

Solid-State Characterization to Understand the Change in the Physicochemical and Thermal Properties of the Consciousness Energy Healing Treated Pyridoxine

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ABSTRACT

Pyridoxine (Vitamin B₆) acts as the cofactors or prosthetic groups for different enzymatic reactions and plays an important role in the proteins, lipids, carbohydrates metabolism, etc. This research work was performed the solid-state characterization to understand the change in the physicochemical and thermal properties of the Consciousness Energy Healing Treated pyridoxine compared to the control sample. Pyridoxine sample was divided into control and treated parts. Control part did not receive the Biofield Energy Treatment, while treated part received the Biofield Energy Healing Treatment (the Trivedi Effect[®]) remotely by a famous Biofield Energy Healer, Alice Branton. The powder XRD peak intensities significantly altered ranging from -35.90% to 128% and crystallite sizes also significantly altered ranging from -42.74% to 7.38% of the treated pyridoxine compared to the control sample. However, the average crystallite size was meaningfully decreased by 14.51% of the treated pyridoxine compared with the control sample. The particle size values in the treated pyridoxine were significantly altered by -12.27% (d₁₀), -0.37% (d₅₀), -73.67% (d₉₀) and 1.73% {D(4,3)}, but the specific surface area was significantly increased by 9% compared to the control sample. The ΔH_{fusion} was significantly increased by 16.2% in the treated sample compared to the control sample. The overall weight loss was significantly decreased by 6.67%; however, the residue amount was significantly increased by 11.87% in the treated sample compared with the control sample. Similarly, the maximum thermal degradation temperature of 1st and 2nd peaks of the treated sample was increased by 1.03% and 2.15%, respectively compared to the control sample. Thus, it was assumed that the Trivedi Effect[®]-Consciousness Energy Healing Treatment might lead to generate a new polymorphic form of pyridoxine which would offer better solubility, dissolution and good bioavailability compared to the control sample. The Consciousness Energy Healing Treated pyridoxine would be very useful to design novel pharmaceutical formulations that might be more efficacious against vitamin B₆ deficiency, Alzheimer's disease, anemia, cardiovascular disease, diabetes, seizures, tuberculosis, cancer, anxiety, asthma, depression, dysmenorrhea, etc.

Keywords: The Trivedi Effect[®], Consciousness energy, Pyridoxine, PXRD, Particle size, Surface area, DSC, TGA/DTG

INTRODUCTION

Pyridoxine commonly known as vitamin B₆ is a water-soluble vitamin which acts as the cofactors or prosthetic groups for different enzymatic reactions. It plays numerous important roles in proteins, lipids and carbohydrates metabolism. Besides, it also has a significant role in the normal function of the nervous system, immune system, red blood cell, endocrine system and also maintains the normal blood glucose level [1,2]. Pyridoxine can be interconverted into two forms, i.e., pyridoxal and pyridoxamine. Pyridoxine, pyridoxamine and other phosphorylated forms are the major forms of vitamin B₆ in plant food, while pyridoxal and pyridoxal-5'-phosphate are obtained from animal foods. Pyridoxine hydrochloride (Pyridoxine HCl) is the hydrochloride salt of vitamin B₆ and converted into its

active co-enzymatic form pyridoxal-5'-phosphate (PLP) [1-4]. Pyridoxine HCl is commonly used as vitamin supplement or as a component of multivitamin preparations for the prevention and treatment of pyridoxine deficiency,

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pyridoxine-dependency seizures, sideroblastic anemia, Alzheimer's disease, metabolic disorders, pulmonary tuberculosis, cardiovascular disease, hyperhomocysteinemia, cancer, anxiety, asthma, attention deficit hyperactivity disorder (ADHD), depression, dysmenorrhoea, diabetes, post-partum lactation suppression, McArdle's disease, osteoporosis, etc. [1,4-7]. Pyridoxine is photosensitive and degrades slowly when exposed to light. It is soluble in water and alcohol; insoluble in ether and chloroform; sparingly soluble in acetone. On decomposition, it releases oxides of nitrogen and hydrogen chloride which are very toxic fumes [8].

