



Co-funded by the
Erasmus+ Programme
of the European Union



THE UNIVERSITY OF TRIPOLI

WP4 Program

Work Package 4: Presentation of the Project “Preparation of Some Metal Nanoparticles Using Caper Plant”

3/1/2024

Submitted by

Dr. Ragiab Ali Issa

Mr. Ezzodeen M Bashloo

Mr. Abubaker Amer Attroug





Nanomaterials have a wide range of applications:

- 
- **Biotechnology** - Medicines – Developing technology to treat cancer (especially breast cancer)
 - **physics** - Developing super computer
 - **Electronics** - developing conductors and semi-conductors
 - **Agriculture** - nano-formulations of agrochemicals for applying pesticides and fertilizers for crop improvement.
 - **chemistry** - Getting a single molecule or a very small collection of molecules to serve as circuits, capacitors, resistors and magnets.

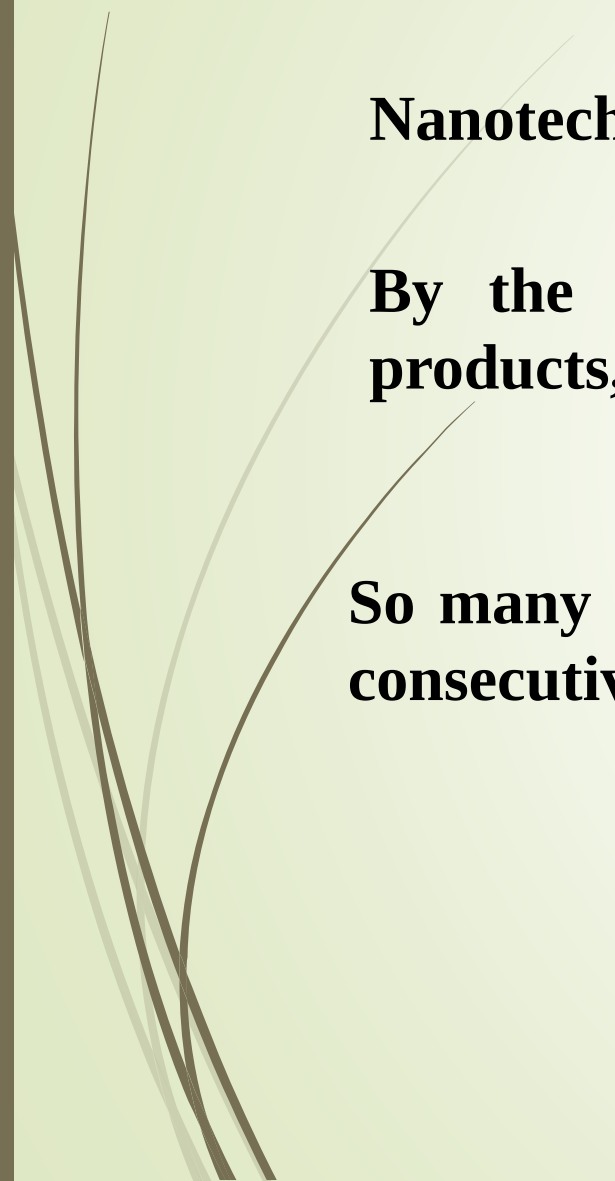


How old is nanotechnology?

Nanotechnology has been introduced first by Feynman in 1959

By the end of 2013, There were about 1700 nanotechnology products, especially in medicine and agriculture

So many researches for a different application have been conducted consecutively.





