

# Infrared Rays are Green Energy in Medical Science Helps Increasing Blood Flow

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**Abstract** - Infrared wave's plays vital role in present medical science in healing fauna. Infrared waves have more advantage when compared with UV rays and Light waves. Unlike UV and light waves the infrared waves have less side effects and comparatively more effective in healing or energising the body cells. Infrared rays releases molecules when they made oscillate by striking to any surface such as walls, snow, earth, stone etc. These molecules makes the human to feel warmth, when they exposure to biological body. In the present it is explained what extent this heat help the human body to relief their body constraints like muscle pains, blood flow, ulcers and etc.

**Keywords** – Blood flow, Infrared, healing, green energy, Heat.

## I. INTRODUCTION

The Infrared (IR) frequency range lies under the visible light range of the electromagnetic spectrum. Infrared rays do not need any medium to travel. The IR waves can freely travel through air and can travel in depths of space. When IR rays collide with any surface, it makes releasing the molecules which causes some heat in surrounding. When the infrared waves strike on any living body surface causes heat penetrate into the skin surface and travel in all uncontrollable directions. When the infrared panels are disabled, the molecules travel throughout the surface until their energy is absorbed by body surface. Throughout this process humans or a living creature can sense this as a warm feeling which makes very comfortable in un-sunshiny day. Based on this property in the present work IR waves are adopted into medical sciences to activate blood cells. Infrared rays have more advantage on human body in many critical situations like to get rid of pains on skin surface, bones. At certain wavelength the infrared waves produces sufficient heat, which may increase blood flow in situations like blood clotting and in heart malfunctioning. During winter the blood flow is different from the blood flow in summer [2]. It highly essential to consider seasonal temperature variations around the skin surface and the area where the waves can propagate in-depth of the skin. Apart from this the heat produced by IR waves can also be used to reduce joint pains for immediate action. There is many other researches are going on IR waves in different applications like cancer treatment, abolish of ulcer and pustule, Coronary Artery Disease, Arteriosclerosis, and hypertension, Infrared Heat Therapy, Ear, Nose, and Throat Conditions Relieved with Infrared Heat. Unlike UV rays the IR waves has an advantage of non-allergic to the skin and no side effects to the human body up to some exposure to radiation.

When high environmental temperatures are exposed to body cells it may cause imbalance of some blood

components and further cause's deviations in electrolyte balance [3] in weak patients or in dehydration affected patients. As the temperature increases, the blood acid-base equilibrium breaks and the levels of some blood components changes accordingly [3]. In the case when environmental temperatures unbalancing the blood flow and respiration, an infrared thermal system helps the human to recover to healthy condition.

When radiation from Infrared panels' strike any surface of the body some part of the wave is absorbed some part of the wave will be reflected. IR waves need to radiate through skin surface until, a living body feel the warmth in the body cells present just beneath the skin surface. Generally IR waves penetrate 1/2" through the skin upper surface. As the IR radiant energy almost matches with a healthy body natural radiant energy, the body absorbs 91% of the IR radiation energy. Unlike Light wave in IR thermal system only few percentage of heat is absorbed by the surrounding air environment of the skin surface. That means in IR heating system, the wastage of heat is very small when comparing with other heating system. Unlike in other heating systems, IR system makes less hot air around the skin surface. In other systems the radiations increases the heat at surroundings. An excessive heat creates side effects, skin allergies, irritation and unexpected problems while healing. In IR thermal system maximum percentage of the heat is penetrated in depth of the skin. Which means maximum percentage of heat is utilized in heating the blood cells and in other healing system. As temperature rises the solubility of Oxygen level also increases [1].

*Different waves with matter*

- 1.1 *Microwave Interaction:* The quantum energy of microwave photons is in the range between 0.00001 and 0.001 eV. Microwaves can strongly penetrate through conductors and causes electric currents which will heat the conductor. Microwaves can also pass through human body. High intensity microwaves are generated in microwave ovens are used to heat food to keep it fresh.
- 1.2 *Infrared interaction:* The quantum energy of infrared photons is in the range between 0.001 and 1.7 eV. Infrared waves are absorbed more strongly than microwaves, but less strongly than visible light. Due to its active vibrational effect of molecules IR waves can be used to heat tissues. Infrared radiation does penetrate through skin more than visible light.
- 1.3 *Visible Light Interaction:* The electrons are elevated to higher energy levels in absorption of visible light photon. Visible light is absorbed strongly with a strong light source.

1.4 *Ultraviolet Interaction:* The near ultraviolet is absorbed very strongly in the surface layer of the skin by electron transitions. As going to higher energies, the ionization energies for many molecules are reached and the more unsafe photoionization processes take place and ionization produces the risk of skin cancer.

Heating of particular area of the body produces reflex-modulated vasodilation in distant-body areas, even in the absence of a change in core body temperature. That is heat one extremity and the contralateral extremity also dilates, heat a forearm and both lower extremities dilate, heat the front of the trunk and the hand dilates[4][8]. Temperature elevation produces an increase in blood flow and dilation directly in capillaries, arterioles and venules, probably through direct action on their smooth muscles. The release of bradykinin, released as a consequence of sweat-gland activity, also produces increased blood flow and vasodilation [8]. Whole-body hyperthermia, with a consequent core temperature elevation, further induces vasodilation via a hypothalamic-induced decrease in sympathetic tone on the arteriovenous anastomoses. Vasodilation is also produced by axonal reflexes and by reflexes that change vasomotor balance [4][8]. The heat transfer in the skin has been traditionally addressed using Pennesbioheat equation [6][9].

$$\rho c \frac{\partial T}{\partial t} = \nabla \cdot (k \nabla T) - c_b \omega_m(T) \rho_b (T - T_a) + Q_m + P(z, t)$$

where,  $\rho$ ,  $c$ ,  $k$  are the density, specific heat and thermal conductivity of tissue, respectively and  $c_b$ , is the specific heat of blood,  $\rho_b$  is the density of blood,  $T$  is local tissue temperature,  $T_a$  is a reference temperature (arterial blood),  $t$  is time,  $Q_m$  is the metabolic heat production per volume, and  $P(z, t)$  is the heat deposited per volume due to spatially distributed heating. In this general form,  $\omega_m$  is a function of temperature to include the specific case of temperature dependent perfusion.