Scientific communities throughout the world carrying out research work for the improvement of better physicochemical properties of the pharmaceutical and nutraceutical compounds, because the physicochemical properties play a crucial role in its dissolution, absorption and bioavailability profile in the physiological system [9]. In this development, the Trivedi Effect® (Biofield Energy Healing Treatment) has played a significant role in altering the physicochemical properties of nutraceutical/pharmaceutical compounds [10-13]. The Trivedi Effect® is a natural and scientifically proven phenomenon in which a person can acquire this energy from the "Universe" and transfer it anywhere on the planet *via* the possible mediation of neutrinos [14]. This energy field exists surrounding the body of every living organism called Biofield, which is an infinite and para-dimensional electromagnetic field. Biofield based Energy Therapies have a significant beneficial outcome against various diseases [15]. The National Institutes of Health and National Center for Complementary and Alternative Medicine recommend and incorporated the Energy therapy under Complementary and Alternative Medicine (CAM) category that has been recognized by the most of the USA people [16,17]. Similarly, the Trivedi Effect® has a significant impact on the transformation of the object(s) and the outstanding results were published in numerous peer-reviewed scientific journals. The Biofield Energy Healing Treatment has the amazing capability to transform the properties of metals and ceramics [18,19], organic compounds [20,21], microorganisms [22,23], various living cells [24,25] and improve the overall productivity of crops [26,27]. Therefore, the current study evaluated the impact of the Trivedi Effect®-Consciousness Energy Healing Treatment on the physicochemical properties of pyridoxine using modern analytical techniques.

MATERIALS AND METHODS

Chemicals and reagents

The test sample pyridoxine hydrochloride was purchased from Tokyo Chemical Industry Co. Ltd., Japan, but the other chemicals were procured in India.

Consciousness energy healing treatment strategies

Pyridoxine was the test sample for the whole experiment, which further divided into two equal parts. One part of pyridoxine was received the Trivedi Effect® - Consciousness Energy Healing Treatment remotely (3 min) by the eminent Biofield Energy Healer, Alice Branton, USA known as the Biofield Energy Treated pyridoxine. However, the second part of pyridoxine was considered as a control sample was treated with a "sham" healer, where the "sham" healer did not have any awareness in the Biofield Energy Treatment. After the treatment, both the samples were stored in sealed conditions and characterized sophisticated analytical techniques.

Characterization

The X-ray diffraction (PXRD) analysis of pyridoxine powder sample was performed with the help of Rigaku MiniFlex-II Desktop X-ray diffractometer (Japan) [28,29]. The crystallites size was calculated with the help of the Scherrer's formula (1):

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

Where G=crystallite size (nm), λ =radiation wavelength, k=equipment constant, β =full-width at half maximum and θ =Bragg angle [30].

The particle size distribution (PSD) analysis was performed using Malvern Mastersizer 2000 (UK) using the wet method [31,32]. The differential scanning calorimetry (DSC) analysis of pyridoxine was performed with the help of DSC Q200, TA instruments. The thermal gravimetric analysis (TGA) thermograms of pyridoxine were obtained with the help of TGA Q50 TA instruments [31,32].

The % change in the above parameters the treated sample were calculated compared to the control sample using the following equation 2:

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

RESULTS AND DISCUSSION

Powder x-ray diffraction (PXRD) analysis

The PXRD diffractograms of both the pyridoxine samples showed sharp and intense peaks at Bragg's angle (2θ) (**Figure 1**) indicated that both the samples were crystalline. The PXRD diffractograms of both the samples showed the highest peak intensity at 2θ equal to 25.1° (**Table 1**, entry 6). The peak intensities of the treated pyridoxine were significantly altered ranging from -35.90% to 128.00% compared to the control sample.

