



Consciousness Energy Healing Treatment Influenced the Physicochemical and Thermal Properties of Berberine Chloride

Dahryn Trivedi¹, Mahendra Kumar Trivedi¹, Alice Branton¹, Gopal Nayak¹, and Snehasis Jana^{2*}

¹Trivedi Global, Inc., Henderson, USA

²Trivedi Science Research Laboratory Pvt. Ltd, India

Abstract

Berberine is a type of bioactive compound that belongs to the class of alkaloids, and is extracted from the shrubs called Berberis. This study was performed to analyze the effect of the Trivedi Effect[®]-Consciousness Energy Healing Treatment on berberine chloride in terms of altering its physicochemical properties by using modern analytical techniques. The study was done by dividing the sample in control and a treated part. The control sample did not give treatment, while the treated part received the Trivedi Effect[®] remotely by the Biofield Energy Healer, Dahryn Trivedi. The PXRD study indicated the significant alterations in the peak intensities of the treated berberine in the range of -7.30% to 309.30%; while the crystallite sizes were altered in the range from -73.02% to 72.04%, compared to the control sample. The treated berberine also showed alteration in the average crystallite size that was significantly decreased by 11.86% as compared to the control sample. The particle sizes of the treated berberine were observed to reduce by 6.14% (d_{10}), 11.22% (d_{50}), 15.63% (d_{90}), and 12.40% {D (4,3)}, which thereby attributed to 5.26% increase in the specific surface area as compared to the control sample. The total weight loss of the treated berberine showed a significant reduction by 23.71% and 45.79% increase in the residue weight than the control sample. The treated berberine showed alterations in the melting temperatures corresponding to 1st, 2nd, 3rd, 4th, 5th, and 6th peak by -3.78%, -2.99%, 1.14%, 0.50%, -0.15%, and -0.53%, respectively; while the latent heat was altered by -66.59%, 20.04%, 26.32%, -12.31%, -40.34%, and 44.22%, respectively, compared to the control sample. The analysis indicated the significant impact of the Trivedi Effect[®] on berberine chloride that might show better solubility, bioavailability, and thermal stability as compared to the control berberine. Thus, the Trivedi Effect[®] could be helpful in designing the novel formulations of berberine chloride to fight against various diseases and disorders with improved efficacy and performance.

Keywords: Berberine; The Trivedi Effect[®]; Consciousness energy healing treatment; Particle size; PXRD; TGA/DTG

Introduction

Berberine is a type of bioactive compound that belongs to the class of alkaloids, and is widely used after extracting it from a group of shrubs called Berberis. It is yellow in color and has been also used in the form of a dye. In traditional Chinese medicine, the use of berberine has a long history to treat various ailments [1]. It can be obtained from the rhizomes, roots, bark, and stem of the Berberis plants. Several studies reported the use of berberine extracts and decoctions due to its antimicrobial activity against bacteria, fungi, viruses, protozoans, Chlamydia, and helminths [2,3]. Moreover, there were various preclinical and clinical studies that explained the ameliorative effect of berberine against various neurological, metabolic, and cardiological problems [4].

Besides, it also showed its pharmacological use when applied as a gel by reducing the redness, pain, oozing, and ulcer sizes in canker sores patients. It is also recommended to slightly reduce the blood sugar levels in diabetic patients and might control the level of sugar in the body as effectively as rosiglitazone or metformin [5,6]. Some scientific studies also indicated the use of berberine in lowering the cholesterol levels in patients as it seems to reduce the total cholesterol, low-density lipoprotein, as well as the triglyceride levels in the body [7]. Its use has also been evident in lowering the blood pressure when used with the drug amlodipine as it reduces the systolic and diastolic blood pressure more effectively as compared to taking amlodipine alone in patients [8]. Moreover, some researches also suggest that it's used in women with PCOS that may help in lowering the blood sugar, reducing the testosterone levels, improving the cholesterol and triglyceride levels, and thereby also lower the waist-to-hip ratio [9]. Besides, there are several other health benefits of berberine that includes fight against depression [10], reduce the growth and spread of various types of cancer [11], potent antioxidant and anti-inflammatory effects [12], prevent infections by fighting with harmful microorganisms, such as viruses, bacteria, fungi and different parasites [13], reduce fat build-up in the liver, and thereby prevent the non-alcoholic fatty liver disease (NAFLD) [14], improved the symptoms and reduced the risk of death in heart failure patients [15], etc. Despite such wide uses, it was reported that the absorption of berberine across the gut wall was poor and it got easily metabolized in the liver and further get excreted with the bile [16,17]. Thus, the research studies should be done with an emphasis on enhancing the berberine

Submitted: 15 April 2019 | **Accepted:** 02 May 2019 | **Published:** 06 May 2019

***Corresponding author:** Snehasis Jana, Trivedi Science Research Laboratory Pvt. Ltd., Thane (W), India. Tel: 91- 022-25811234; Email: publication@trivedieffect.com

Copyright: ©2019 Trivedi et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Citation: Trivedi D, Trivedi MK, Branton A, Nayak G, Jana S (2019) Consciousness Energy Healing Treatment Influenced the Physicochemical and Thermal Properties of Berberine Chloride. JSM Analytic Bioanalytic Techniq 4: 7.



bioavailability that could be done by altering its physicochemical properties [18].

