

Influence of Biofield Energy Treatment on Isotopic Abundance Ratio in Aniline Derivatives

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Abstract

The aim of this study was to evaluate the impact of biofield energy treatment on the isotopic abundance of $^{13}\text{C}/^{12}\text{C}$ or $^2\text{H}/^1\text{H}$ or $^{15}\text{N}/^{14}\text{N} \equiv (\text{PM}+1)/\text{PM}$ in aniline; and $(\text{PM}+1)/\text{PM}$ and $^{81}\text{Br}/^{79}\text{Br} \equiv (\text{PM}+2)/\text{PM}$ in 4-bromoaniline using Gas Chromatography-Mass Spectrometry (GC-MS). Aniline and 4-bromoaniline samples were divided into two parts: control and treated. The control part remained as untreated, while the treated part was subjected to Mr. Trivedi's biofield energy treatment. The treated samples were subdivided in three parts named as T1, T2, and T3 for aniline and four parts named as T1, T2, T3, and T4 for 4-bromoaniline. The GC-MS data revealed that the isotopic abundance ratio of $(\text{PM}+1)/\text{PM}$ in aniline was increased from -40.82%, 30.17% and 73.12% in T1, T2 and T3 samples respectively. However in treated samples of 4-bromoaniline the isotopic abundance ratio of $\text{PM}+1/\text{PM}$ was increased exponentially from -4.36 % (T1) to 368.3% (T4) as compared to the control. A slight decreasing trend of the isotopic ratio of $(\text{PM}+2)/\text{PM}$ in 4-bromoaniline was observed after biofield energy treatment. The GC-MS data suggests that the biofield energy treatment has significantly increased the isotopic abundance of ^2H , ^{13}C and ^{15}N in the treated aniline and 4-bromoaniline, while slight decreased the isotopic abundance of ^{81}Br in treated 4-bromoaniline as compared to their respective control.

Keywords: Biofield energy treatment; Aniline; Gas chromatography-Mass spectrometry; 4-Bromoaniline; Isotopic abundance

Abbreviations

PM: Primary Molecule; PM+1: Isotopic Molecule either for $^{13}\text{C}/^{12}\text{C}$ or $^2\text{H}/^1\text{H}$ or $^{15}\text{N}/^{14}\text{N}$; PM+2: Isotopic molecule for $^{81}\text{Br}/^{79}\text{Br}$

Introduction

Aniline and its derivatives are widely present in natural products, vitamins, amino acids and are being used as antioxidants, and in the production of dyes and pesticides [1,2] although these compounds are hazardous to the environment and humans, including its acute toxicity, neurotoxicity, reproductive and developmental toxicity. Aniline and 4-bromoaniline have been used as an intermediate in the synthesis of several pharmaceutical drugs (plasmochin, and pamaquine) [3,4], antioxidants (*p*-phenylenediamine and octyl diphenylamine), and antiseptic agents [5]. Diazo product of these compounds can be used for the production of azo dye in the textile industry. Some other chemical intermediates like *p*-phenylenediamine, 2-chloro-4-nitroaniline, 2,6-dichloro-4-nitroaniline etc. are also prepared using *p*-bromoaniline/aniline as a starting material [6]. Aromatic secondary amines can be readily oxidized and are used as antioxidants in rubber industries [7]. Amines and their salts are also known to possess bactericidal, fungicidal and algacidal activities [8]. Despite such practical importance, aromatic amines are prone to oxidation at ambient conditions, the N-H bond cleavage starts the most common photochemical process in N-H containing aromatic compounds and reduces its practical importance [9,10].

