

## The Impact of Magnesium, Copper Nanoparticles at A Concentration of (2-1) Mg/Liter on Main and Secondary Metabolic Components of Three *Cichorium Intybus* Cultivars

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### Abstract.

On April 11th, 2021, three types of *Cichorium intybus* were planted after being sprayed with nanoparticles at two doses (2-1) mg/litre. While the rate of interactions between three cultivars of *Cichorium intybus* recorded the most significant value, the wild cultivar treated with nanoparticles at a concentration of (2 mg/L) amounted to (15–15) amino acids attained the highest value (173.58). While the interaction rate between *Cichorium intybus* plant varieties was recorded at the highest value in the American variety treated with magnesium nanoparticles at a concentration of (1 mg/litre), which reached (34-4) enzyme, the red variety reached (225.94) for catalase enzyme, where the highest value was recorded (1.03). Peroxidase (POD) had the most significant value (0.506), and the red variety of *Cichorium intybus* plants treated with copper nanoparticles at a dosage of (2 mg/L) had the highest interaction rate among cultivars (0.665).

**Keywords.** *Cichorium intybus*, Magnesium, Copper nanoparticles.

### 1. Introduction

*Cichorium intybus* is a plant that can either be biennial or perennial and is a member of the composable family of the Asteraceae. It is very resistant to the cold and typically grows to a height of between 20 and 150 centimeters, forms a long and strong wedge root, has a long stem, thick brown tapio root, and the stem and vein are usually green. *Cichorium intybus* may grow with long, empty, ribbed stems that are high and rigid and have few leaves even if they occasionally take on a red ring. This is despite the fact that they can sometimes take on a red ring [1]. The buds are branching and rigid, and the leaves are a cintybus green color. They are organized in the form of a rosette and vary in length from 10 to 25 centimeters. The leaves may be

elliptical, narrow, oblong, or lanceolate, and they are typically main, pinnate, or serrated [2-4].

There are many distinct chemical compounds present in the many morphological components of the dandelion plant, including the roots, stems, flowers, and leaves. It was discovered that the methcholi extract of Cintybus had a significant amount of cichoric acid as its primary constituent. Dandelion roots include trace amounts of glycoside, ranging from 0.001-0.02 percent. There is no starch in dandelion seeds, but they contain between (0.1 and 2.0 percent) of this chemical, 9 to 15 percent of reducing sugars, and between (40 and 60 percent) of inulin (which acts as a storehouse of plant energy). It should also be noted that intybinenei contains between (0.1 and 2.0

percent). It is a component that is often found in coffee alternatives, pectin, vitamins B and C, and dandelion leaves contain A, B, phytochemicals, and other substances [5].

The dandelion plant, which is a member of the family Asteraceae, is widely regarded as one of the most significant medicinal herbs in the plant kingdom. The several Cinybw extracts all shown a diverse array of biological and pharmacological capabilities, including antihyperuricemia, anti-inflammatory, anti-diabetic, anti-blood, and antioxidant activities [2,4,6,7,8].

Fertilizers frequently decay soil fertility and the decreasing harvest efficiency because of supplement irregularity in the soil, which has been perceived as a standout amongst the most imperative factors that limit crop yield. However, Mineral fertilizers also play an essential role in increasing the production of crops [9,10].

The term nanomaterials technology or micro-microtechnology comes from the Greek word nano, which may be translated as "dwarf" and also means "every small thing." The word nano derives its roots from the Greek word nano, which also means "dwarf." The study of the fundamental properties of molecules and substances whose dimensions do not exceed one hundred nanometers is the focus of nanoscience. As is currently known [11,12].

Nanomaterials are currently being used as nanotechnology provides new multidisciplinary windows in agricultural and food sciences and contributes to many agricultural research that can lead to new ways to solve many agricultural problems [13].

Where nanoparticles have other potential applications in the farming system such as the detection of pollutants, plant diseases, pests, and pathogens, especially in foliar fertilization or soil fertilization [14,15].

According to [16,17], nanoparticles have distinct physicochemical features and have the ability to increase plant metabolism [18]. Nanoparticles created via engineering may

cause interference in plant leaves and can also convey their nuclear and chemical features to the plants they infect. plant cells [19].

