

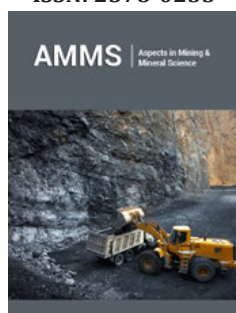
# Consciousness Energy Healing Treatment: Physicochemical and Thermal Characterization of Magnesium

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## Abstract

Magnesium is the fourth most common human body mineral followed by sodium, potassium, and calcium and it acts as a cofactor in more than 300 enzyme system. The aim of this study was to determine the influence of the Trivedi Effect®-Consciousness Energy Healing Treatment on the physicochemical and thermal properties of magnesium by using sophisticated analytical techniques. The test sample was divided into the control and treated magnesium; where the Trivedi Effect®-Consciousness Energy Healing Treatment was provided remotely only to the treated part by a renowned Biofield Energy Healer, Dahryn Trivedi; however, the control part was not received the Biofield Energy Treatment. The particle sizes of the treated magnesium were significantly increased by 45.92% ( $d_{10}$ ), 31.07% ( $d_{50}$ ), 21.44% ( $d_{90}$ ), and 28.74% {D (4,3)} compared to the control sample. Therefore, the resultant specific surface area of the treated magnesium was significantly reduced by 28.57% than the control sample. The powder X-ray diffraction peak intensities and crystallite sizes of the treated magnesium were decreased ranging from 0.72% to 11.43% and 3.81% to 19.40%, respectively, compared to the control sample. The average crystallite size of the treated magnesium was significantly reduced by 13.39%, compared with the control sample. The weight loss of the treated magnesium was increased by 79.09% during the thermal degradation; however, the residue amount was decreased by 40.31% as compared to the control sample. The maximum thermal degradation temperature of the treated magnesium was reduced by 4.95%, compared to the control sample. Hence, the Trivedi Effect®-Consciousness Energy Healing Treatment might alter the physicochemical and thermal properties of magnesium by forming a new polymorph that may show better appearance, flowability, and compatibility along with altered thermal stability compared to the control sample. Thus, the Trivedi Effect®-Consciousness Energy Healing Treated magnesium could be used efficiently in designing the more efficacious novel nutraceutical formulations against various diseases such as muscle cramps and spasm, gestational deficiency in pregnancy, migraine, kidney disease, diabetes, and heart diseases, etc.

**Keywords:** Magnesium; Consciousness energy healing treatment; The Trivedi Effect®; PSA; PXRD; TGA/DTG

**Abbreviations:** ATP: Adenosine Triphosphate; ADP: Adenosine Diphosphate; NCCAM: National Center for Complementary and Alternative Medicine; PXRD: Powder X-ray Diffraction; PSA: Particle Size Analysis; TGA: Thermal gravimetric analysis; DTG: Differential thermogravimetric analysis

## Introduction

Nutritional deficiency is increasing due to many reasons such as a neglected epidemic of chronic disease and another important is the widespread deficiency of selected nutrients. Among which, magnesium deficiency and the importance of this element in the human organism is well defined [1]. Thus, biological significance in day-to-day life has clinical relevance, as magnesium is the fourth most common human body mineral followed by sodium, potassium, and calcium [2]. On an average, an adult required approximately 25 grams of magnesium in reserve with its distribution in bone (53%), muscles (27%), soft tissues (19%), and less than 1% in the serum. Serum concentration ranges from 75-95mmol/L and below would be considered as deficient [3,4]. The major biological significance of magnesium is its involvement as a cofactor in more than 300 enzyme system. This is required for various biological fundamental processes including energy production and nucleic acid synthesis. Mitochondria stores the high level of intracellular magnesium, which plays an important role in inorganic phosphate synthesis and ATP (adenosine triphosphate) from ADP (adenosine diphosphate) synthesis. More than 3000 human proteins bind with magnesium along with