The stability issue associated with the structural properties of aromatic amine derivatives can be addressed by an alternative mean. Nowadays, biofield energy treatment is known to alter the various properties of living and non-living things [11-13]. The American College of Obstetricians and Gynecologists (ACOG) defines biofields as "energy fields that purportedly surround and penetrate the human body". Human has the ability to harness the energy from environment/universe and can transmit into any object around the Universe. The object(s) always receive the energy and responded into useful way. This process is known as biofield treatment [14]. National Centre for Complementary and Alternative Medicine (NCCAM) have reported that biofield energy therapies are commonly used to promote the

health and healing is very popular in subgroup of energy medicine among complementary medicines [15-17]. People in western countries practice biofield healing therapy as certain form of Complementary and Alternative Medicine (CAM) [18]. Mr. Trivedi's unique biofield treatment is also called as 'The Trivedi Effect'. The impact of the Trivedi Effect has been well studied in various research fields like material sciences [19,20], agricultural [21,22], and microbiology research [23]. Hence, based on the outstanding results achieved by the biofield energy treatment an attempt was made to evaluate the effect of biofield energy treatment on the isotopic abundance ratio of $^{13}\text{C}/^{12}\text{C}$ or $^2\text{H}/^1\text{H}$ or $^{15}\text{N}/^{14}\text{N}$ ($\text{PM}+1/\text{PM}$) and $^{81}\text{Br}/^{79}\text{Br}$ ($\text{PM}+2/\text{PM}$) in aniline and 4-bromoaniline.

Experimental

Materials

Aniline and 4-bromoaniline were procured from Qualigens, India and S. D. Fine Chem. Ltd., India, respectively.

Biofield energy treatment modalities

Aniline and 4-bromoaniline were taken in this experiment for biofield energy treatment. The compounds were divided into two parts named as control and treated. No treatment was given to the control set. The treated group was handed over to Mr. Trivedi for biofield energy treatment in sealed pack under standard laboratory conditions. Mr. Trivedi provided the treatment through his energy transmission process to the treated group without touching the sample. After treatment, the treated samples were stored at standard laboratory conditions for GC-

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MS analysis as per the standard operating protocol. The control and treated samples were characterized using Gas Chromatography-Mass Spectrometry (GC-MS). The experimental results in treated groups were analyzed and compared with the control set.

GC-Mass spectrometry

GC-MS analysis was done on Perkin Elmer/auto system XL with Turbo mass, USA. The GC/MS was performed in a silica capillary column. It was equipped with a quadrupole detector with pre-filter, one of the fastest, widest mass ranges available for any GC/MS. The mass spectrometer was operated in an Electron Ionization (EI) positive/negative, and chemical ionization mode at the electron ionization energy of 70 eV. Mass range: 20-620 Daltons (amu), stability: ± 0.1 m/z mass accuracy over 48 hours. The identification of analytes was done by retention time and by a comparison of the mass spectra of identified substances with references.

The treated sample was divided into three parts in aniline as T1, T2, and T3 and four parts in 4-bromoaniline as T1, T2, T3, and T4 for GC-MS analysis. The mass spectrum from GC-MS was obtained in the form of % abundance vs. mass to charge ratio (m/z). The isotopic abundance ratio $^{13}\text{C}/^{12}\text{C}$ or $^2\text{H}/^1\text{H}$ or $^{15}\text{N}/^{14}\text{N}$ (PM+1/PM) and $^{81}\text{Br}/^{79}\text{Br}$ (PM+2/PM) was expressed by its deviation in the treated samples as compared to the control. The percentage change in isotopic ratio (PM+1/PM) and (PM+2/PM) were calculated on a percentage scale from the following formula:

$$\text{Percent change in isotopic abundance ratio (PM+1 / PM)} = \frac{R_{\text{Treated}} - R_{\text{Control}}}{R_{\text{Control}}} \times 100$$

Where, R_{Treated} and R_{Control} are the ratio of intensity at (PM+1) to PM in mass spectra of treated and control samples, respectively.

Results and Discussion

GC-MS data

GC-MS of aniline: The mass spectra of control and treated samples (T1, T2, and T3) are presented in Figures 1 and 2. Mass spectra showed PM peak at $m/z=93$ in control and all the treated samples of aniline. The intensity ratio of PM+1 (i.e., $m/z=94$) and PM (i.e., $m/z=93$) peaks are presented in Table 1. There were three major peaks observed in control sample i.e., at $m/z=93$, 65 and 52 due to fragmentation of aniline, corresponded to the following ions: $\text{C}_6\text{H}_7\text{N}^+$, C_5H_5^+ (pentadine), and C_4H_4^+ (buten-3-yne) respectively. The peaks at $m/z=93$, 65 and 52 in control sample were well matched with the previously reported GC-MS data [24]. The treated aniline samples (T1-T3) were fragmented in a different fashion as compared to the control and exhibited five major peaks in the mass spectrum with diverse intensities. For instance, peaks at $m/z=65$, 52, 39, and 28 were observed may be due to PM breaking up of treated aniline to pentadine, buten-3-yne, propyne and ethene radicals respectively.