When dealing with skin allergies the distribution of heat is different. The distribution of heat varies with histamine injection. The histamine “wave” propagates with the velocity of  $v$  and exhibits a bio-chemical switch behaviour. At point  $r$ , a supplementary heat source appears after time  $t = r/v$ . The increase of heating is constant in time and is linearly related to the maximal histamine concentration at point  $r$  [5]. The skin temperature with histamine action is discussed with slight modification along with biot’s number [7].

$$\Delta T_H(r, t) = T_H(r, t) - T_{s0}$$

Where  $T_H(r, t)$  is the temperature after histamine action at point  $r$  and time  $t$ ,  $T_{s0}$  is the temperature before examination,  $T_H$  is the temperature change at point  $r$  with respect to time  $t$ .

## II. MOTIVATION

The IR systems are very easy to carry and more comfortable to operate. In the Infrared wave thermal systems the body producing 3times of sweat when compared with old traditional thermal systems. These

results can be obtained at room temperature only with IR thermal systems. This will be more help full for the cardiovascular patients. But in other hot air thermal systems, the same result can be obtained at higher room temperatures. Hence IR thermal systems response time is very small when compare with other hot air systems. Other thermal systems need to wait large time approximately 30mins to 60mins to reach higher temperature readings and then it will start function its task. It makes patient to wait and feel more warmth causes unnecessary irritations and sometimes rashes.

## III. EXPERIMENTAL RESULTS

Naturally the blood cells of healthy body generate IR radiation as output from the skin to heal the cuts, injuries and wounds. Further deep penetration of IR waves boost up the healing process to fasten the curative process. Past researches convey that natural radiation could be in the range of 2-9 microns. It is very safe to select Infrared lamps with 2-25 micron wave band. Applying IR wave’s causes molecules to vibrate and it causes toxins, fat and impurities to dilute into the blood stream. This will make release of sweat at large volume as in huge physical exercise. These wave bands can extensively use to apply on skin surface to heal or heat the bottom layer of the skin. With changing of range of wave band it is observed different temperature readings. By varying different wave bands different heat ranges are observed and feel warmth. Heating the lower muscle of the skin means, the blood flow also increases. Without any physical exercise a cardio patient can be healed by pumping blood by increasing the blood flow. The temperature emitted by a body generally evaluated by Wien’s displacement law. A general relation between a radiation and warm body and wave length is,

$$\lambda = 2900 / (T(\text{celsius}) + 273.15)$$

In terms of frequency the Wien’s law becomes,

$$\nu_{\max} = \frac{\alpha}{h} kT \approx (5.879 \times 10^{10} \text{ Hz / K}) T$$

Table I: Wavelength vs Temperature

Wave Length (microns)	Temperature (Kelvin)
8	363
8.2	356
8.3	350
8.5	341
8.9	323
9	322
9.2	314
9.5	304
9.6	300
9.7	298
10	290
10.2	285
10.4	282
10.5	274
10.6	272

The table I is showing the temperature readings when Infrared waves are focussed on skin surface. These values are observed at room temperature. The values are recorded while doing heat therapy which is done by Infrared Medical lamp. With small modifications in the lamp a wide range of intensities can be observed in the system. There are many varieties of infrared medical lamps are available in the Indian market which can be used for Heat therapy. Different company lamps are available in the Range of INR 4000/- to INR 5000/- rupees. Infrared rays' heat therapy can be used to healing properties as it can fasten flow of blood in the cells making recovery faster. It can also be used to relieve broken muscle tissues and fractures in certain cases. In the present work a 300Watt lamp is used to observe the body heat. The body heat is continuously observed by focussing the light for not more than 15 minutes. There will not be any need to take appointments of physiotherapist's. Mostly it is preferred to use in emergency situations like in mid night, travelling and like in not movable situations. But it is always preferred to have doctor's advice before we take any decision.

Care must be taken while the temperature is below 290 Kelvin. It is below freezing point. And these temperatures should not apply long time on living beings. The temperatures below 300 Kelvin are not preferable to apply on human beings. These temperatures may harm the skin tissue permanently.

#### IV. CONCLUSION

The Infrared lamps should not be used without any experts advise. Higher intensities may cause seivour damage to the tissues and in sensitive areas. Heating of muscles produces an increased blood flow level similar to that seen during exercise. Without the skin or body surface estrangement the Infrared waves can increase the temperature with minimal heat loss to environment. The deep penetration of infrared rays increases the heat and increases the blood flow which relieves the joint pains. The unwanted toxins in blood cell can also be removed by deep penetrations of IR waves. The Infrared heating system is very much use full for those who can move themselves, older people, and also new born children. It is better to have the infrared lamp in the house in case of emergency and uncomfortable ailments like arthritis, rheumatism or even spinal injuries.

#### V. FUTURE SCOPE OF WORK

Infrared waveband requires further study and analysis to produce more effective work in other areas. With small modifications in the range IR waves can be radiated on black heads to remove it from face. IR wave radiations can be used to remove ulcers, body odour, cancer, pain relief, dental, protect new born babies, dandruff by increasing blood flow in scull upper surface and many other medical science groups. So it is very important to analyse the IR working principle and its wave band in order to achieve good socio results.

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