ATP to yield a bioactive form of ATP, ie., Mg-ATP. The biological half-life of magnesium is about 42 days (~1000 hours) [5]. The metabolic role of magnesium and its important functioning in body homeostasis has been significantly reported. Besides, deficiency of magnesium may lead to many physical and mental health issues. Magnesium sulfate (MgS) has reported several benefits and significant improvement in the symptom of breathlessness in many acute asthma exacerbations [6,7]. Magnesium has a significant role in vitamin D absorption and role in rickets and osteoporosis; it is required for conversion of vitamin D into its active form needed for calcium absorption and metabolism, along with the functioning of parathyroid hormone [8]. Magnesium has a high role in muscle cramps and spasm [9], gestational deficiency in pregnancy with lower mean arterial pressure in women along with higher birth weight infants [10,11], importance in migraine [12], in prevention of diabetic complications [13], depression [14], kidney disease, and heart diseases and many more has been significantly studied. Some ideal natural sources of magnesium are hemp seeds, pumpkin seeds, flax seeds, and Brazil nuts. Besides, some carbohydrates which include a high content of magnesium are whole wheat bread, baked potato, rice, brown rice, kidney beans, and white rice. In addition, milk products and green leafy vegetables such as boiled spinach, avocado, and chopped broccoli are the other rich source of magnesium [15].

The physicochemical and thermal properties of compounds play important role in their formulation development and the Consciousness Energy Healing Treatment is a novel approach that have been used these days in modifying such properties of compounds [16,17]. The Biofield Energy Treatment is a kind of Energy therapy (the Trivedi Effect®) and the use of such therapies against various diseases has been evident nowadays due to their advantageous effect. Therefore, such therapies are also accepted by the National Center for Complementary and Alternative Medicine (NCCAM) under the category of Complementary and Alternative Medicine (CAM) therapies along with yoga, Reiki, Ayurvedic medicine, homeopathy, Qi Gong, Tai Chi, chiropractic/osteopathic manipulation, acupuncture, acupressure, hypnotherapy, aromatherapy, cranial sacral therapy, etc. [18,19]. Similarly, the importance of the Trivedi Effect®-Consciousness Energy Healing Treatment has been reported by various researchers for its significant impact on the living organisms and non-living materials. The impact of the Biofield Energy Treatment has been significantly improved the agricultural productivity [20,21], antimicrobial activity [22-24], physicochemical properties of the pharmaceuticals/nutraceuticals [25-27], various properties of metals, ceramics, and chemicals [28-30], and in the field of biotechnology [31,32], skin and bone health [33-35], and cancer research [36], etc. Thus, this

research work was designed to determine the effect of the Biofield Energy Treatment (the Trivedi Effect®) on the physicochemical and thermal characteristics of magnesium by using various analytical techniques.

## Materials and Methods

### Chemicals and reagents

The test sample magnesium powder (MEPCO, India) and other chemicals used during the experiments were purchased from India.

### Consciousness energy healing treatment strategies

The experimental design includes dividing the test sample magnesium into two parts, among which the first part was not received the Biofield Energy Treatment and considered as the control sample. Besides, the second part of the sample was received the Trivedi Effect®-Consciousness Energy Healing Treatment for about 3 minutes under standard laboratory conditions and known as The Biofield Energy Treated magnesium. This treatment was provided to the test sample, remotely, by the renowned Biofield Energy Healer, Dahryn, USA, through her unique energy transmission process. However, the control sample was treated by a “sham” healer, who did not have any awareness about the Biofield Energy. Both the samples were then stored in sealed conditions and characterized further by using modern analytical techniques.

### Characterization

The particle size distribution (PSD) analysis of magnesium test samples were performed with the help of Malvern Mastersizer 2000 (UK) using the wet method [37,38]. The powder X-ray diffraction (PXRD) analysis of magnesium powder samples were performed with the help of Rigaku MiniFlex-II Desktop X-ray diffractometer (Japan) [39,40]. The average size of crystallites was calculated from PXRD data using the Scherrer's formula (1)

$$G = k\lambda/\beta\cos\theta \quad (1)$$

Where G is the crystallite size in nm, k is the equipment constant,  $\lambda$  is the radiation wavelength,  $\beta$  is the full width at half maximum, and  $\theta$  is the Bragg angle [41]. Similarly, the thermal gravimetric analysis (TGA) thermograms of magnesium samples were obtained with the help of TGA Q50 TA instruments [42].