However, a significant alteration in isotopic abundance ratio of (PM+1/PM) was observed for treated aniline as compared to the control. The isotopic abundance ratio in control and treated aniline was calculated and presented in the Table 1, also the change in isotopic abundance ratio of (PM+1)/PM for the treated samples are shown in Figure 3. It is seen from the Figure 3 that the isotopic abundance ratio of PM+1/PM of treated aniline was increased by 30.17% in T2 and 73.12% in T3, and decreased to 40.82% in T1 as compared to the control. The increased isotopic abundance ratio of (PM+1/PM) in treated aniline samples may increase the effective mass (μ) and binding energy due to heavier isotopes i.e., ^{13}C or ^2H or ^{15}N .

GC-MS spectra of 4-bromoaniline: The PM peak was observed at $m/z=171$ in both control and treated samples with different intensity

(Figures 4 and 5). The base peak was observed at $m/z=65$ in control and treated (T1) sample of 4-bromoaniline, however for other treated samples, T2, T3, and T4 the molecular ion peak i.e., at $m/z=171$ was the base peak. The intensity ratio of PM peak and PM+1 peak are given in Table 2. Total four major peaks at $m/z=171$, 92, 65, and 39

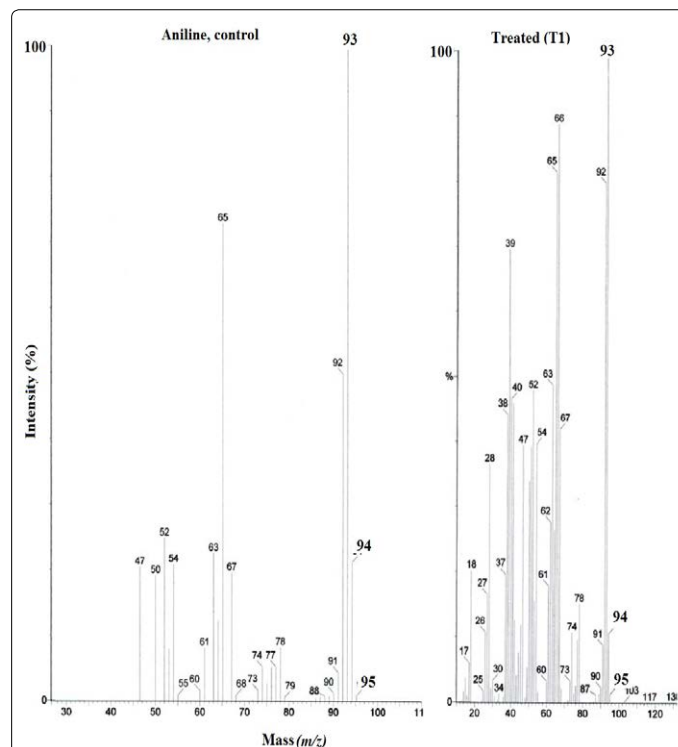


Figure 1: GC-MS spectra of control and treated (T1) samples of aniline.