Biofield Energy Healing Treatment is known these days for altering the various properties of a drug that might affect its bioavailability. Energy healing is a kind of Complementary and Alternative Medicine (CAM) that was performed with significant clinical and non-clinical outcomes and accepted worldwide [19,20]. There are various Energy Healing Therapies such as, Reiki, yoga, therapeutic touch, pranic healing, deep breathing, pilates, Ayurvedic medicine, traditional Chinese herbs and medicines, homeopathy, hypnotherapy, and acupressure, etc. that have been accepted by the National Center for Complementary and Alternative Medicine (NCCAM) [21,22]. The Trivedi Effect®-Consciousness Energy Healing therapies is also such type of CAM therapies that have been reported by various researchers for its significant impact in the non-living materials and living organisms. The effect of Consciousness Energy Healing Treatment has been found in improving the crop yield in agriculture science [23,24], nutraceuticals properties [25,26], the physicochemical properties of metals and ceramics [27-29], skin health [30,31], bioavailability of various drugs [32-34], and in the field of microbiology [35-37], biotechnology [38, 39], bone health [40-42], cancer science research [43,44], and human health and wellness. This study was aimed to understand and estimate the effect of Biofield Energy Treatment on the physicochemical properties of berberine by using various modern analytical techniques.

Materials and Methods

Chemicals and reagents

The test sample berberine chloride was procured from Tokyo Chemical Industry Co., Ltd., Japan and other chemicals used in the research work were purchased in India.

Consciousness energy healing treatment strategies

The test sample berberine was divided into two equal parts. One part of the test sample was considered as a control sample, which did not receive the Biofield Energy Treatment. But, the control sample was treated with an ignorant person who did not have any knowledge about the Biofield Energy Treatment is called the "sham" healer. However, the second part of the test sample has received the Energy of Consciousness Healing Treatment (Trivedi Effect®) remotely for 3 minutes and known as the treated berberine sample. This Biofield Energy Treatment was provided through the healer's unique energy transmission process by the renowned Biofield Energy Healer, Dahryn Trivedi, USA. After the treatment, both the samples were stored in sealed conditions and characterized using modern analytical techniques.

Characterization

The powder X-ray diffraction (PXRD) analysis of berberine chloride powder sample was executed with the help of Rigaku MiniFlex-II Desktop X-ray diffractometer (Japan) [45,46]. The average crystallites size was calculated using the Scherrer's formula (1)

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

Where k is the equipment constant, G is the crystallite size in nm, β is the full-width at half maximum, λ is the radiation wavelength, and θ is the Bragg angle [47].

The particle size analysis (PSA) was performed on Malvern Master sizer 2000, from the UK using the wet method [48]. Similarly, the DSC analysis of berberine chloride was performed with the help of DSC Q200, TA instruments. The thermal gravimetric analysis/ differential thermogravimetric analysis (TGA/DTG) thermograms of berberine chloride were obtained with the help of TGA Q50 TA instruments [49].

The % change in specific surface area, particle size, peak intensity, melting point, latent heat, crystallite size, weight loss and T_{max} of the treated berberine chloride was 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 analysis showed the diffractograms of the control and treated berberine that involve the details of the Bragg's angles of the characteristic peaks in both the samples (Figure 1). The diffractograms were further analysed with respect to the relative intensities of the characteristic peaks and the corresponding crystallite sizes of both the samples and the details were mentioned in Table 1.

The analysis of the diffractograms indicated that the Bragg's angles (2θ) of the characteristic peaks of the treated berberine chloride sample were slightly altered in comparison to the 2θ of the peaks of the control sample. However, the major changes were observed in the relative intensities of the peaks of the treated berberine as well as the corresponding crystallite sizes, when compared with the control sample. The peak intensities of the treated berberine were mostly increased in the range from 2.72% to 309.30% except the peak at 25.62° that showed reduced intensity by 7.30%, compared to the control sample. Similarly, the crystallite sizes of the treated berberine were significantly altered in the range from -73.02% to 72.04%, compared to the control sample. Moreover, the treated berberine showed a significant reduction in the average crystallite size that was decreased from 245.30 nm (control) to 216.20 nm, i.e., 11.86% than the control sample. The new polymorph formation might take place after the Biofield Energy Treatment of the compounds as reported earlier in various research studies [48,49]. Such changes could be attributed to the alterations in the peak intensities of the characteristic peaks of the diffractogram and their corresponding crystallite sizes after the Biofield Energy Treatment of the compounds and thereby the changes in their crystalline properties [50]. Hence, the novel polymorph of berberine chloride might form after the treatment of the berberine chloride that might show some altered crystal habit than the control berberine; and could be used as an approach for the improvement of the solubility and bioavailability profile [51].