The contribution that nanoparticles play in the process of photosynthesis. We know that photosynthesis is an essential process for plants in diseases that change light energy into chemical energy, and we also know that plants convert only 2-4 percent of the energy available in radiation into the growth of a new plant. This information is important to keep in mind when discussing plant diseases [20]. These days, researchers are looking for ways to boost the specialized efficiency of plants with vascular systems. Scientists are working with Rubisco, an enzyme that plays an important role in photosynthesis, to catalyze the incorporation of carbon dioxide into biological compounds. This is being accomplished through the manipulation of divisions and genetic manipulations in order to speed up photosynthesis in turbocharged plants and crops.

## 2. Material and Method

The experiment was carried out in the field in Iraq during the agricultural season of 2021-2022. On April 11, 2021, the proportion was planted in saddles using mixed soil at the location. On November 14th, 2021, it was noticed that a plant has begun its growing process. Following the plant development phase, on the Monday, January 31, 2022, the plant was treated with nanoparticles (magnesium at a concentration of 2-1 mg/L, copper at 1-2 mg/L), the papers were sprayed after two weeks, and the following features were investigated:

### 2.1. Total Sugars

The weight of 0.2 g of dried and ground sample was added to it (8) of ethyl alcohol at a minute concentration, and then the filtrate was separated from the sediment using a Heraeus. Chris+ centrifuge. This was done in accordance with the methodology described in [21]. The percentage of total sugars found in the leaves was calculated using this method.

gummy manufactured in Germany at a rate of 3000 revolutions per minute and for a duration of fifteen minutes, with the procedure being carried out a total of two more times in a row. The quantity of sugars was estimated to be 650 nanometers with the use of a gadget called an UV-visible spectrometer that was provided by the Japanese business Shimadzu.

### 2.2. Calculation of the Amount of Free Amino Acids

After adding 1 ml of hydrogen reagent, boiling the mixture in a water bath for 20 minutes, and then adding 5 ml of the reducer solution, (1) ml of ethanol extract was placed in (25) ml test tubes and mixed with (0.1) sodium hydroxide using methyl carrier guide. The mixture was then cooled to room temperature and (5) ml of the reducer solution was added. With distilled water and propanol, which were combined in an equal amount), chilled, and decreased to twenty-five milliliters with distilled water, then the absorbance was measured at fifty-seven nanometers using an antenna spectrophotometer:

Nondestructive estimation of talar-free amino acid distribution using near-infrared spectroscopy [22].

### 2.3. Peroxidase Enzyme

It was determined, in accordance with the methodology described by , how much of the peroxidase enzyme's activity was measured [23].

0.1 milligrams worth of potassium phosphate was added.

5.33 percent of pyrogallol and hydrogen peroxide solution in the tubes, then left to settle at a temperature of 20 degrees Celsius, then the plant extract was added, and the absorbance was recorded at Margeni (420)

nanometers at every twenty seconds for one minute, then the rate was extracted. 5.33 percent of pyrogallol and hydrogen peroxide solution in the tubes.

$$\frac{\text{volume activity}/V/}{\Delta Au_{20/20} \times v + \text{dilution factor}} = \frac{VS \times 12}{(1)}$$

### 2.4. Catalase Enzyme

The level of catalase enzyme activity was evaluated in accordance with the methodology used by [24]. The extract of the standard form was put to the sample test tube, while the standard test tube received a volume of one thousand milliliters. After the in butene had had 2000 ml of the hydrogen peroxide solution added to it, the tubes were given a thorough mixing before being brought into the bath for preparation. After heating the water to 37 degrees Celsius for two minutes, 2000 milliliters of ammonium reagent were added, and the mixture was stirred to incorporate the in butene.

Using the following equation, we were able to determine the effectiveness of the cutler.

$$\text{catalase activity of test} + k_u = \frac{2,303}{+} \times \log (2)$$

## 3. Results and Discussion

2.4 Spraying the paper has an immediate effect. Vehicles' metabolism of the main and secondary dandelion plants indicates results in my schedule (1) that changed the effect minutes that she had on herself. transparent to carbohydrates when a transaction occurs, when larger values are recorded. In contrast to the treatment and the control, nanoparticles of copper that were concentrated to 2 mg/L achieved 9.91, where it was captured (5.99).