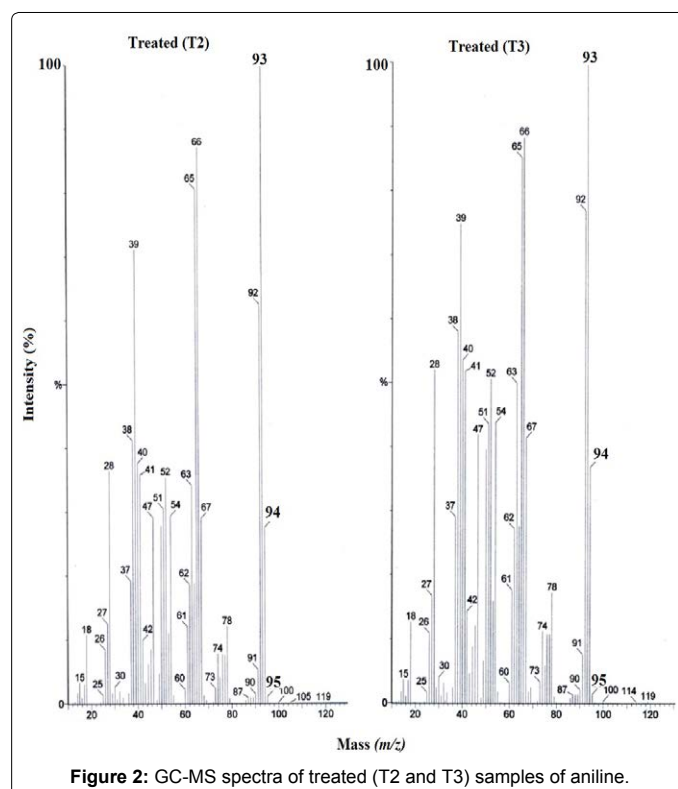


Figure 2: GC-MS spectra of treated (T2 and T3) samples of aniline.

Parameter	Control	Treated		
		T1	T2	T3
Peak intensity at m/z =(PM)	100	100	100	100
Peak intensity at m/z =(PM+1)	21.21	12.55	27.61	36.72

Table 1: GC-MS isotopic abundance analysis result of aniline.

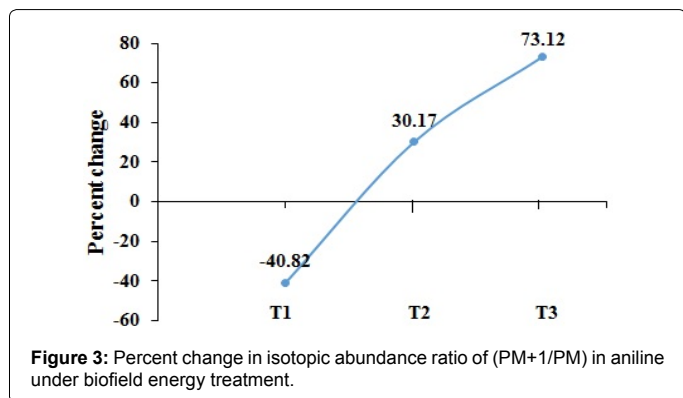


Figure 3: Percent change in isotopic abundance ratio of (PM+1/PM) in aniline under biofield energy treatment.

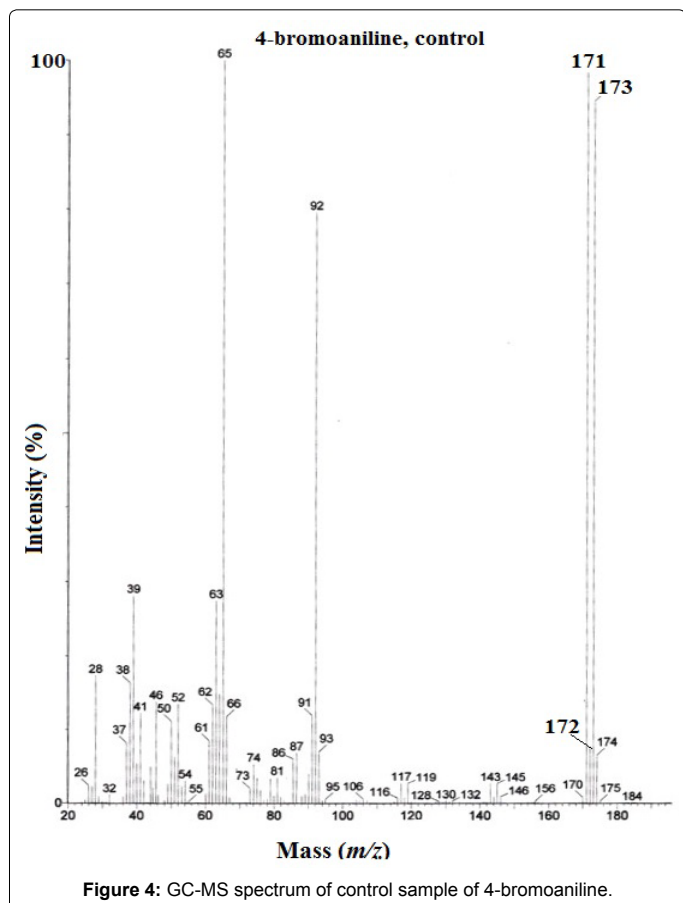


Figure 4: GC-MS spectrum of control sample of 4-bromoaniline.

