

**FREQUENCY ANALYSIS OF SACRED SOUND OM (AUM)**

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**ABSTRACT**

Since times of yore sacred sounds like "OM", Gayatri Mantra and Mrutunjay Mantra have played a significant role not only culturally but also helped in maintaining mental and physical health. According to the manuscripts, it is scientifically verified that these sounds have a remarkable and positive impact on human body and mind. But, still extensive research needs to be conducted to prove the impact of sacred sounds, especially "OM", on our significant parts of the body, for example, the heart. This research paper does the frequency analysis of "OM" sound with its chanting performed with the three basic sounds of "A", "U" and "M". There are varied ways of chanting the sound "OM" or "AUM", according to the ancient literature like the Mandukya Upanishda. Therefore it's typically confusing for a layman to seek out the precise or ideal method of chanting the sound "OM" or "AUM". So, in this research work more focus is on variety of ways of chanting "AUM" which can offer the utmost health benefits. The tools and strategies to be used are; Spectral Analysis, Audio Analysis, computing Techniques. Here sacred sound AUM is recorded and its scientific analysis is carried out. The female subject is chanting AUM for 11 times and the sound file is of 7 minutes duration. The sampling rate is chosen as 44100. The work reviewed is mainly divided into some major steps such as basic understanding, health benefits, and Spectral analysis of sound AUM.

**Keywords:** OM, AUM, Spectral analysis, sacred sound.

**I. INTRODUCTION**

**BASICS OF OM OR AUM**

In line with Upanishads, OM is that the name or image of God. It is comprised of 3 letters, namely, A, U, and M and it is the linguistic unit of the past, present, and also the future. OM is the basis of all thoughts and chanting or brooding about Om can cause quiet psychological state. In line with Upanishadas, In Bhagvad Gita's sacred text, it has been explained that Om means the Brahman or consciousness and who remembers it invariably, attains the supreme goal. In Patanjali's Yoga Sutras (PYS) that is one among the classical yoga texts explained, OM as Pranava that's Iswara. In line with Yoga teachings, OM is the basis behind all thoughts and chanting or brooding about Om can cause calm psychological state. Chanting OM comes underneath the side of meditation. The "Om" mantra is additionally thought of the name of absolute. Om also written as AUM is an element of the picture found in ancient and medieval era manuscripts, temples, monasteries and non-secular retreats in Hinduism, Buddhism, and Jainism. The image encompasses a meaning in all Indian religions, like Buddhism, Hinduism, Jainism and Sikhism, however the meaning and connotations of Om differ among the various schools and across the varied traditions. The linguistic unit Om is additionally noted as onkara, omkara and pranava. [17]

**ORIGIN AND MEANING**

The word has 3 phonemes: "A-U-M", though it's typically said to be trisyllabic, despite this being either archaic or the results of translation. The linguistic unit Om is 1st mentioned within the Upanishads, the paranormal texts

related to the Hinduism philosophy. It has multifariously been related to ideas of "cosmic sound" or "mystical syllable" or "affirmation to one thing divine", or as symbolism for abstract non secular ideologies within the Upanishads. In the Vedic literature all layers of sacred texts, the linguistic unit is widespread and joined to data that it stands for the "whole of Vedas". The Aitareya Vedic literature of Rig religious writing, in section five.32, as an example suggests that the 3 phonetic parts of Om (pronounced AUM) correspond to the 3 stages of cosmic creation, and when it is chanted or uttered, it celebrates the artistic powers of the universe. The Vedic literature layer of sacred text texts equate Om with Bhur-bhuvah-Svah, the latter symbolising "the whole Veda". They provide many shades of meaning to Om, like it being "the universe on the far side the sun", or that it is "mysterious and inexhaustible", or "the infinite language, the infinite knowledge", or "essence of breath, life, everything that exists", or that "with that one is liberated". The linguistic unit Om evolves to mean several abstract ideas within the earliest Upanishads. Max Müller and alternative other researchers state that these philosophical texts suggest Om as a "tool for meditation", state varied meanings that the linguistic unit is also within the mind of one meditating, starting from "artificial and senseless" to "highest ideas like the reason for the Universe, essence of life, Brahman, Atman, and self-knowledge. After having outlined these 3 states and turiya, the sacred writing continues. "This is that the atman symbolized by Om, that has four elements. The akara, or the "a" sound of Om represents the waking state and is the basis of the words apti which means "obtaining". Whoever is aware of this obtains all needs and is the better of all. The ukara, or the "u" sound of Om defines the dream state and is the root of the word utkarsa which means "exhalation" : He who notices this excels in his power of understanding, in the continuity of knowledge and becomes equal to that understanding.[3]