The % change in particle size, surface area, crystallite size, peak intensity, weight loss and maximum thermal degradation temperature of the Biofield Energy Treated magnesium was calculated compared with the control sample using the following equation 2:

$$\% \text{ change} = [(Treated - Control) / Control] \times 100 \quad (2)$$

## Results and Discussion

### Particle size analysis (PSA)

**Table 1:** The particle size distribution of the control and treated magnesium.

Parameter	$d_{10}$ (μm)	$d_{50}$ (μm)	$d_{90}$ (μm)	D(4,3) (μm)	SSA(m <sup>2</sup> /g)
Control	176.31	344.02	626.33	375.28	0.021

Biofield Energy Treated	257.28	450.89	760.63	483.12	0.015
Percent change (%)	45.92	31.07	21.44	28.74	-28.57

$d_{10}$ ,  $d_{50}$ , and  $d_{90}$ : particle diameter corresponding to 10%, 50%, and 90% of the cumulative distribution,  $D(4,3)$ : the average mass-volume diameter, and SSA: the specific surface area.

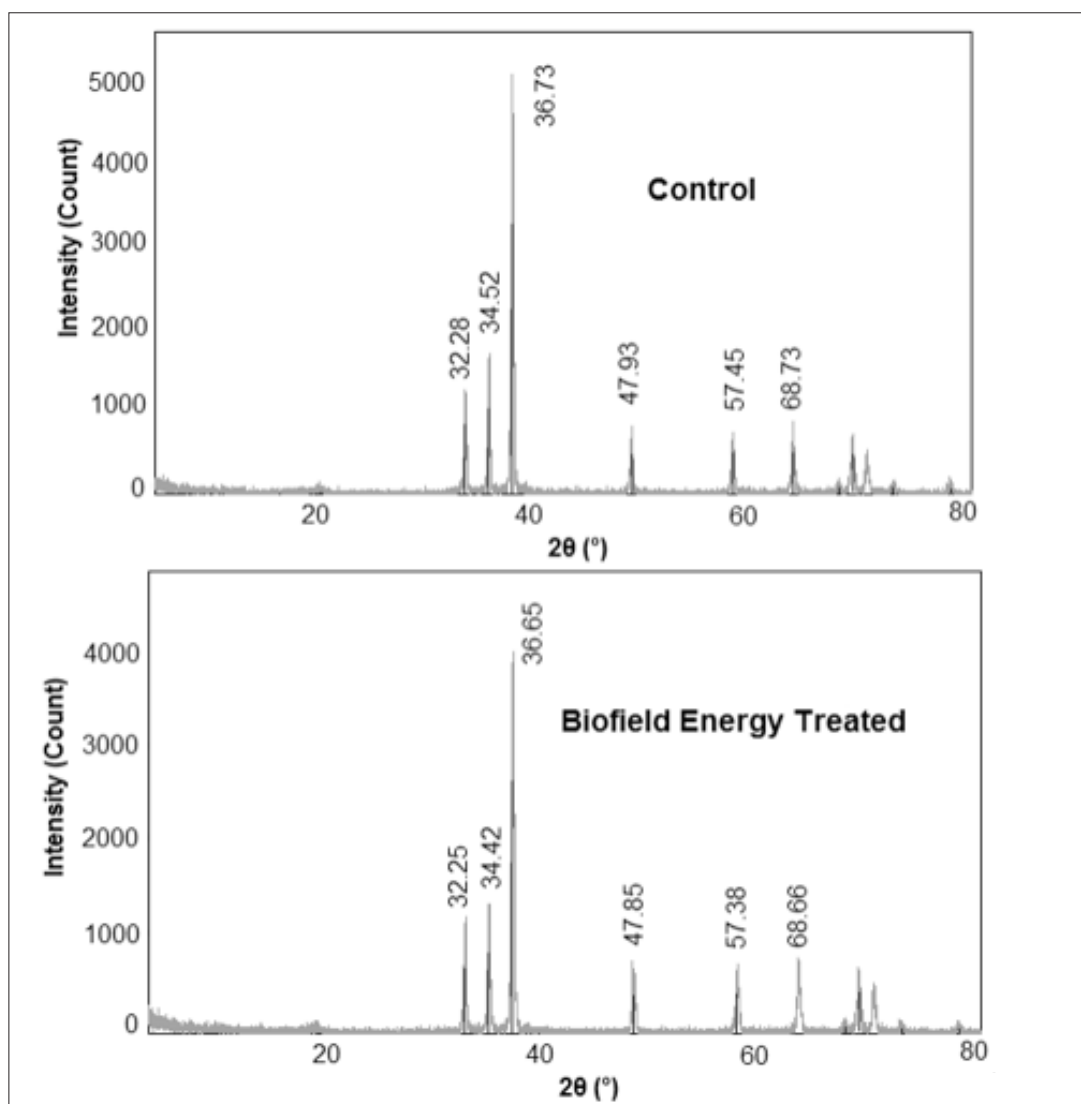
The particle size analysis of both the control and treated samples of magnesium was done and presented in (Table 1). The results helped to determine the impact of the Biofield Energy Treatment on the particle size distribution of the sample. The treated magnesium showed a significant increase in the particle size values at  $d_{10}$  (45.92%),  $d_{50}$  (31.07%),  $d_{90}$  (21.44%), and  $D(4,3)$  (28.74%), compared to the control sample (Table 1). Besides, the treated magnesium showed a significant reduction in the specific surface area by 28.57% that resulted due to the increase in the particle size values after the Biofield Energy Treatment, compared to the control sample.