were observed in the control sample of 4-bromoaniline may due to the fragmentation of 4-bromoaniline to $C_6H_6BrN^+$, $C_6H_6N^+$, $C_5H_5^+$, and $C_3H_3^+$ ions, respectively. Further treated samples, T1, T2, and T3 of 4-bromoaniline were fragmented in a similar way as the control sample but T4 sample fragmented to give two extra peaks at $m/z=52$ and 42 which could be due to the $C_4H_4^+$ and $C_3H_6^+$ ions, respectively. Peak at $m/z=92$ was seen in both control and treated samples may due to the initial fragmentation of 4-bromoaniline to aniline⁺. Peaks at $m/z=65$

and 39 were observed may be due to the formation of cyclopentadiene and propyne from the ring opening reaction of 4-bromoaniline. The extra peaks were observed at $m/z=52$ and 42 in treated (T4) sample of 4-bromoaniline, which may be due to the formation of but-1-en-3-yne and propene. Fragmentation pattern and number of fragmented peaks of control 4-bromoaniline molecules were well matched with the literature report [25]. The isotopic abundance ratio of (PM+1/PM) and (PM+2/PM) of control and treated 4-bromoaniline are shown in the Table 2 and plotted in Figure 6. The isotopic abundance ratio of PM+1/PM of treated 4-bromoaniline was increased exponentially up to 368.3% from T1 to T4 samples (T1= -4.36%, T2=70.78% T3=140.55%, and T4=368.3%). However, the isotopic abundance ratio of PM+2/PM was decreased gradually to 4.65% (T1= -0.5%, T2= -0.64% T3= -3%, and T4= -4.65%). The change in PM+2/PM may be due to the presence of bromine in 4-bromoaniline. It is reported that the isotope fractionation for bromine is slower than chlorine, carbon, hydrogen and nitrogen in hydrophobic environment which is much dependent on the reaction path (kinetic) of organohalogen compounds [26] and slow depletion of PM+2/PM ratio (4.65%) is observed.

Atoms taking part in chemical bonds with higher isotopic number have higher binding energy with increased effective mass (μ) and vice versa. Thus, the increased isotopic abundance ratio of $^{13}C/^{12}C$ or $^2H/^1H$ (PM+1/PM) in both the compounds (aniline and 4-bromoaniline) might increase the effective mass and binding energy after biofield energy treatment that may enhance the stability of aniline derivatives significantly. However the isotopic abundance ratio of $^{81}Br/^{79}Br$ (PM+2/PM) was decreased slightly in 4-bromoaniline. As the isotopic abundance of ^{81}Br is 49.31% and ^{79}Br is 50.69%, so this minor depletion (-4.65%) in ^{81}Br in treated 4-bromoaniline may not affect the stability significantly. However the increased isotopic abundance ratio (PM+1/PM) may reasonably increase the number of heavier isotopes (i.e., 2H , ^{13}C and ^{15}N) in the molecule after biofield energy treatment. Some probable bonds are presented in Table 3 that might present in aniline and 4-bromoaniline such as $^{12}C-^{12}C$, $^1H-^{12}C$, $^{13}C-^{12}C$, $^2H-^{12}C$, $^1H-^{13}C$, $^{12}C-^{81}Br$, $^{13}C-^{14}N$, and $^2H-^{15}N$ after the biofield energy treatment. The effective mass of various chemical bonds were calculated and presented in Table 3. The result showed that μ of normal $^{12}C-^{79}Br$, $^{12}C-^{12}C$, $^{12}C-^{14}N$ and $^1H-^{12}C$ bonds were 10.41, 6, 6.46 and 0.923 amu, respectively. It showed that effective mass is higher in case of heavier isotope (i.e., $^{12}C-^{81}Br=10.45$, $^{12}C-^{13}C=6.24$, $^{13}C-^{14}N=6.74$ and $^2H-^{12}C=1.71$ amu). So localized enrichment of heavier isotope may occur in this process, which may lead to significant change in energy of the isotope substituted bonds. It may enhance the bond strength, stability, and binding energy of aniline and 4-bromoaniline molecules.

