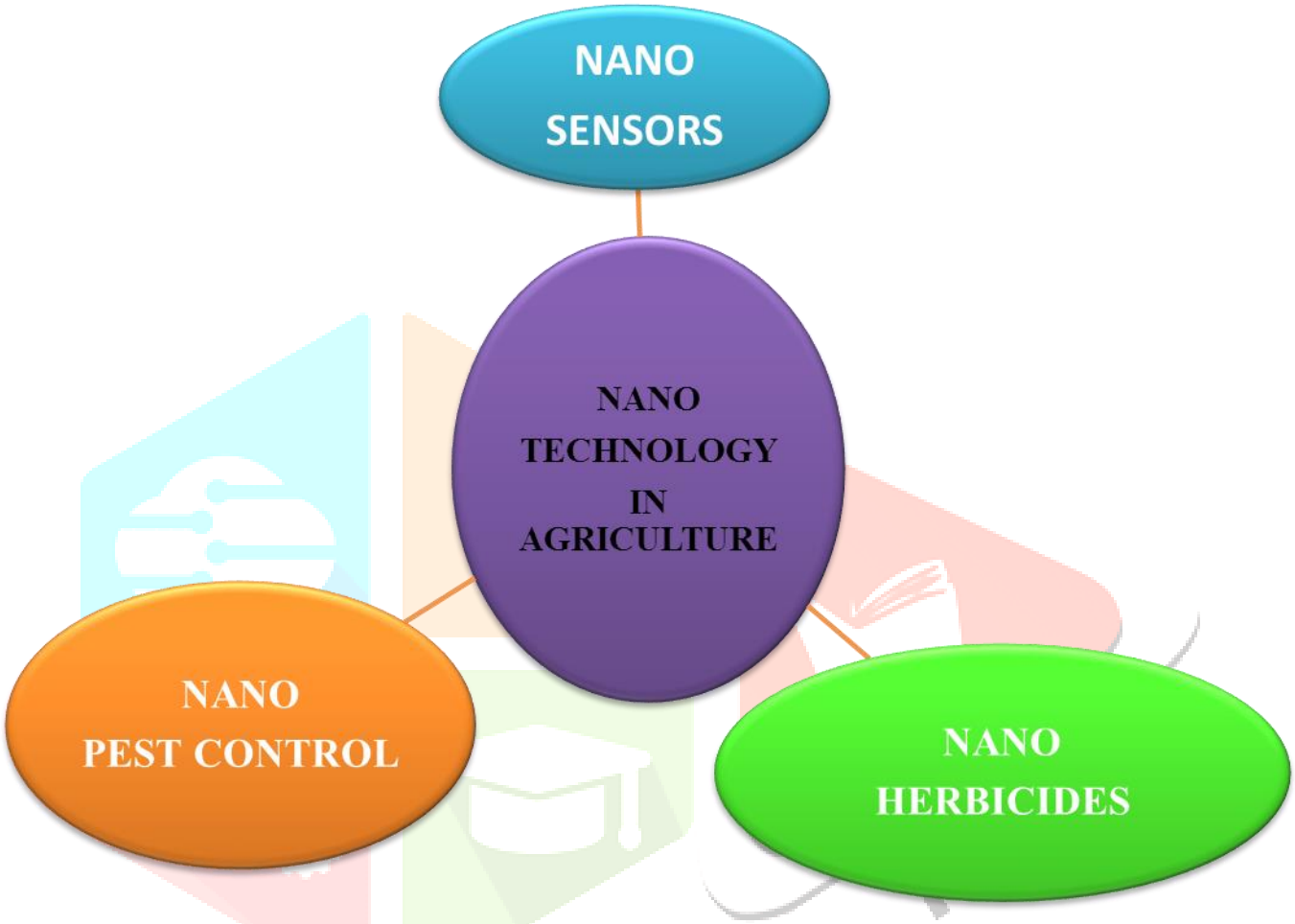

Figure 2. Green nanotechnology's concepts

2.2. Improvement in soil quality

For the purpose of increasing the water holding capacity of soil, different nanotech solutions or sensors are used i.e. hydro gels, nanoclays, nanozeolites [9].

They work by minimizing the loss of water which reduces the water shortage and doesn't affect yield.

2.3. Weed management with nanoherbicides

Green phase has 1/3 of the Indian agricultural area . During or after summer season they depend upon rain farming only, on which limited amount of herbicides are used. Markets have the availability of different types of herbicides which are only designed to kill the weeds by acting on the surface level.

With the help of Nanotechnology it becomes easy to produce the herbicide molecules which are target specific (Table 1). They can be produced with the combination of nanoparticles which have the ability to bind with specific receptors present on rhizogenic area of target weeds.

1. Micromolecules used for weed control.

S.NO	NANOMOLECULES	WEEDS
1	Ag , Cu , Mn	Allium cepa
2	CuO , ZnO	Cacumis sativas

2.4. Nanotech in pest control

Nanoencapsulation is one of the most useful method in order to control or lower down the pest level or population in plants. The ancient pests which are used for the control have the limitation of producing pest threat to environment.