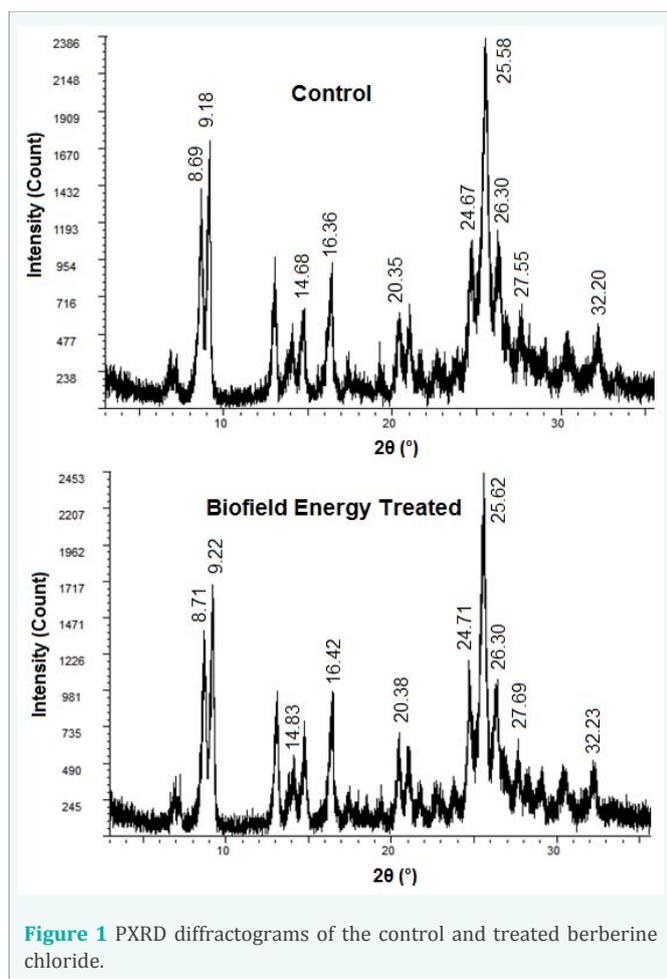


Figure 1 PXRD diffractograms of the control and treated berberine chloride.

Particle size analysis (PSA)

The particle size analysis of the samples indicate the changes that might occur in the particle size distribution of the treated berberine corresponding to d_{10} , d_{50} , d_{90} , and $D(4,3)$ after the Biofield Energy Treatment, compared to the control sample and the results are given in Table 2. It was observed that the treated berberine showed a significant reduction in the particle size distribution by 6.14% (d_{10}), 11.22% (d_{50}), 15.63% (d_{90}), and 12.40% { $D(4,3)$ } than the control sample.

The significant changes in the particle sizes ultimately contributed to the considerable increase in the specific surface area of the treated berberine by 5.26% after the Biofield Energy Treatment in comparison to the control sample. Several studies have been done on establishing the relationship between drug performance and its particle size distribution such as dissolution, absorption, and bioavailability [52,53]. The approach of reducing the particle size of the compound has been used by various researchers to improve the effective surface area and thereby the dissolution that ultimately increases the bioavailability of compound [54]. Thus, it is presumed that the Biofield Energy Treated berberine chloride might show improved bioavailability and drug performance as it showed improved surface area than the control sample.

Thermal Gravimetric Analysis (TGA)/ Differential Thermogravimetric Analysis (DTG)

The TGA/DTG data reported the thermal degradation pattern of the treated berberine with respect to the control sample and the differences regarding the weight loss, residue weight, and maximum degradation temperature (T_{max}) among the control and treated berberine were reported in Table 3. There was various scientific evidence on the thermal studies of berberine chloride that reported its stability up to 350 K. Besides, the TGA curve reported in those studies showed degradation of berberine chloride in four-steps in between the temperature range of 350 K to 520 K [55]. The TGA studies of the control and the treated samples reported similar thermograms (Figure 2), and further data regarding the weight loss and residue weight were mentioned in Table 3. It was observed that the total weight loss of the treated berberine chloride sample during the thermal degradation was 50.27% that was significantly reduced by 23.71%, compared to the weight loss of the control sample (65.89%). Moreover, the significant reduction in the weight loss during degradation resulted in 45.79% increase in the residue weight, compared to the control sample (Table 3).

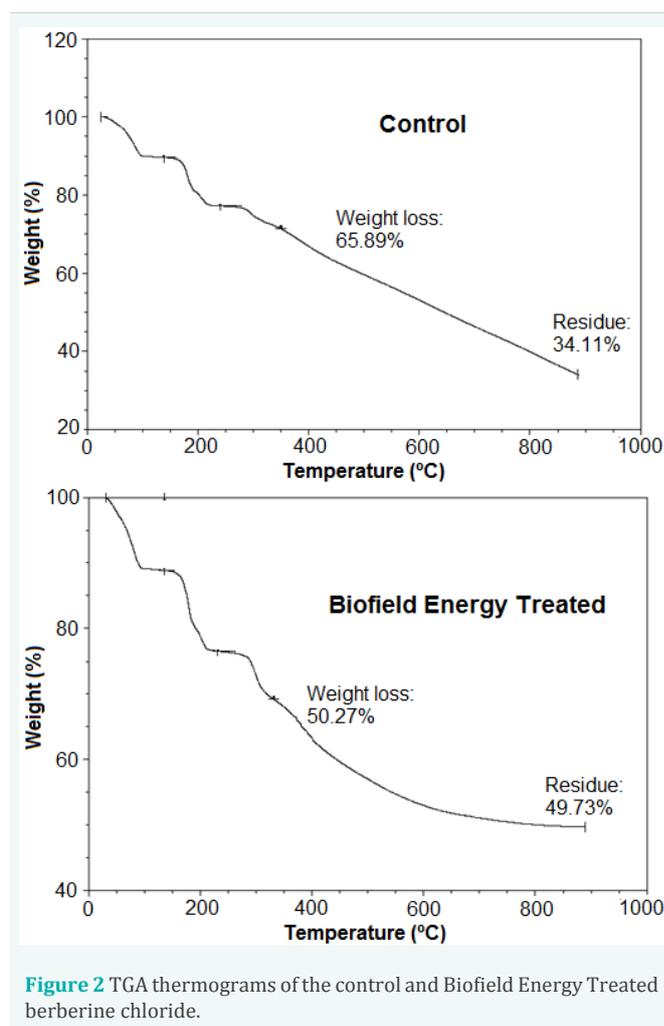


Figure 2 TGA thermograms of the control and Biofield Energy Treated berberine chloride.