Conclusion

In summary, aniline and 4-bromoaniline were studied under the influence of biofield energy treatment and significant changes were observed in isotopic abundance as compared to the control sample. The increases in isotopic abundance ratio of $^{13}C/^{12}C$ or $^2H/^1H$ or $^{15}N/^{14}N$ (PM+1/PM) was up to 73.12% and 368.3% in treated samples of aniline and 4-bromoaniline respectively. However, in treated samples of 4-bromoaniline, the isotopic abundance ratio of $^{81}Br/^{79}Br$ (PM+2/PM) was decreased by 4.65%. The alteration of isotopic ratio after biofield energy treatment has a significant impact on the bond energies and the chemical reactivity of the molecules. Bond strength may be increased by increasing the effective mass (μ), of the atoms which consequently increases the binding energy. The decreased number of ^{81}Br in the treated samples might not affect much on the total effective masses of the respective bonds as the number of altered atoms are negligible as compared to the abundance of the PM+1 isotopes. It is assumed from

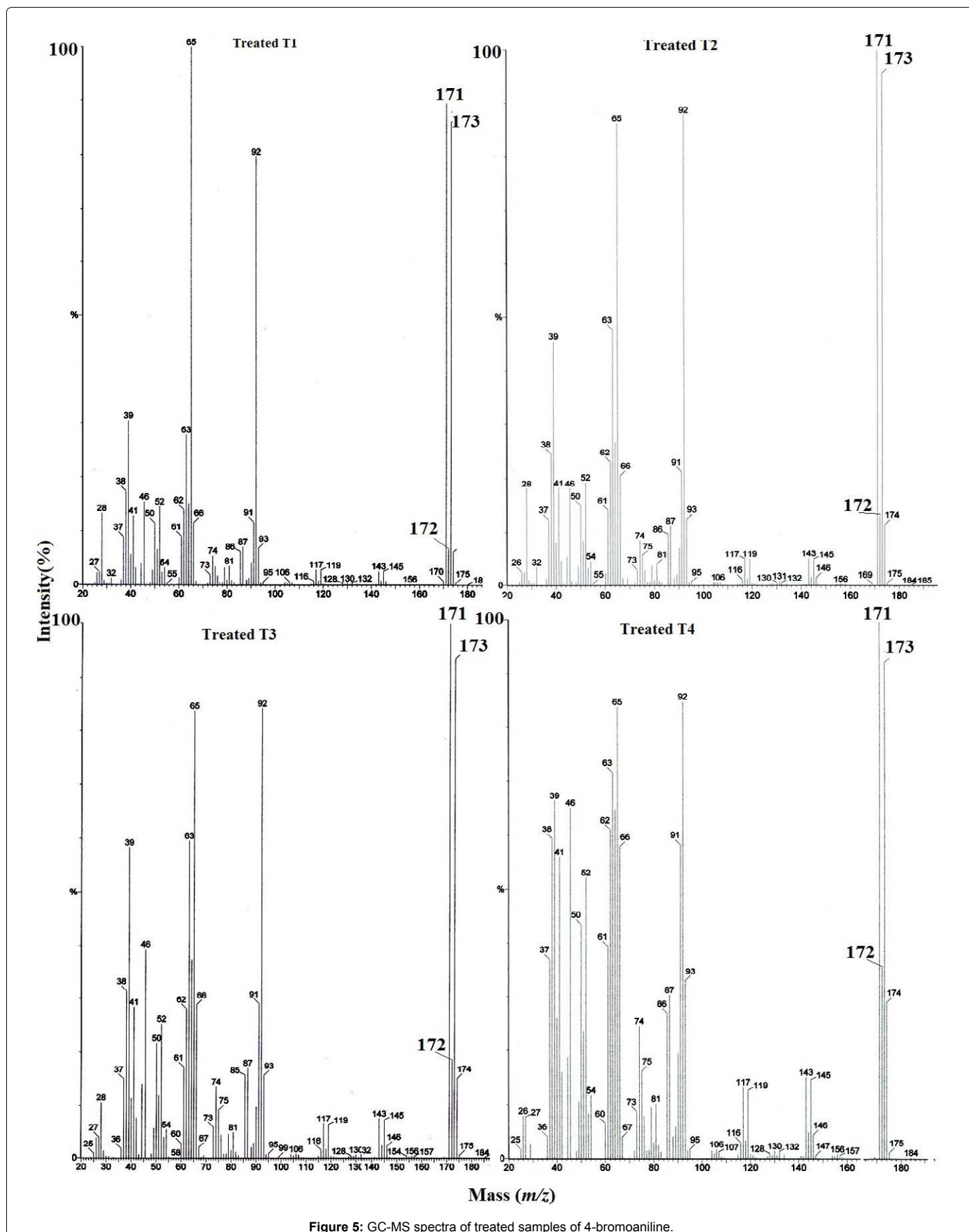


Figure 5: GC-MS spectra of treated samples of 4-bromoaniline.

Parameter	Control	Treated			
		T1	T2	T3	T4
Peak intensity at m/z =(PM)	98	89.64	100	100	100
Peak intensity at m/z =(PM+1)	7.5	6.56	13.07	18.41	35.84
Peak intensity at m/z =(PM+2)	94.42	85.93	95.73	93.45	91.86

Table 2: GC-MS isotopic abundance analysis result of 4-bromoaniline.