Figure 1: Meaning of OM (AUM) - Four states of human consciousness

### **BENEFITS OF OM CHANTING**

**IMPROVED PULMONARY FUNCTION-** In a study that examined the effects of Bhramari pranayama and Om chanting on pulmonary function, 82 healthy subjects practiced both pranayama and chanting for five minutes each, six days of a week for two weeks. Remarkable improvements in various pulmonary functions were observed in this group when compared to a control group.[2]

**INCREASED MENTAL ALERTNESS-**One of the most common diseases in the world is hypertension and persistent causes cardiovascular diseases. It was seen that chanting of Om reduces heart rate, blood pressure and reduces skin resistance. Earlier studies reported that, proper 'Om' chanting causes vibration sensation around the ears, which is transmitted through the vagal nerve. One of the most common treatments for depression is vagal nerve stimulation. Earlier studies reported that Om chanting deactivates limbic system. Medical treatment of hypertension is not always successful to achieve blood pressure control. Om meditation not only affects the many parts of the brain, such as pre-frontal cortex, vagus nerve, amygdale and others but also affects the heart rate and respiratory rate. Researches on Om meditation are categorized under four different heads: Neuroimaging studies, EEG studies, evoked potentials studies and other methods studies [3]. Even though the

existing research evidenced of Om meditation in curing anxiety and depression, more studies with better design, with larger sample size and with various control groups are required.

**POTENTIAL RELIEF FROM STRESS AND DEPRESSION**-Globalization, industrialization and modernization epitomize the extreme disorientation of man from himself, and his fellow men. Today we are heading toward materialistic progress at the cost of our health, physical as well as mental. Stress creates adverse effect on physical as well as mental health. Our first reaction to stressful situation is rapid pulse rate. Short term stress is relatively easy to control. But long term stress may lead us to mental illness like anxiety, depression, breathlessness, sleep disorders, eating disorders etc. Studies have shown that techniques like meditation, mantra therapy, music therapy or Raga therapy can guide us in this matter. Today’s researchers have also done experiments to show that mantra therapy can be used to handle human reactions like stress, anxiety, fear etc.

During the OM chanting practice, our mind focuses on the repetition of OM chanting. Furthermore, this practice helps us to reach steadiness. The frequency of the chant signal achieves steadiness following a continuous chanting. This states the attainment of the steadiness in the mind of an OM chanting person. This provides peace to the stressed mind. The mental stress of a person gets reduced while the mind goes towards steadiness. In addition, concentration also improves. From the average Energy plot of all frames of OM it is clear that acoustic of OM contains seven to eight peaks. The frequency band corresponding to each peak is having a lot of significance since it contains traditional chakra (energy centers) frequencies from the Indian tradition as shown in table III. There are seven chakras in a human body:[7]

**Table 1: Chakra Frequencies**

<i>Band No.</i>	<i>Frequency (Hz)</i>	<i>Range</i>	<i>Significance in Chakra System</i>
1	100 ~ 112.5		
2	112.5 ~ 125		
3	125 ~ 137.5		
4	137.5 ~ 150		Shuman Resonance
5	150 ~ 162.5		
6	162.5 ~ 175		
7	175 ~ 187.5		
8	187.5 ~ 200		
9	200 ~ 212.5		
10	212.5 ~ 225		
11	225 ~ 237.5		
12	237.5 ~ 250		Root
13	250 ~ 262.5		
14	262.5 ~ 275		
15	275 ~ 287.5		Sacral
16	287.5 ~ 300		
17	300 ~ 312.5		
18	312.5 ~ 325		Solar
19	325 ~ 337.5		
20	337.5 ~ 350		Heart

21	350 ~ 362.5	
22	362.5 ~ 375	
23	375 ~ 387.5	Throat
24	387.5 ~ 400	
25	400 ~ 412.5	
26	412.5 ~ 425	3rd Eye
27	425 ~ 437.5	
28	437.5 ~ 450	
29	450 ~ 462.5	
30	462.5 ~ 475	
31	475 ~ 487.5	Crown
32	487.5 ~ 500	

## II. DISCUSSIONS

The sound is generated due to vibration of air particles. The waves generated in air, has areas of compression and rarefaction. The sound OM created while chanting generates vibration waves in air. This chanting creates a positive vibration in human body and has very positive effects. Till today lot of research has been done to search for the scientific evidence for these effects of OM chanting on human body. There are many methods of chanting OM. This chanting creates a positive vibration in human body and in turn it has very positive effects. These various methods are going to be compared in this research. One of the methods which are now days more popular is to chant as A-U-M. Each word i.e. A, U and M have their own frequencies. Each of these sounds has unique effect on every part. The sound of 'A' has more effect on the portion just below the navel or just below the stomach. Whereas the sound 'U' cause maximum vibration in the region near heart. The last sound is of 'M' creates vibration above the region of throat.