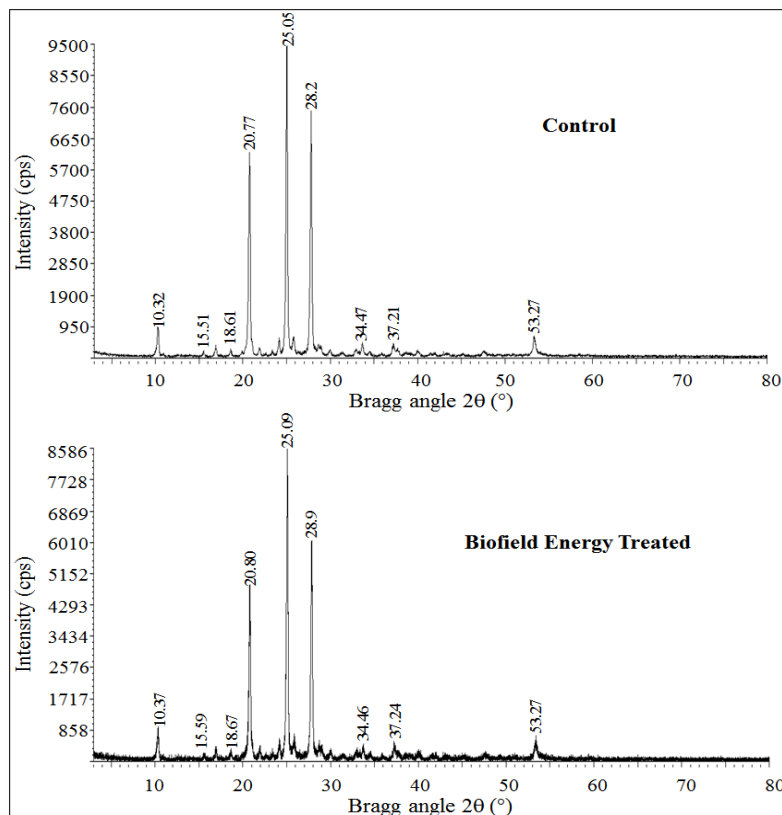


Figure 1. Powder XRD diffractograms of the control and treated pyridoxine.

Table 1. Powder XRD data of the control and treated pyridoxine.

Entry No.	Bragg angle ($^{\circ}2\theta$)		Peak Intensity (%)			Crystallite size (G, nm)		
	Control	Treated	Control	Treated	% Change	Control	Treated	% Change
1	10.32	10.37	180.00	140.00	-22.22	378.00	373.00	-1.32
2	15.51	15.59	17.00	15.40	-9.41	570.00	453.00	-20.53
3	18.61	18.67	39.00	25.00	-35.90	606.00	347.00	-42.74
4	20.77	20.80	1152.00	868.00	-24.65	435.00	420.00	-3.45
5	24.16	24.20	83.00	57.00	-31.33	432.00	427.00	-1.16
6	25.05	25.09	1546.00	1363.00	-11.84	446.00	449.00	0.67
7	25.80	25.86	103.00	120.00	16.50	348.00	266.00	-23.56
8	27.82	27.85	1242.00	1064.00	-14.33	420.00	428.00	1.90
9	28.92	28.90	93.00	128.00	37.63	152.00	137.00	-9.87
10	33.62	33.77	50.00	114.00	128.00	391.00	258.00	-34.02
11	34.47	34.46	24.00	31.00	29.17	325.00	349.00	7.38
12	37.21	37.24	64.00	120.00	87.50	309.00	238.00	-22.98
13	53.27	53.27	195.00	167.00	-14.36	329.00	250.00	-24.01
14	Average crystallite size					395.46	338.08	-14.51

Similarly, the crystallite sizes of the treated pyridoxine sample were significantly altered ranging from -42.74% to 7.38% compared to the control sample. However, the overall crystallite size of the treated sample (338.08 nm) was significantly decreased by 14.51% compared with the control sample (395.46 nm).