Table 1: PXRD data for the control and treated berberine chloride.

Entry No.	Bragg angle (2θ)		Intensity (cps)			Crystallite size (G, nm)		
	Control	Treated	Control	Treated	% change	Control	Treated	% change
1	8.69	8.71	230	254	10.43	277	306	10.47
2	9.18	9.22	282	332	17.73	304	318	4.61
3	14.68	14.83	114	235	106.14	302	143	-52.65
4	16.36	16.42	147	151	2.72	240	267	11.25
5	20.35	20.38	199	220	10.55	93	160	72.04
6	24.67	24.71	272	339	24.63	208	199	-4.33
7	25.58	25.62	630	584	-7.30	215	255	18.60
8	26.30	26.30	202	313	54.95	241	201	-16.60
9	27.55	27.69	43	176	309.30	367	99	-73.02
10	32.20	32.23	95	134	41.05	206	214	3.88

Table 2: Particle size distribution of the control and treated berberine chloride.

Parameter	d_{10} (μm)	d_{50} (μm)	d_{90} (μm)	D(4,3) (μm)	SSA (m^2/g)
Control	2.28	16.76	139.71	48.94	1.14
Biofield Energy Treated	2.14	14.88	117.87	42.87	1.20
Percent change (%)	-6.14	-11.22	-15.63	-12.40	5.26

Table 3: TGA/DTG data of the control and treated berberine chloride.

Sample	TGA		DTG; T_{max} ($^{\circ}\text{C}$)			
	Total weight loss (%)	Residue %	Peak 1	Peak 2	Peak 3	Peak 4
Control	65.89	34.11	86.80	180.13	293.92	379.69
Biofield Energy Treated	50.27	49.73	81.64	182.30	297.23	386.14
% Change	-23.71	45.79	-5.94	1.20	1.13	1.70

Table 4: Comparison of DSC data between the control and treated berberine chloride.

Peak	Description	Peak Temperature ($^{\circ}\text{C}$)	$\Delta\text{H}(\text{J/g})$
Peak 1	Control sample	95.73	29.45
	Biofield Treated sample	92.11	9.84
	% Change	-3.78	-66.59
Peak 2	Control sample	152.84	140.70
	Biofield Treated sample	148.27	168.90
	% Change	-2.99	20.04
Peak 3	Control sample	203.54	76.03
	Biofield Treated sample	205.87	96.04
	% Change	1.14	26.32
Peak 4	Control sample	219.95	56.20
	Biofield Treated sample	221.06	49.28
	% Change	0.50	-12.31
Peak 5	Control sample	291.15	49.88
	Biofield Treated sample	290.71	29.76
	% Change	-0.15	-40.34
Peak 6	Control sample	315.48	139.30
	Biofield Treated sample	313.82	200.90
	% Change	-0.53	44.22

The previous DTG studies on the berberine chloride showed that the DTG thermogram involves four peaks, which indicated the various thermal decomposition products such as, H_2O (379K), CO (421K), CO (490K), and H_2O (514K) [55]. This DTG study on the control and treated berberine also reported the presence

of four peaks in their respective DTG thermograms (Figure 3), and the peak temperatures were found similar as mentioned in the literature. The further analysis showed that the maximum thermal degradation temperature (T_{max}) of the treated berberine corresponding to the 1st peak was decreased by 5.94%; while

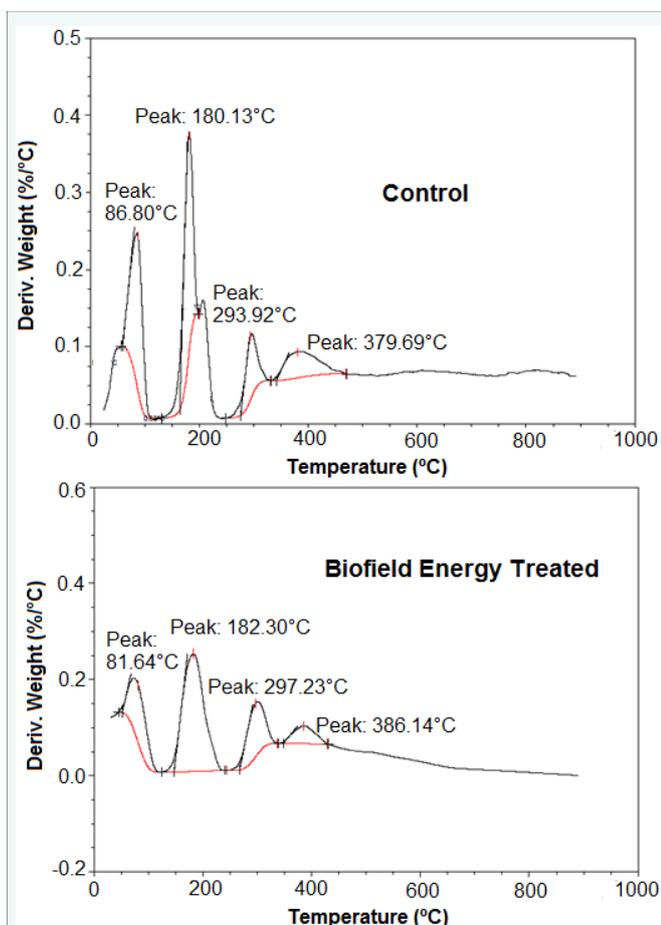


Figure 3 DTG thermograms of the control and treated berberine chloride.