Some previous studies suggested the increase in particle sizes of a compound due to the impact of the increase in thermal energy. Thus, it is presumed that the Biofield Energy Treatment might help

in increasing the thermal energy within the molecules of sample, thereby decreasing the nucleus densities and resulted in enhanced particle size [43,44]. Such an increased particle size of the treated magnesium might enhance the shape, appearance, and flowability of the treated magnesium as compared to the control sample [45,46].

### Powder X-ray Diffraction (PXRD) Analysis

The PXRD diffractograms of both the samples were shown in (Figure 1). The diffractograms were further analyzed in terms of the variations observed in the Bragg's angles of the characteristic peaks of the treated magnesium along with the corresponding relative intensities and crystallite sizes, compared to the control sample (Table 2).



**Figure 1:** PXRD diffractograms of the control and treated magnesium.

**Table 2:** PXRD data for the control and treated magnesium.

Entry No.	Bragg angle ( $^{\circ}2\theta$ )		Intensity (cps)			Crystallite size (G, nm)		
	Control	Treated	Control	Treated	% change <sup>a</sup>	Control	Treated	% change <sup>b</sup>
1	32.28	32.25	245	217	-11.43	372	318	-14.52
2	34.52	34.42	283	265	-6.36	381	327	-14.17
3	36.73	36.65	971	898	-7.52	365	309	-15.34
4	47.93	47.85	139	138	-0.72	366	295	-19.4
5	57.45	57.38	161	144	-10.56	363	318	-12.4
6	68.73	68.66	168	158	-5.95	341	328	-3.81

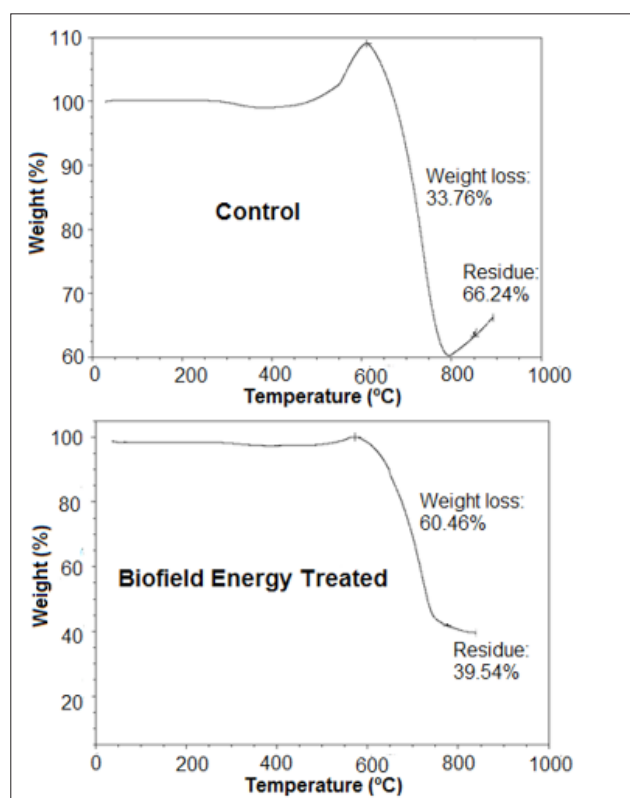
<sup>a</sup>denotes the percentage change in the intensity of the treated magnesium with respect to the control sample; <sup>b</sup>denotes the percentage change in the crystallite size of the treated magnesium with respect to the control sample.