So for vanishing the adverse condition of ancient pest control techniques, new approach is introduced which is Nanoencapsulation (Table 2)[11].

It contains the nano sized particles of active ingredients which are sealed within the sac walled structure.

2. Nanoparticles used against plant pathogen

TYPES	NANOFERTILIZERS	ACTION AGAINST PATHOGEN
Plant growth promoting	Ag , TiO2	Lactobacillus strains (Bacteria)
	Ag	Aspergillus strains (Fungi)

3. White Nanotechnology

It refers to the dairy as well as packaged products.

3.1.Food packaging with nanotech The use of material which is composed of nanoparticles which act as an improvement in physical as well as chemical packaging of food [2].

They have the capability to strengthen the barriers quality, antimicrobial activity and temperature tolerance [5].

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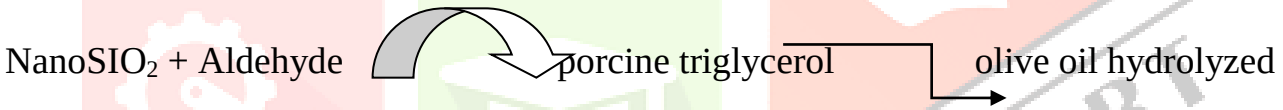
3.2. Nanotechnology in food processing

In food processing i.e. to maintain the flavor quality, nutrient quality of product, enzymes are used which have to be immobilized first with the help of nanoparticles.

The nano SIO_2 combine with aldehyde and bind covalently with porcine triglycerols and hydrolyze olive oil and help in adaptability, reusability & stability.



3.3. Improve nanoceuticals

The improvement in nanoceuticals goes simultaneously with the improvement in nanotechnology.

The food supplement containing the nanoceuticals are now available in the market .

In order to improve the bioavailability of fruit drinks, carotenoid coated nanoparticles are mixed in water [3, 8].

3.4.Nanosensors

Nanoparticles containing the nanosensors are designed to track the internal as well as external environment of food product [7]. It can monitor the temperature, humidity with regards to the time.

4.Blue Nanotechnology

It refers to the concept of nanotechnology in marine phase (Fig. 3).

4.1. Nanosensor in marine

For the monitoring of trimethylamine (TMA), dimethylamine (DMA) in sea foods, nanosensors are produced which are based on optical fiber (OF) detection [6].

It is an analytical performance based method which proves to be superior over classical methods like chromatography[4].

4.2. Nanotech emulsion

It is the widely used class of emulsion that forms the disinfectants by adding the liquid phase water into the aqueous phase with ultra shear forces.

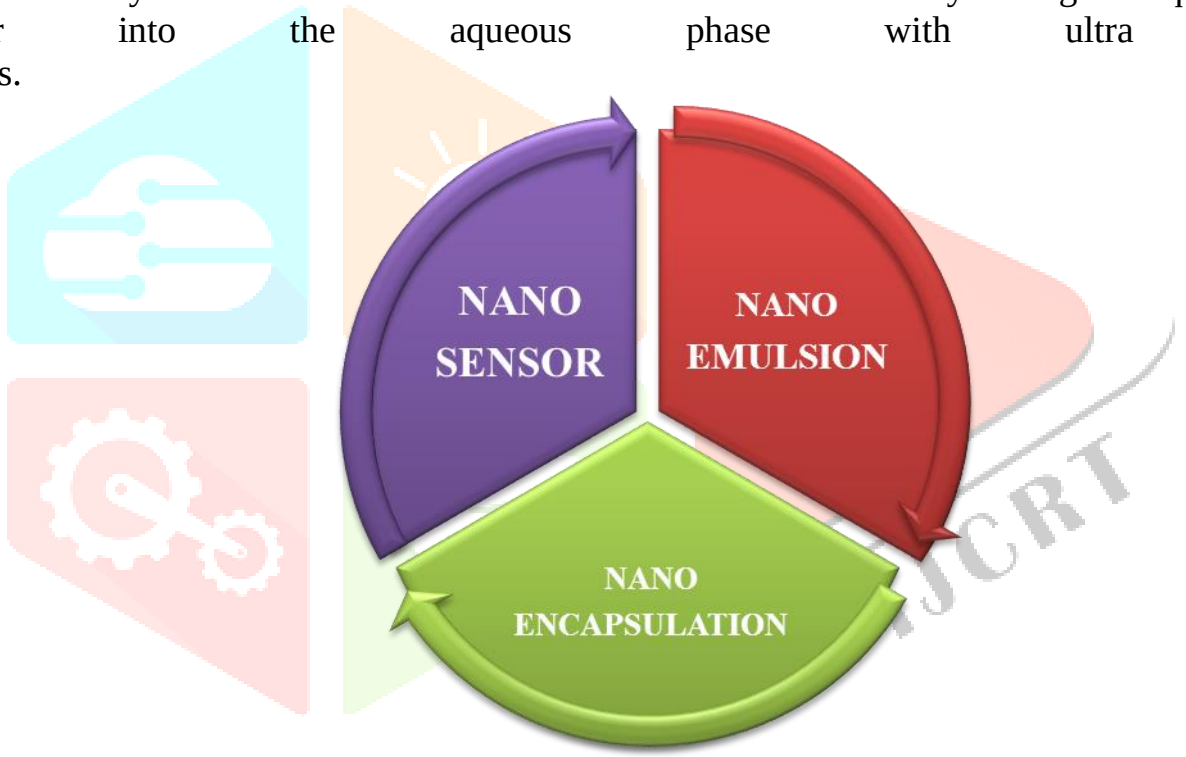


Figure 3. Blue nanotechnology's concepts

4.3. Nanoencapsulation

It consists of the type of system in which the bioactive molecules are present inside the space of vesicle containing the innermost core which is filled by liquid and surrounded by polymer membrane .