the other peaks such as 2nd, 3rd, and 4th peak were increased by 1.20%, 1.13%, and 1.70%, respectively in comparison to the T_{max} of the control sample. Hence, it was observed from the overall TGA/DTG studies that the thermal degradation of the treated berberine was reduced after the Biofield Energy Treatment that indicated the improved thermal stability of the sample, compared to the control berberine.

Differential Scanning Calorimetry (DSC) Analysis

The melting and degradation pattern of the control and treated berberine chloride samples were studied by using DSC analysis [56]. There was the presence of six peaks in the thermograms of both the samples, which involves five endothermic peaks while one exothermic peak (Figure 4). The analysis of the peak temperatures indicated that the temperature corresponding to 1st, 2nd, 3rd, 4th, 5th, and 6th peak of the treated berberine chloride sample were significantly altered by -3.78%, -2.99%, 1.14%, 0.50%, -0.15%, and -0.53%, respectively as compared to the control berberine (Table 4). Besides, the significant changes were also observed in the latent heat of fusion (ΔH) of the treated berberine corresponding to each peak, compared to the control sample. The ΔH corresponding to 1st, 2nd, 3rd, 4th, 5th, and 6th peak were significantly altered by -66.59%, 20.04%, 26.32%, -12.31%,

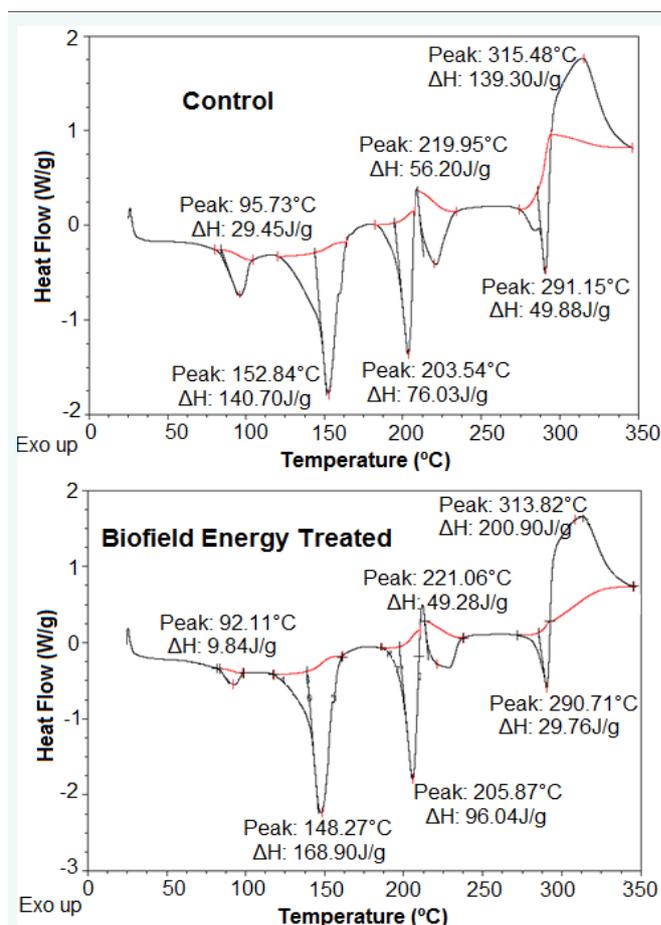


Figure 4 DSC thermograms of the control and treated berberine chloride.

-40.34%, and 44.22%, respectively, compared to the control sample.

The overall study showed that the melting temperature and the corresponding ΔH of the Biofield Energy Treated berberine were considerably changed after the treatment as compared to the control berberine chloride sample. Such changes in the melting behavior might be attributed to some significant alterations in the crystallization structure of the treated berberine after the Biofield Energy Treatment [56].

Conclusions

In this study, significant changes were observed in the physicochemical and thermal properties of berberine chloride after the treatment with the Trivedi Effect®-Consciousness Energy Healing Treatment. The PXRD study indicated the significant alterations in the peak intensities of the Biofield Energy Treated berberine in the range of -7.30% to 309.30%; while the crystallite sizes were altered in the range from -73.02% to 72.04%, compared to the control sample. The treated berberine also showed alteration in the average crystallite size that was significantly decreased by 11.86% as compared to the control sample. Such significant changes in the crystalline