The change in the crystallite properties of the Biofield Energy Treated pyridoxine were significantly altered compared to the control sample. The peak intensity of each diffraction face on the crystalline compound changes according to the crystal morphology [33] and changes in the diffraction type provide the proof of polymorphic transitions [34,35]. The Trivedi Effect[®] probably produced the novel polymorphic form of pyridoxine through Biofield Energy *via* neutrino oscillations [13]. Different polymorphic forms of pharmaceuticals have noteworthy effects on drug performance, such as bioavailability, therapeutic efficacy and toxicity [36,37]. Thus, the Trivedi Effect[®] Treated pyridoxine would be better in designing novel pharmaceutical formulations.

Particle size analysis (PSA)

The particle size analysis of both the control and Biofield Energy Treated pyridoxine were performed and the data are presented in tabular format (**Table 2**). The particle sizes in the Biofield Energy Treated pyridoxine were significantly decreased by 12.27% (d_{10}), 0.37% (d_{50}) and 73.67% (d_{90}) compared to the control sample. However, the particle size value in the Biofield Energy Treated pyridoxine was increased at D(4,3) by 1.73% compared to the untreated sample. The specific surface area of Biofield Energy Treated pyridoxine was significantly increased by 9% compared to the untreated sample. The Trivedi Effect[®] might be acted as an external force for contravention the larger particles to smaller particles size sample and increased the surface area of the particles. The particle size, shape and surface area have their impact on the solubility, dissolution rate, absorption, bioavailability and even the therapeutic potency of a drug [37,38]. Thus, it is anticipated that the treated sample might improve the therapeutic performances of pyridoxine HCl formulations.

Table 2. The particle size distribution of the control and treated pyridoxine.

Parameter	d_{10} (μm)	d_{50} (μm)	d_{90} (μm)	D(4,3) (μm)	SSA (m^2/g)
Control	7.94	38.41	135.28	57.99	0.411
Biofield Energy Treated	6.96	38.27	35.62	58.99	0.448
Percent change (%)	-12.27	-0.37	-73.67	1.73	9.00

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

Differential scanning calorimetry (DSC) analysis

The DSC thermograms of the control and treated sample showed a sharp endothermic peak at 216.19°C and 215.27°C, respectively (**Figure 2**). The thermogram pattern and melting point closely matched to the literature data [39]. The melting point of the Biofield Energy Treated pyridoxine was similar to the control sample.

The latent heat of fusion (ΔH_{fusion}) of the treated pyridoxine (346.4 J/g) was significantly increased by 16.20% compared

with the control pyridoxine (298.1 J/g) (**Table 3**). As per the literature, any change in the latent heat of fusion can be attributed to the disrupted molecular chains and the crystal structure [40]. Thus, the Biofield Energy Healing Treatment might be responsible for the disturbance of the crystal structure and molecular chains of pyridoxine which might be the cause of elevation of thermal stability of the treated sample compared to the control sample.

Table 3. DSC data of the control and treated pyridoxine.

Sample	Control	Biofield Energy Treated	% Change
Melting Temp (°C)	216.19	215.27	-0.43
ΔH (J/g)	298.10	346.40	16.20