5. Conclusion.

Nanotechnology can contribute in enhancing agricultural, industrial and food productivity in sustainable manner, using nanotech inputs more efficiently, and reducing byproducts that can harm the environment and human health.

There is an urgent need to conduct public debate on agriculture, food as well as industrial nanotech sectors.

Hopefully by this new era with new, advance and environment friendly future ,we will process the basic aim i.e. the development of humanity.

6. Impacts of nanotechnology

It shows the overall impact of nanotechnology in all the three phases (Fig. 4).

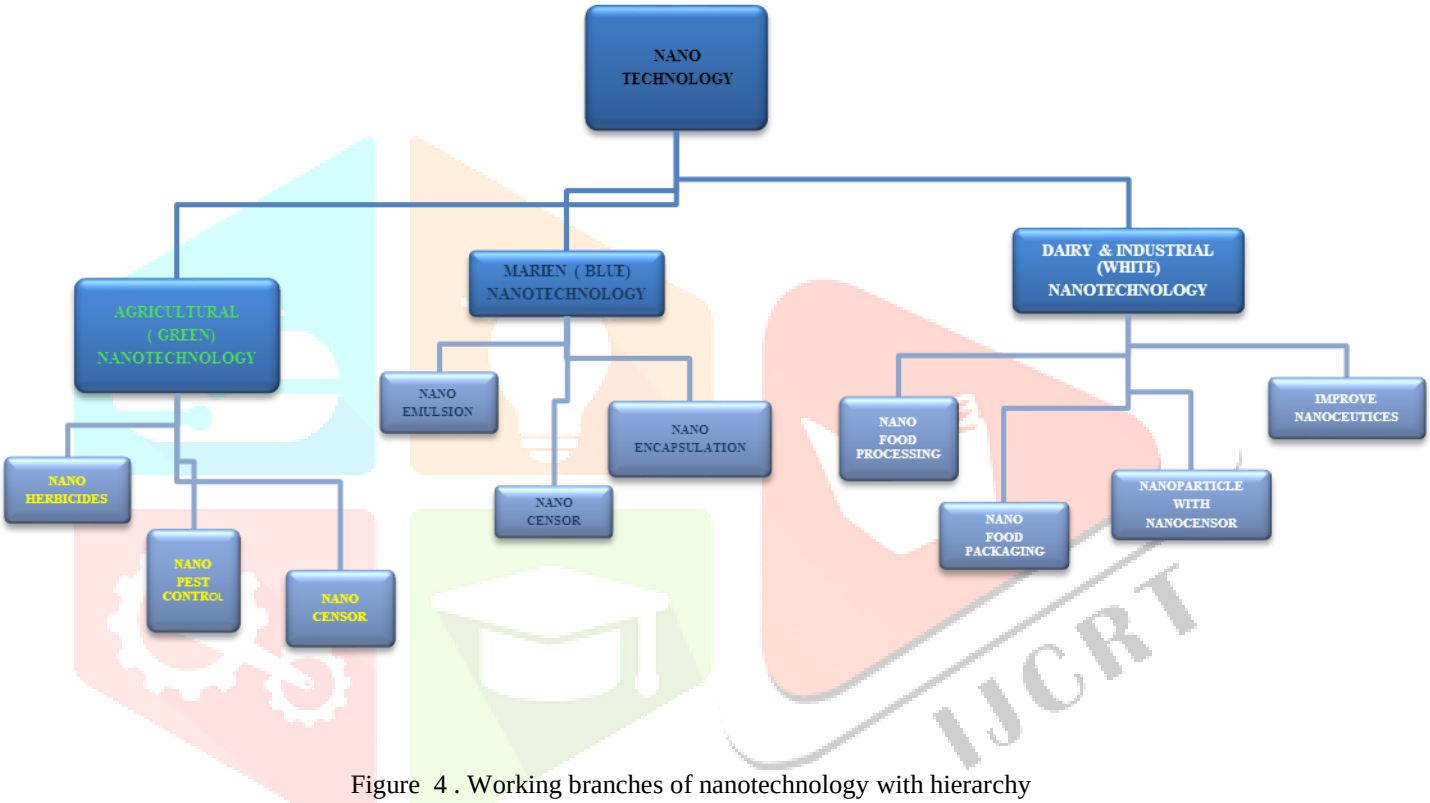


Figure 4 . Working branches of nanotechnology with hierarchy

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