properties of the treated berberine might indicate the formation of some new polymorph of berberine chloride after the Biofield Energy Treatment in comparison to the control sample. The particle sizes of the Biofield Energy Treated berberine were observed to reduce by 6.14% (d_{10}), 11.22% (d_{50}), 15.63% (d_{90}), and 12.40% $\{D(4,3)\}$, which thereby attributed to 5.26% increase in the specific surface area as compared to the control sample. Such alterations in the particle sizes and effective surface area of the treated berberine after the Biofield Energy Treatment might improve the solubility, dissolution, and bioavailability in comparison to the control sample. The total weight loss of the Biofield Energy Treated berberine showed a significant reduction by 23.71% and 45.79% increase in the residue weight than the control sample. Hence, the treated berberine chloride showed better thermal stability after the Biofield Energy Treatment compared to the control sample. The treated berberine showed alterations in the melting temperatures corresponding to 1st, 2nd, 3rd, 4th, 5th, and 6th peak by -3.78%, -2.99%, 1.14%, 0.50%, -0.15%, and -0.53%, respectively; while the ΔH was altered by -66.59%, 20.04%, 26.32%, -12.31%, -40.34%, and 44.22%, respectively, compared to the control sample. Thus, the overall study concluded the impact of the Trivedi Effect[®]-Consciousness Energy Healing Treatment on the physicochemical and thermal properties of the berberine chloride sample. It was assumed that there might be a formation of a new polymorph of berberine chloride after the Biofield Energy Treatment that may possess better dissolution, absorption, and thermal stability than the control sample. Hence, the Trivedi Effect[®] Treated berberine chloride could be used in formulating new pharmaceutical/nutraceutical products with better efficacy and performance against the treatment and prevention of various diseases such as polycystic ovary syndrome, high cholesterol, hypertension, gastric ulcers, inflammation, hyperglycemia, congestive heart failure, metabolic syndromes, arrhythmia, fatty liver diseases, depression, and prevent infections by fighting with harmful microorganisms, such as viruses, bacteria, fungi, etc.

Acknowledgements

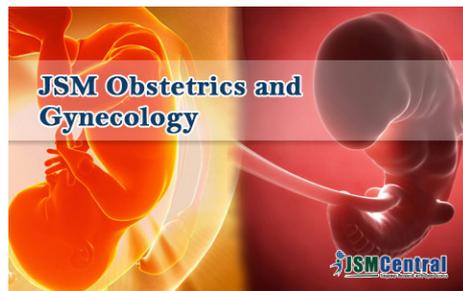
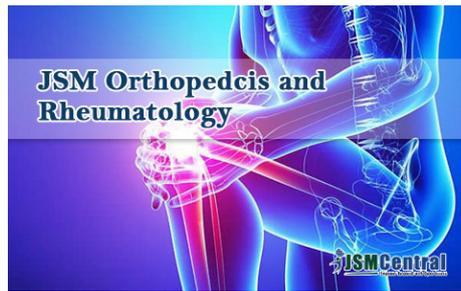
The authors are grateful to Central Leather Research Institute, SIPRA Lab. Ltd., Trivedi Science, Trivedi Global, Inc., Trivedi Testimonials, and Trivedi Master Wellness for their assistance and support during this work.