There was the presence of sharp and intense peaks in the diffractograms of the control and treated magnesium that showed the crystalline nature of both the samples. The peak intensities and crystallite sizes of the peaks of the treated magnesium showed significant changes as, the peak intensities were reduced ranging from 0.72% to 11.43%; while the crystallite sizes were reduced ranging from 3.81% to 19.40%, compared to the control sample. The impact of the Biofield Energy Treatment was also visible on the average crystallite size of the treated magnesium (315.83nm) that was significantly reduced by 13.39% as compared to the control sample (364.67nm). The altered peak intensities and crystallite sizes of the treated magnesium suggested the possibility of the formation of new polymorph after the Biofield Energy Treatment [47]. Such altered polymorphic properties of treated magnesium sample may suggest better solubility and bioavailability profile [48]

as compared to the control sample.

### Thermal gravimetric analysis (TGA)/ Differential thermogravimetric analysis (DTG)

The effect of the Biofield Energy Treatment on the thermal properties of magnesium sample was analyzed. The TGA thermograms of both the samples were recorded (Figure 2) and the data regarding the weight loss and residue weight were analyzed (Table 3). The results showed the significant increase in the total weight loss of the treated magnesium by 79.09% during the thermal degradation process; whereas, the residue weight was significantly reduced by 40.31% (Table 3) as compared to the control sample. Thus, the TGA data indicated a significant increase in the thermal degradation of the treated magnesium, compared to the control sample.

**Figure 2:** TGA thermograms of the control and treated magnesium.

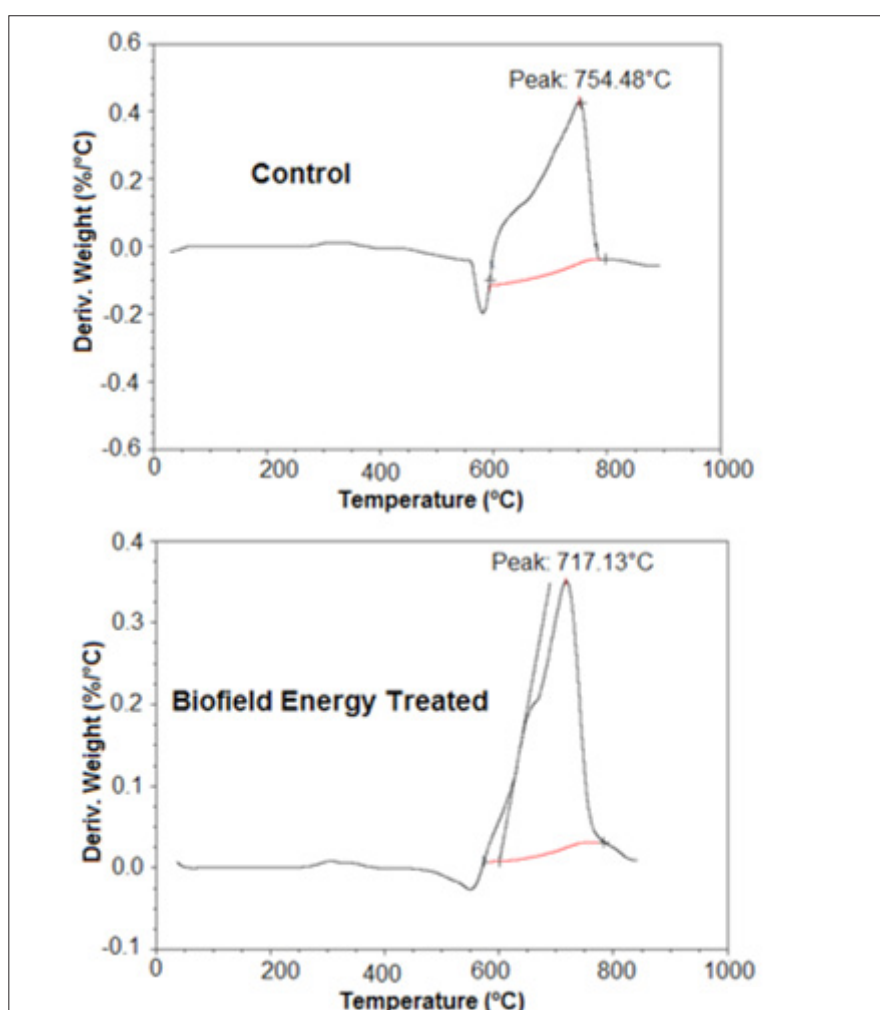
**Table 3:** TGA/DTG data of the control and treated samples of magnesium.