**Table 1.** Cichorium intybus plant varieties. .carbohydrates

Minute Impact Rate	red	American type	the local	Concentrations of nanoparticles
5.99	10.93	3.44	3.61	0
8.73	10.65	3.88	11.67	mg/L1/mg
6.05	10.66	3.57	3.922	mg/L2/mg
9.15	10.63	3.59	13.25	mg/L1/cu
9.91	10.93	3.65	15.15	mg/L2/cu
	1076	3.62	9.52	The effect of dandelion varieties
For overlaps 0.10	For items 0.07	Nanoparticles 0.05		%5 valueLSD

When considering acids Results are in the schedule (2) on those changed effects. Minutes are indicated by "amino." where copper nanoparticles were found in higher concentrations during transaction b minutes When it reached (173.58) at a concentration of (2 mg/L), it was of lower value for therapy.

**Table 2.** Amino Cichorium intybus plant varieties

Minute Impact Rate	red	American type	the local	Concentrations of nanoparticles
233.71	382.14	181.72	137.28	0
110.173	155.1	13.62	73.48	mg/L1/mg
132.29	157.96	178.64	60.28	mg/L2/mg
98.12	135.08	127.38	31.9	mg/L1/cu
173.58	225.94	199.54	75.26	mg/L2/cu
	211.244	158.18	79.64	The effect of dandelion varieties
For overlaps 4.80	For items 3.31	nanoparticles . 3.79		%5 valueLSD

Results show that she was self-effect in Schedule (3) on the modified Effect Minutes Nanoparticles. Catalysts for my enzyme are clear when a transaction occurs, when larger values are recorded. Magnesium nanoparticles concentrated (1 mg/L) achieved (1.03) in contrast to the control's recorded (0.61) value, while the effect was changed by the addition

of dandelion plants, which registered greater values than the wild variety and reached (0.948) after treatment. The plant dandelion struck me as an inter-varietal interference therapy. When item American treatment microcrystalline magnesium is obtained at a concentration of 1 mg/liter (1.39), the values are in minutes.

**Table 3.** Catlase Cichorium intybus plant varieties

Minute Impact Rate	red	American type	the local	Concentrations of nanoparticles
0.61	0.51	0.40	0.92	0
1.03	0.60	1.39	1.11	mg/L1/mg
0.90	0.93	0.48	1.31	mg/L2/mg
0.43	0.23	0.30	0.76	mg/L1/cu
0.51	0.20	0.71	0.64	mg/L2/cu
	0.494	0.656	0.948	The effect of dandelion varieties
significant -for non interactions	for varieties insignificant	The nanoparticles are not significant		%5 valueLSD

According to the enzyme Peroxidase (PoD), the results in the schedule (4) have been adjusted. Significantly affected nanoparticles, as the greatest value was noted during treatment in minutes. copper nanoparticle concentrations of 2 mg/L (0.605) and lower values when the coefficient (1 mg/L cu) was equal to 0.443. When compared to the control,

the control registered (0.545), but when it was modified, Effect Varieties plants dandelion registered higher values when item red reached (0.582), and then the Interference treatment between Varieties plants dandelion registered a higher value at item red treatment in minutes of nanoparticles copper concentrated (2 mg/liter) reached (0.665).

**Table 4.** Peru Cedese (Peru xdase) POD Cichorium intybus plant varieties.

Minute Impact Rate	red	American type	the local	Concentrations of nanoparticles
0.54	0.70	0.58	0.34	0
0.44	0.46	0.55	0.32	mg/L1/mg
0.48	0.59	0.54	0.31	mg/L2/mg
0.44	0.49	0.57	0.27	mg/L1/cu
0.50	0.66	0.60	0.25	mg/L2/cu
	0.58	0.57	0.30	The effect of dandelion varieties
For overlaps 0.30	For items 0.21	The nanoparticles are not significant		%5 valueLSD

## Conclusion

I displayed the study's updated findings, which changed the paper's effect within minutes. In elementary and secondary schools, copper and magnesium nanoparticles with a concentration of 2-1 mg/liter have metabolic effects on me. Where Does Copper Work as an Active Oxidation Factor Assistant in the Collection of Miscellaneous Vegetarian Proteins? Tous Yanin The sept chrome receptors for ethylene [25]. and functioning copper ions as an auxiliary factor in enzymes like (cu/ZnSOD, cytochrome, cuzn-superoxid edisutase, plastocyanin). Copper is a vital component of the metabolism of wall cells and machinery at the cellular level. Protein transfer, perspiration, the oxidized crust, [26]. Magnesium, however, acts as a helper in enzymatic interactions that activate Parasap, aiding in the transport of sugars within the plant during operations as well as the stability of diapers. Ribosome molecules and amino acid stability installation. [27].

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