References

1. Yin J, Zhang H, Ye J. Traditional chinese medicine in treatment of metabolic syndrome. *Endocr Metab Immune Disord Drug Targets*. 2008; 8: 99-111.
2. Cernáková M, Kostálová D. Antimicrobial activity of berberine--a constituent of Mahonia aquifolium. *Folia Microbiol (Praha)*. 2002; 47: 375-378.
3. Dhamgaye S, Devaux F, Vandeputte P, Khandelwal NK, Sanglard D, Mukhopadhyay G, et al. Molecular Mechanisms of Action of Herbal Antifungal Alkaloid Berberine, in *Candida albicans*. *PLoS ONE*. 2014; 9: e104554
4. Chander V, Aswal JS, Dobhal R, Uniyal DP. A review on Pharmacological potential of Berberine; an active component of Himalayan *Berberis aristata*. *J Phytopharmacol*. 2017; 6: 53-58.
5. Yin J, Xing H, Ye J. Efficacy of berberine in patients with type 2 diabetes mellitus. *Metabolism*. 2008; 57: 712-717.
6. Dong H, Wang N, Zhao L, Lu F. Berberine in the treatment of type 2 diabetes mellitus: a systemic review and meta-analysis. *Evidence-based complementary and alternative medicine: eCAM*. 2012: 591654.
7. Dong H, Zhao Y, Zhao L, Lu F. The effects of berberine on blood lipids: a systemic review and meta-analysis of randomized controlled trials. *Planta Med*. 2013; 79: 437-446.
8. Birdsall T, Kelly G. Berberine: therapeutic potential of an alkaloid found in several medicinal plants. *Alt Med Rev*. 1997; 2: 94-103.
9. Wei W, Zhao H, Wang A, Sui M, Liang K, Deng H, et al. A clinical study on the short-term effect of berberine in comparison to metformin on the metabolic characteristics of women with polycystic ovary syndrome. *Eur J Endocrinol*. 2012; 166: 99-105.
10. Kulkarni SK, Dhir A. On the mechanism of antidepressant-like action of berberine chloride. *Eur J Pharmacol*. 2008; 589: 163-172.
11. Ortiz LM, Lombardi P, Tillhon M, Scovassi AI. Berberine, an epiphany against cancer. *Molecules*. 2014; 19: 12349-12367.
12. Xiao HB, Sun ZL, Zhang HB, Zhang DS. Berberine inhibits dyslipidemia in C57BL/6 mice with lipopolysaccharide induced inflammation. *Pharmacol Rep*. 2012; 64: 889-895.
13. Wu Y, Li JQ, Kim YJ, Wu J, Wang Q, Hao Y. *In vivo* and *in vitro* antiviral effects of berberine on influenza virus. *Chin J Integr Med*. 2011; 17: 444-452.
14. Yuan X, Wang J, Tang X, Li Y, Xia P, Gao X. Berberine ameliorates nonalcoholic fatty liver disease by a global modulation of hepatic mRNA and lncRNA expression profiles. *J Transl Med*. 2015; 13: 24.
15. Zeng XH, Zeng XJ, Li YY. Efficacy and safety of berberine for congestive heart failure secondary to ischemic or idiopathic dilated cardiomyopathy. *Am J Cardiol*. 2003; 92: 173-176.
16. Tsai PL, Tsai TH. Hepatobiliary excretion of berberine. *Drug Metab Dispos*. 2004; 32: 405-412.
17. Ye M, Fu S, Pi R, He F. Neuropharmacological and pharmacokinetic properties of berberine: a review of recent research. *J Pharm Pharmacol*. 2009; 61: 831-837.
18. Khadka P, Ro J, Kim H, Kim I, Kim JT, Kim H, et al. Pharmaceutical particle technologies: An approach to improve drug solubility, dissolution and bioavailability. *Asian J Pharm*. 2014; 9: 304-316.
19. Movaffaghi Z, Farsi M. Biofield therapies: Biophysical basis and biological regulations. *Complement Ther Clin Pract*. 2009; 15: 35-37.
20. Barnes PM, Powell-Griner E, McFann K, Nahin RL. Complementary and alternative medicine use among adults: United States, 2002. *Adv Data*. 2004; 343: 1-19.
21. Barnes PM, Bloom B, Nahin RL. Complementary and alternative medicine use among adults and children: United States, 2007. *Natl Health Stat Report*. 2008; 12: 1-23.
22. Fan K wai. National Center for Complementary and Alternative Medicine Website. *J Med Libr Assoc*. 2005; 93: 410-412.
23. Trivedi MK, Branton A, Trivedi D, Nayak G, Mondal SC, Jana S. Morphological characterization, quality, yield and DNA fingerprinting of biofield energy treated alphonso mango (*Mangifera indica* L.). *J Food Nutrition Sciences*. 2015; 3: 245-250.
24. Trivedi MK, Branton A, Trivedi D, Nayak G, Mondal SC, Jana S. Evaluation of biochemical marker - Glutathione and DNA fingerprinting of biofield energy treated *Oryza sativa*. *Am J BioScience*.