Terminology

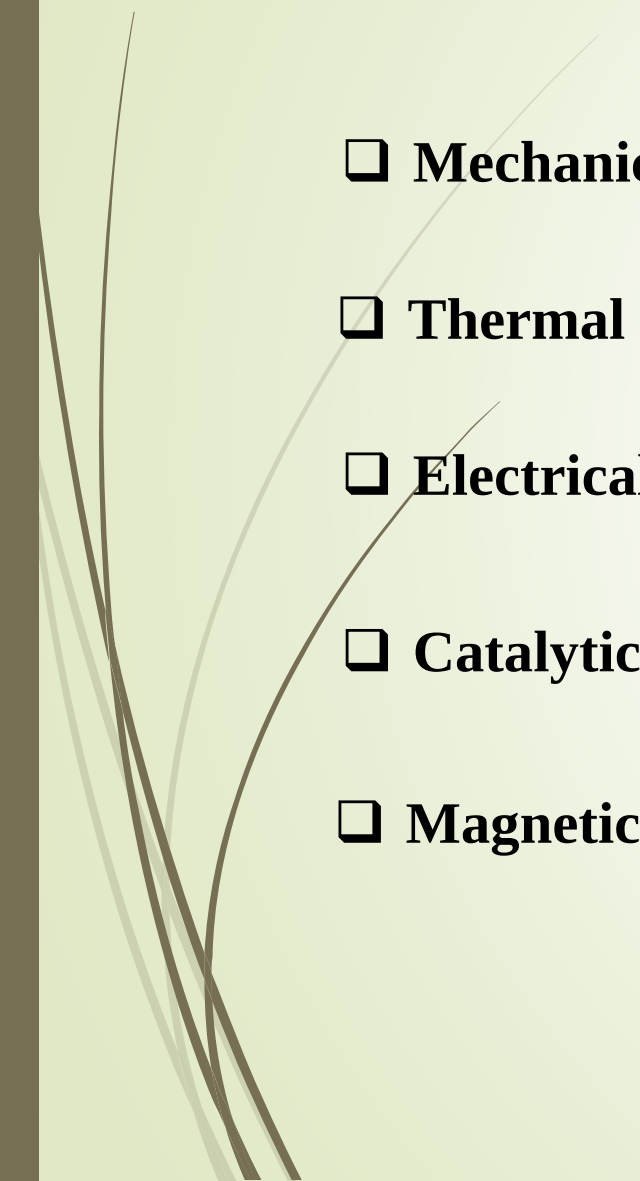
Nanoparticles are microscopic materials that possess a particle size in the range of **1-100nm**.

Green Chemistry: The use of less hazardous, eco-friendly substances in the design and synthesis of nanoparticles such as bacteria, yeasts and plants.