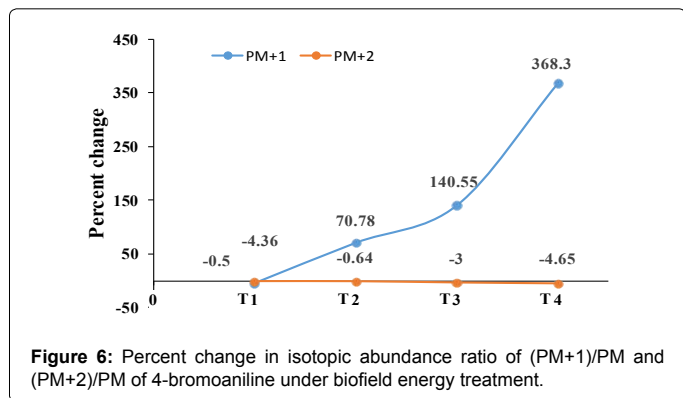


Figure 6: Percent change in isotopic abundance ratio of (PM+1)/PM and (PM+2)/PM of 4-bromoaniline under biofield energy treatment.

Isotopes bond	Isotope type	Reduced mass (μ) $m_A m_B / (m_A + m_B)$
$^{12}\text{C}-^{12}\text{C}$	lighter	6.00
$^{13}\text{C}-^{12}\text{C}$	heavier	6.26
$^1\text{H}-^{12}\text{C}$	lighter	0.923
$^1\text{H}-^{13}\text{C}$	heavier	0.929
$^2\text{H}-^{12}\text{C}$	heavier	1.04
$^{14}\text{N}-^{13}\text{C}$	heavier	6.5
$^{15}\text{N}-^{12}\text{C}$	heavier	1.71
$^{14}\text{N}-^{13}\text{C}$	heavier	1.71
$^{79}\text{Br}-^{12}\text{C}$	lighter	10.41
$^{79}\text{Br}-^{13}\text{C}$	heavier	11.16
$^{81}\text{Br}-^{12}\text{C}$	heavier	10.45
$^{14}\text{N}-^2\text{H}$	heavier	1.75
$^{15}\text{N}-^1\text{H}$	heavier	0.94

Table 3: Possible isotopic bonds in treated aniline and 4-bromoaniline. Where, m_A : Mass of an atom A, m_B : Mass of an atom B, Here A may be C (carbon) or H (hydrogen) and so on.

the results that the increased isotopic abundance ratio of PM+1 after Mr. Trivedi's biofield energy treatment on aniline and 4-bromoaniline molecules are enough to maintain the stability of bonds, which could result in the reduction of decomposition and photo oxidation reactions initiated by heat, light and molecular oxygen in aniline and 4-bromoaniline.

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