- 2015; 3: 243-248.
25. Trivedi MK, Branton A, Trivedi D, Nayak G, Plikerd WD, Surguy PL, et al. A Systematic study of the biofield energy healing treatment on physicochemical, thermal, structural, and behavioral properties of magnesium gluconate. *Int J Bioorganic Chemistry*. 2017; 2: 135-145.
26. Trivedi MK, Branton A, Trivedi D, Nayak G, Plikerd WD, Surguy PL, et al. Chromatographic and spectroscopic characterization of the consciousness energy healing treated *Withania Somnifera* (ashwagandha) root extract. *European J Biophysics*. 2017; 5: 38-47.
27. Trivedi MK, Tallapragada RM. A transcendental to changing metal powder characteristics. *Met Powder Rep*. 2008; 63: 22-28.
28. Trivedi MK, Nayak G, Patil S, Tallapragada RM, Latiyal O. Studies of the atomic and crystalline characteristics of ceramic oxide nano powders after bio field treatment. *Ind Eng Manage*. 2015; 4: 161.
29. Trivedi MK, Nayak G, Patil S, Tallapragada RM, Latiyal O, Jana S. Effect of biofield energy treatment on physical and structural properties of calcium carbide and praseodymium oxide. *Int J Materials Sci Applications*. 2015; 4: 390-395.
30. Kinney JP, Trivedi MK, Branton A, Trivedi D, Nayak G, Mondal SC, et al. Overall skin health potential of the biofield energy healing based herbomineral formulation using various skin parameters. *Am J Life Sci*. 2017; 5: 65-74.
31. Singh J, Trivedi MK, Branton A, Trivedi D, Nayak G, Gangwar M, Jana S. Consciousness energy healing treatment based herbomineral formulation: A safe and effective approach for skin health. *American J Pharmacol Phytotherapy*. 2017; 2: 1-10.
32. Branton A, Jana S. The influence of energy of consciousness healing treatment on low bioavailable resveratrol in male *Sprague Dawley* rats. *Int J Clin Developmental Anatomy*. 2017; 3: 9-15.
33. Branton A, Jana S. The use of novel and unique biofield energy healing treatment for the improvement of poorly bioavailable compound, berberine in male *Sprague Dawley* rats. *Am J Clin Exp Med*. 2017; 5: 138-144.
34. Branton A, Jana S. Effect of The biofield energy healing treatment on the pharmacokinetics of 25-hydroxyvitamin D₃ [25(OH)D₃] in rats after a single oral dose of vitamin D₃. *Am J Pharmacol Phytotherapy*. 2017; 2: 11-18.
35. Trivedi MK, Branton A, Trivedi D, Nayak G, Charan S, Jana S. Phenotyping and 16S rDNA analysis after biofield treatment on *Citrobacter braakii*: A urinary pathogen. *J Clin Med Genom*. 2015; 3: 129.
36. Trivedi MK, Patil S, Shettigar H, Mondal SC, Jana S. Evaluation of biofield modality on viral load of Hepatitis B and C viruses. *J Antivir Antiretrovir*. 2015; 7: 083-088.
37. Trivedi MK, Patil S, Shettigar H, Mondal SC, Jana S. An impact of biofield treatment: Antimycobacterial susceptibility potential using BACTEC 460/MGIT-TB System. *Mycobact Dis*. 2015; 5: 189.
38. Trivedi MK, Patil S, Shettigar H, Bairwa K, Jana S. Phenotypic and biotypic characterization of *Klebsiella oxytoca*: An impact of biofield treatment. *J Microb Biochem Technol*. 2015; 7: 203-206.
39. Nayak G, Altekhar N. Effect of biofield treatment on plant growth and adaptation. *J Environ Health Sci*. 2015; 1: 1-9.
40. Anagnos D, Trivedi K, Branton A, Trivedi D, Nayak G, Mondal SC, Jana S. Influence of biofield treated vitamin D₃ on proliferation, differentiation, and maturation of bone-related parameters in MG-63 cell-line. *Int J Biomed Engineering Clin Sci*. 2018; 4: 6-14.
41. Lee AC, Trivedi K, Branton A, Trivedi D, Nayak G, Mondal SC, Jana S. The potential benefits of biofield energy treated vitamin D₃ on bone mineralization in human bone osteosarcoma cells (MG-63). *Int J Nutrition Food Sc*. 2018; 7: 30-38.
42. Stutheit ME, Trivedi K, Branton A, Trivedi D, Nayak G, Mondal SC, et al. Biofield energy treated vitamin D₃: Therapeutic implication on bone health using osteoblasts cells. *Am J Life Sci*. 2018; 6: 13-21.
43. Trivedi MK, Patil S, Shettigar H, Mondal SC, Jana S. The potential impact of biofield treatment on human brain tumor cells: A time-lapse video microscopy. *J Integr Oncol*. 2015; 4: 141.
44. Trivedi MK, Patil S, Shettigar H, Gangwar M, Jana S. *In vitro* evaluation of biofield treatment on cancer biomarkers involved in endometrial and prostate cancer cell lines. *J Cancer Sci Ther*. 2015; 7: 253-257.
45. Desktop X-ray Diffractometer "MiniFlex+". *The Rigaku J*. 1997; 14: 29-36.
46. Zhang T, Paluch K, Scalabrino G, Frankish N, Healy AM, Sheridan H. Molecular structure studies of (1S,2S)-2-benzyl-2,3-dihydro-2-(1H-inden-2-yl)-1H-inden-1-ol. *J Mol Struct*. 2015; 1083: 286-299.
47. Langford JI, Wilson AJC. Scherrer after sixty years: A survey and some new results in the determination of crystallite size. *J Appl Cryst*. 1978; 11: 102-113.
48. Trivedi MK, Sethi KK, Panda P, Jana S. Physicochemical, thermal and spectroscopic characterization of sodium selenate using XRD, PSD, DSC, TGA/DTG, UV-vis, and FT-IR. *Marmara Pharm J*. 2017; 11: 311-318.
49. Trivedi MK, Branton A, Trivedi D, Nayak G, Plikerd WD, Surguy PL, et al. A systematic study of the biofield energy healing treatment on physicochemical, thermal, structural, and behavioral properties of iron sulphate. *Int J Bioorganic Chem*. 2017; 2: 135-145.
50. Trivedi MK, Branton A, Trivedi D, Nayak G, Lee AC, Hancharuk A, et al. Evaluation of the impact of biofield energy healing treatment (the Trivedi Effect®) on the physicochemical, thermal, structural, and behavioural properties of magnesium gluconate. *Int J Nutrition Food Sci*. 2017; 6: 71-82.
51. Savjani KT, Gajjar AK, Savjani JK. Drug Solubility: Importance and Enhancement Techniques. *ISRN Pharmaceutics*. 2012: Article ID 195727.
52. Loh ZH, Samanta AK, Heng PWS. Overview of milling techniques for improving the solubility of poorly water-soluble drugs. *Asian J Pharm*. 2015; 10: 255-274.
53. Khadka P, Roa J, Kim H, Kim I, Kim JT, Kim H, Cho JM, Yun G, Lee J. Pharmaceutical particle technologies: An approach to improve drug solubility, dissolution and bioavailability. *Asian J Pharm*. 2014; 9: 304-316.
54. Hu J, Johnston KP, Williams RO. Nanoparticle engineering processes for enhancing the dissolution rates of poorly water soluble drugs. *Drug Dev Ind Pharm*. 2004; 30: 233-245.
55. Cheng XX, Lui Y, Hu YJ, Liu Y, Li LW, Di YY, et al. Thermal behavior and thermodynamic properties of berberine hydrochloride. *J Therm Anal Calorim*. 2019.
56. Zhao Z, Xie M, Li Y, Chen A, Li G, Zhang J, et al. Formation of curcumin nanoparticles *via* solution enhanced dispersion by supercritical CO₂. *Int J Nanomedicine*. 2015; 10: 3171-3181.



Our motto is to advance scientific excellence by promoting open access. We are committed in the widest possible dissemination of research and uplift future innovation



Submit Manuscript