ΔH : Latent heat of fusion

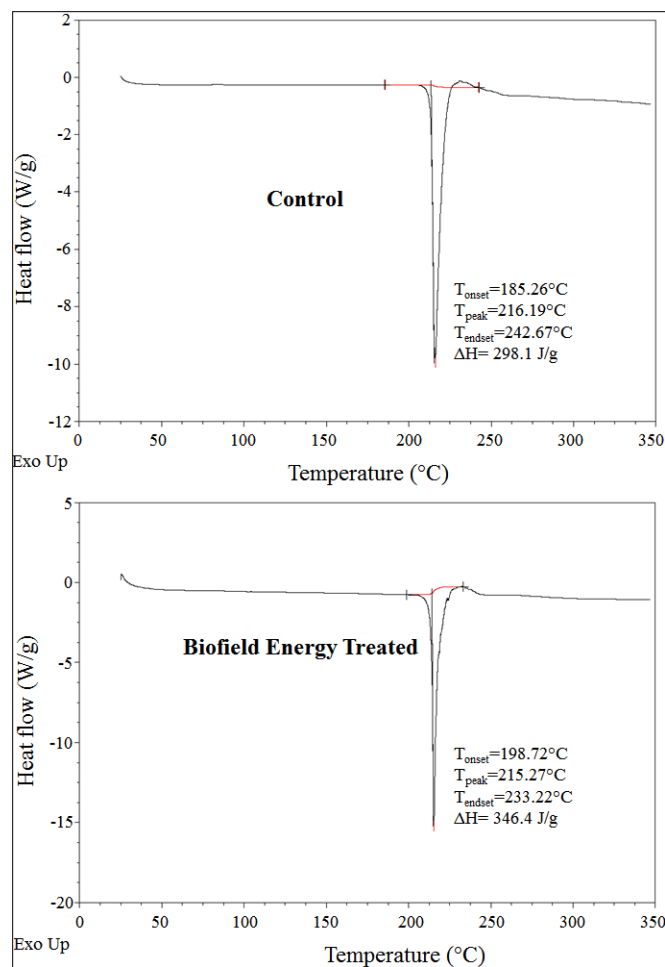


Figure 2. DSC thermograms of the control and treated pyridoxine.

Thermal gravimetric analysis (TGA)/differential thermogravimetric analysis (DTG)

The TGA thermograms of the control and Biofield Energy Treated pyridoxine samples showed two steps of thermal degradation (**Figure 3**). The weight loss of the treated

pyridoxine was meaningfully decreased by 6.67% compared to the control sample (**Table 4**). The residue quantity was significantly increased by 11.87% in the Biofield Energy Treated pyridoxine compared with the control sample (**Table 4**).

Table 4. TGA/DTG data of the control and treated pyridoxine.

Sample	TGA		DTG; T_{max} (°C)	
	Total weight loss (%)	Residue %	1 st Peak	2 nd Peak
Control	64.03	35.97	208.32	369.62
Biofield Energy Treated	59.76	40.24	210.46	377.55
% Change	-6.67	11.87	1.03	2.15