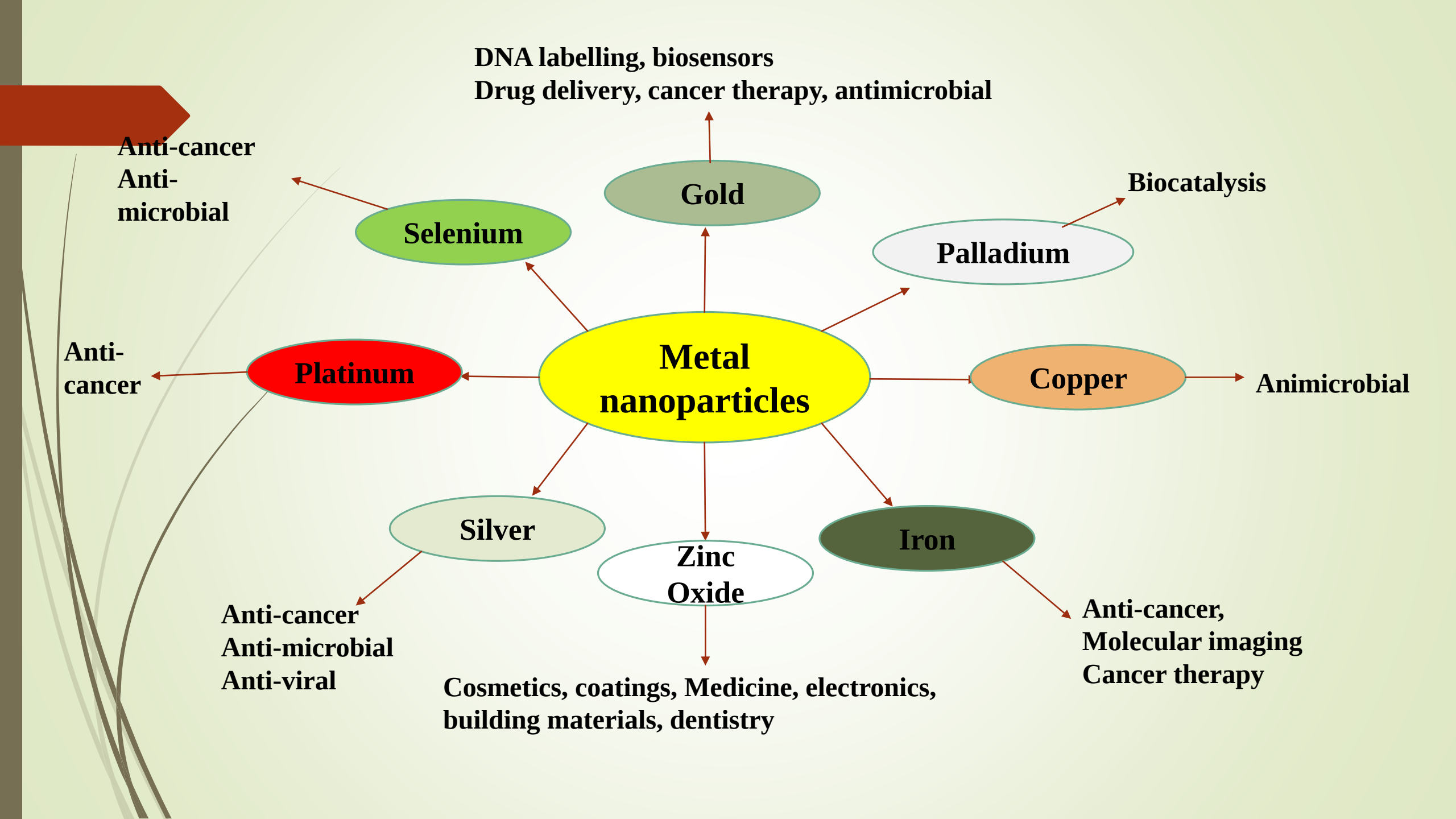


Advantages of nanoparticles Properties

- ☐ **Mechanical strength**
 - ☐ **Thermal stability**
 - ☐ **Electrical conductivity**
 - ☐ **Catalytic activity**
 - ☐ **Magnetic properties**
- 

APPLICATION OF NANOPARTICLES





Nanoparticle synthesis

```
graph TD; A[Nanoparticle synthesis] --> B(Physical Methods); A --> C(Chemical Methods); A --> D(); B --- B1[Grinding system, Ultrasonication, laser ablation, irradiation...etc]; C --- C1[Simple, low temperature, use of toxic reducing and stabilizing agents.]; D --- D1[Easy, efficient, less energy, eliminates the use of toxic chemicals, produce safer products and by products.];
```

Grinding system,
Ultrasonication, laser
ablation,
irradiation...etc

Physical Methods

Time and energy
consuming (high
T and P)

Chemical vapour
deposition, chemical
reduction,
solvothermal , sol-gel

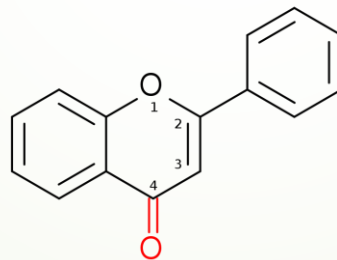
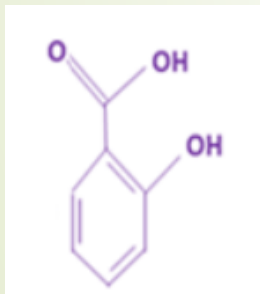
Chemical Methods

Simple, low temperature, use of
toxic reducing and stabilizing
agents.

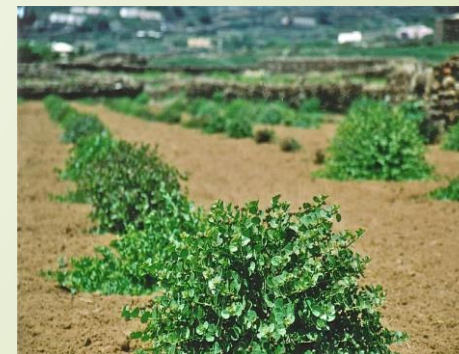
Easy, efficient, less energy,
eliminates the use of toxic
chemicals, produce safer
products and by products.

Why capers plant?

- Caper is a **Mediterranean wild plant**, and naturally grows in many countries like Italy Spain, Algeria, Tunis Morocco and Libya etc
- It can easily have cultivated in farms and grows in numerous types of soil.
- Caper plant contains a lot of compounds such as proteins, phenols and flavonoids ...etc



- These components and others may can help to reduce metal salts to nanoparticle elements or oxide.



Instrumentation Required

- ✓ **Modern UV-Visible spectrophotometer, complete with computer and operating software.**
- ✓ **FT-IR spectrophotometer, complete with computer, operating software and library.**
- ✓ **Benchtop pH-mV Meter, 0 to 14 pH Range, +/- 0.02 pH Accuracy, 0.01 Resolution.**
- ✓ **Scanning Electron Microscope (SEM) and or Transmission Electron Microscope (TEM)**
- ✓ **Ordinary laboratory consumables and chemicals**

Project time table

Project states	Months				
	1	2	3	4	5
Literature survey					
Sample collection					
sample preparations					
sample analysis and characterization					
Writing the report					

Estimated budget

S. N	ITEMS	AMOUNT (euro)
1	Instruments and equipments	29,150
2	Consumables	785
3	Researcher financial reward	11,250
	TOTAL	41,185

Enjoy Pizza with capers