Here sacred sound OM is recorded and its scientific analysis is carried out. Here the method of chanting A-U-M is selected. The collected data which includes the different samples from male and female subject is analysed. The female subject is chanting OM for 11 times and the sound file is of 7 minutes duration. The sampling rate is chosen as 44100. The work reviewed is mainly divided into some major steps such as basic understanding of sound OM, health benefits of sound OM, Spectral analysis of sound OM and sound analysis..

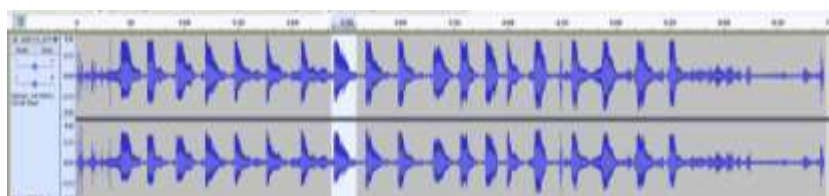


Fig.1: Audio file for AUM chanting of Female subject.

The above figure shows the audio file recording for female subjects. The audio file is of 7 minutes length and sampling rate is 44100

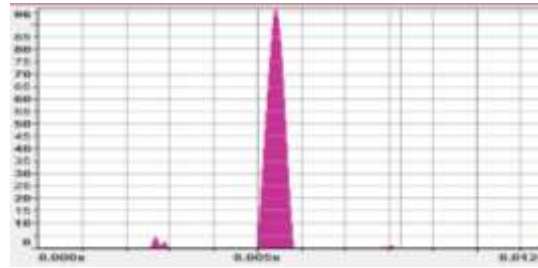


Fig.2: Enhanced Autocorrelation using Audacity Software for Audio sample OM chanting of Female subject

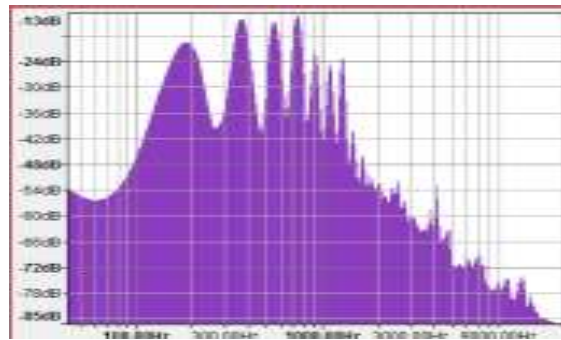


Fig.3: Frequency Plot using Audacity Software for OM chanting of Female Subject

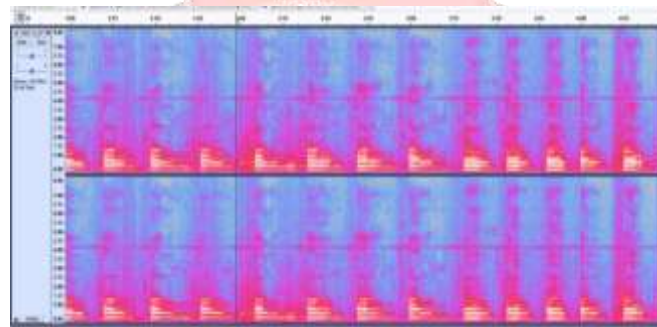


Fig.4: Spectrogram Plot using Audacity Software for OM chanting of Female Subject The figure no. 4 shows the spectrogram. It can be seen that the maximum sound energy content is in the between the frequency range of the 200 Hz to 1400 Hz.

**DESCRIPTIVE STATISTICS:**

Table 2: Descriptive statistics for the audio sample of OM chanting

S.No.	Frequency (Hz)	
1	Mean	430.66
2	Standard Error	55.59
3	Median	430.66
4	Mode	#N/A
5	Standard Deviation	242.34
6	Sample Variance	58732.65
7	Kurtosis	-1.19
8	Skewness	1.21E-10

9	Range	775.19
10	Minimum	43.066406
11	Maximum	818.26
12	Sum	8182.61719
13	Count	19
14	Mean	430.66

### III. CONCLUSION:

1. As per the frequency analysis carried out, the major components of the frequency are 185 Hz, 367 Hz, 550 Hz and 737 Hz. These observed frequencies are lying in the range of standard values as referred in table no. 1.
2. The statistical mean value for the sound AUM is 430 Hz. And the standard deviation is 242.34
3. The maximum sound energy is between frequency ranges of 200 Hz to 1400 Hz.
4. The frequencies are linked with 'A' 'U' 'M' and related with the Chakras "Root", "Heart" and "Crown", respectively. It means that when we chant AUM all the seven energy centers in human body get energized. Life has energy centers and they all vibrate at different frequencies related with the Chakras "Root", "Heart" and "Crown", respectively. It means that when we chant AUM all the seven energy centers in human body get energized. Life has energy centers and they all vibrate at different frequencies.

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