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

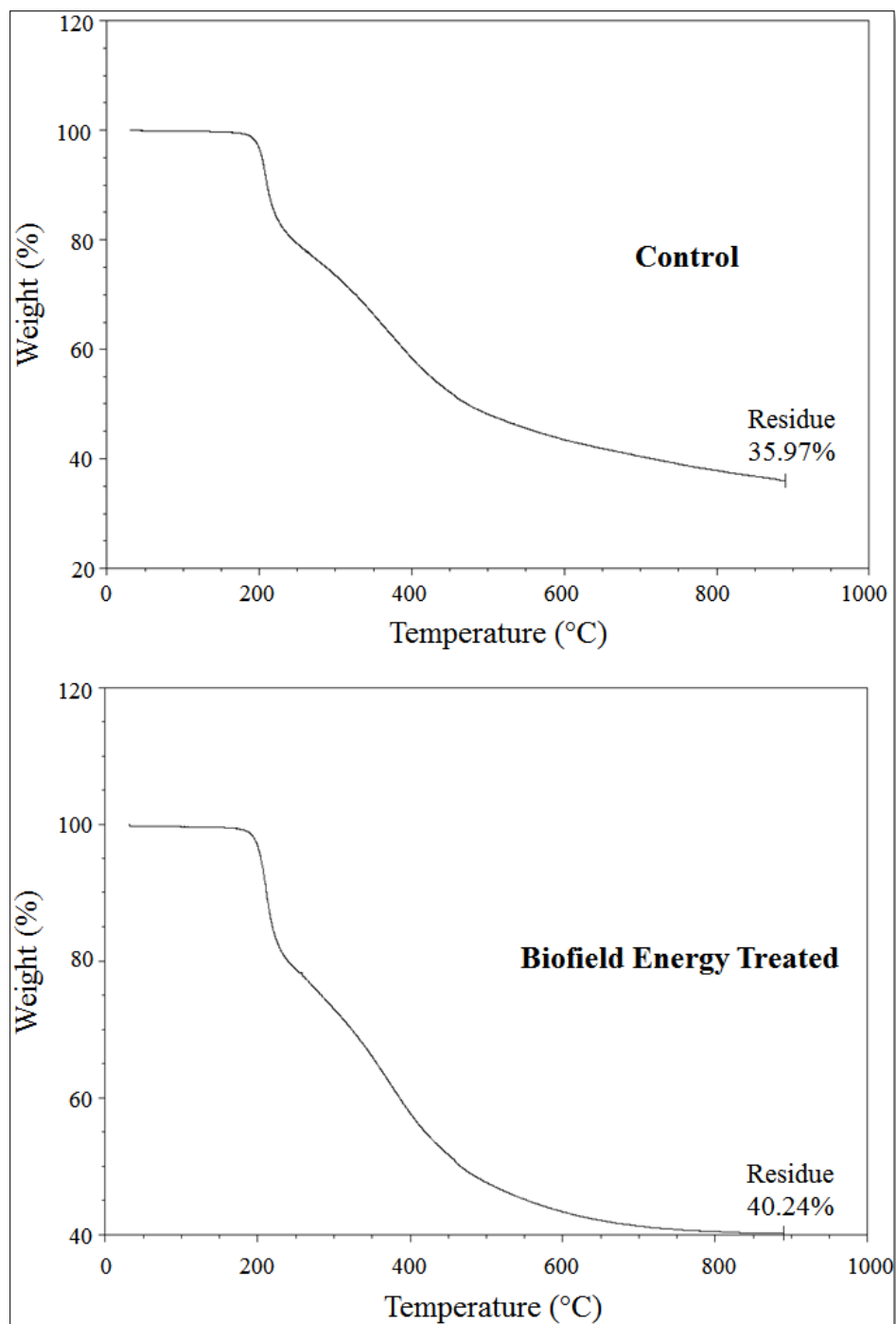


Figure 3. TGA thermograms of the control and treated pyridoxine.

The DTG of both the samples also showed two peaks in the thermograms (**Figure 4**). The T_{max} of 1st and 2nd peaks of the treated sample was increased by 1.03% and 2.15%, respectively compared to the control sample (**Table 4**).

Overall, TGA/DTG analysis of pyridoxine samples revealed that the thermal stability of the Biofield Energy Treated sample was significantly increased compared with the control sample.