Sample	TGA		DTG
	Total weight loss (%)	Residue %	$T_{\max}$ (°C)
Control	33.76	66.24	754.48
Biofield Energy Treated	60.46	39.54	717.13
% Change	79.09	-40.31	-4.95

$T_{\max}$  = the temperature at which maximum weight loss takes place in TG or peak temperature in DTG.

Besides, the DTG analysis of both the samples showed the presence of a single peak in their respective thermograms (Figure 3) that denote the maximum thermal degradation temperatures ( $T_{\max}$ ). The  $T_{\max}$  of the treated magnesium was found to be reduced by 4.95% than the  $T_{\max}$  of the control sample. Thus, the DTG data was observed in support of the TGA results, as the reduction in

$T_{\max}$  temperature indicated the reduced thermal stability of the treated magnesium in comparison to the control sample. Overall, the TGA/DTG data indicated the increased thermal degradation of the treated magnesium after the Biofield Energy Treatment than the control sample.

**Figure 3:** DTG thermograms of the control and Biofield Energy Treated magnesium.

## Conclusion

The study sums up the impact of the Trivedi Effect®-Consciousness Energy Healing Treatment on the physicochemical and thermal properties of magnesium. The particle sizes of the Biofield Energy Treated magnesium was significantly increased by 45.92% ( $d_{10}$ ), 31.07% ( $d_{50}$ ), 21.44% ( $d_{90}$ ), and 28.74% {D(4,3)}

compared to the control sample. Therefore, the resultant specific surface area of the Biofield Energy Treated magnesium was significantly reduced by 28.57% than the control sample. Such changes in the particle sizes and surface area of the treated magnesium might help in improving the appearance, flowability, shape, and compatibility of the sample, compared to the control sample. The powder X-ray diffraction peak intensities and crystallite



sizes of the Biofield Energy Treated magnesium were decreased ranging from 0.72% to 11.43% and 3.81% to 19.40%, respectively, compared to the control sample. The average crystallite size of the Biofield Energy Treated magnesium was significantly reduced by 13.39%, compared to the control sample. These altered crystalline properties of the Biofield Energy Treated magnesium might be due to the possible formation of new polymorph after the Biofield Energy Treatment. Such polymorph might help in improving the solubility and bioavailability of the Biofield Energy Treated magnesium as compared to the control sample. The total weight loss of the Biofield Energy Treated magnesium was increased by 79.09% during the thermal degradation; however, the residue amount was decreased by 40.31% as compared to the control sample. Thus, the thermal data indicated the increased thermal degradation of the Biofield Energy Treated magnesium compared with the control sample. The overall results revealed that the Trivedi Effect®-Consciousness Energy Healing Treatment has significantly altered the physicochemical and thermal properties of the magnesium sample that might alter the solubility, appearance, flowability, bioavailability, and thermal stability of the treated magnesium compared with the control sample. Therefore, the novel approach of using the Biofield Energy Treated magnesium in the nutraceutical/pharmaceutical formulation could be beneficial in the treatment of various diseases such as vitamin D deficiency borne rickets and osteoporosis, muscle cramps and spasm, gestational deficiency in pregnancy, migraine, kidney disease, diabetes, and heart diseases, etc.

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