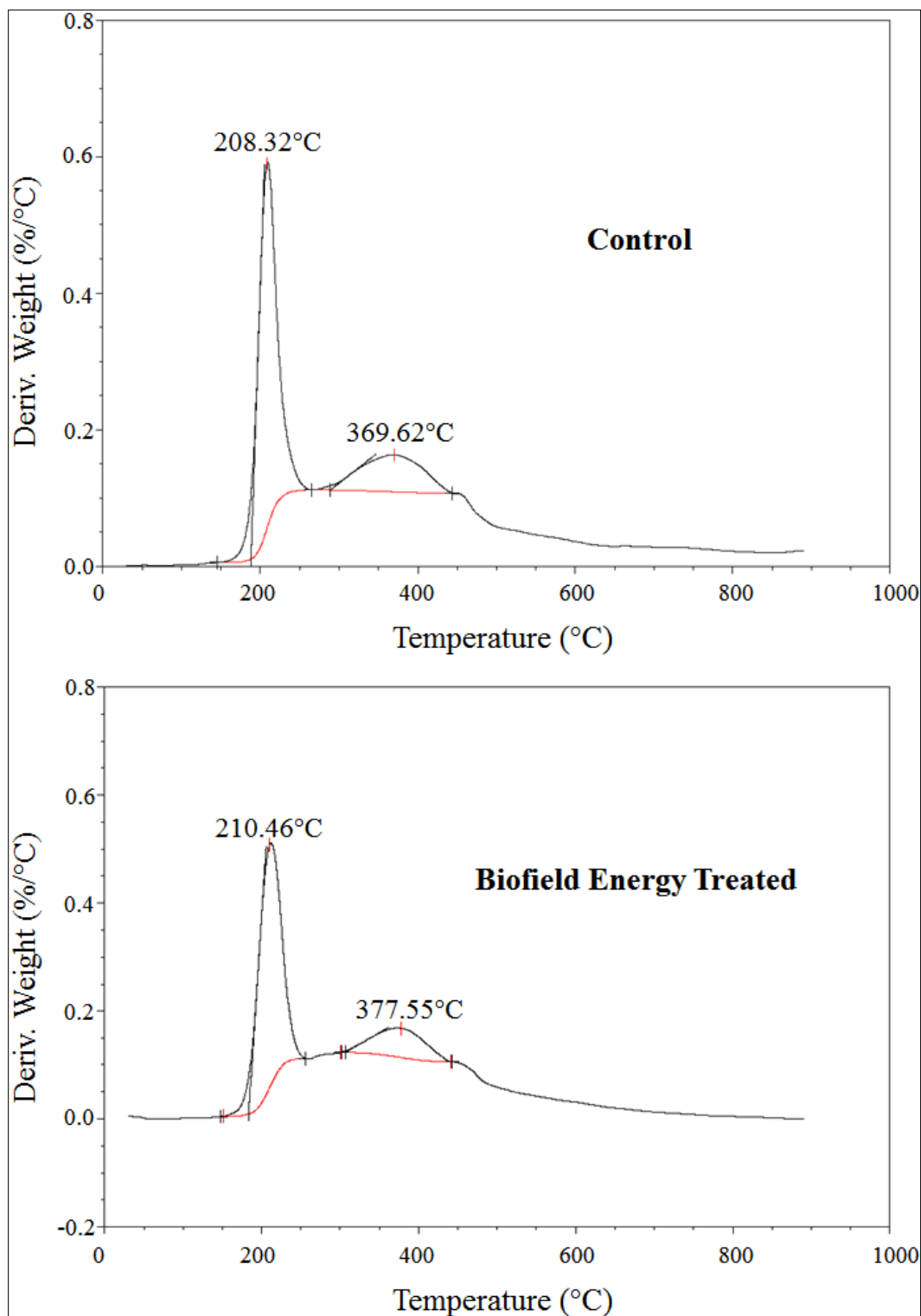


Figure 4. DTG thermograms of the control and treated pyridoxine.

CONCLUSION

The Consciousness Energy Healing Treatment has shown the significant effects on the physicochemical properties of

pyridoxine. The powder XRD peak intensities and crystallite sizes of the Biofield Energy Treated pyridoxine were significantly altered ranging from -35.90% to 128% and -42.74% to 7.38%, respectively compared to the control

sample. The average crystallite size of the Biofield Energy Treated pyridoxine was significantly decreased by 14.51% compared to the control sample. The particle size values in the treated sample were significantly decreased by 12.27%, 0.37% and 73.67% at d_{10} , d_{50} and d_{90} , respectively, whereas the particle size increased by 1.73% at D(4,3) compared to the control sample. Hence, the specific surface area of treated pyridoxine was significantly increased by 9% compared to the control sample. The ΔH_{fusion} was significantly increased by 16.2% in the treated sample compared with the control sample. The total weight loss was significantly decreased by 6.67%; hence the residue amount was significantly increased by 11.87% in the treated pyridoxine compared with the control sample. The T_{max} of 1st and 2nd peaks of the treated sample was increased by 1.03% and 2.15%, respectively compared to the control sample. Thus, it was assumed that the Trivedi Effect®-Consciousness Energy Healing Treatment might lead to generate a new polymorphic form of pyridoxine which would offer better solubility, dissolution and good bioavailability compared to the control sample. The Trivedi Effect®-Consciousness Energy Healing Treated pyridoxine would be very useful to design better pharmaceutical formulations that might offer better therapeutic response against pyridoxine deficiency, pyridoxine-dependency seizures, sideroblastic anemia, Alzheimer's disease, metabolic disorders, pulmonary tuberculosis, cardiovascular disease, hyperhomocysteinemia, cancer, anxiety, asthma, ADHD, depression, dysmenorrhoea, diabetes, post-partum lactation suppression, McArdle's disease, osteoporosis, etc.

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