

SCIENCE OF LIGHT AND COLOUR

CHAPTER

2

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2.1. Science of Light and Colour

The wave form of light energy configures its own space known as a wave packets or quanta. This configuring of space is due to oscillatory, inherited nature of transverse wave form of energy which is associated with matter.

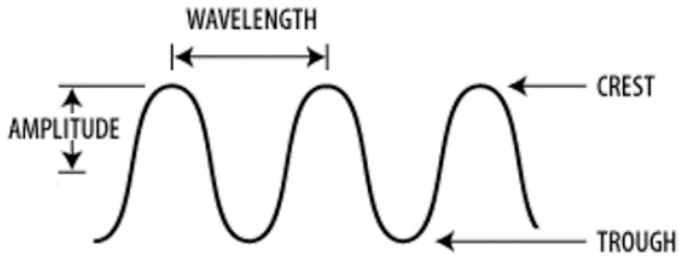


Figure 2.1. A Sine Wave

There are different types and identical properties of EM radiations including gamma rays, x-rays, radio waves, visible, ultraviolet, and infrared. The whole array of these is known as the electromagnetic spectrum, which runs in order of wavelength from longest (radio waves that range from 1 millimeter to several kilometers) to shortest (gamma rays at less than 0.1 nanometers). The human eye is only sensitive to EM radiation at wavelengths that range roughly between 780 nanometers and 380 nanometers.

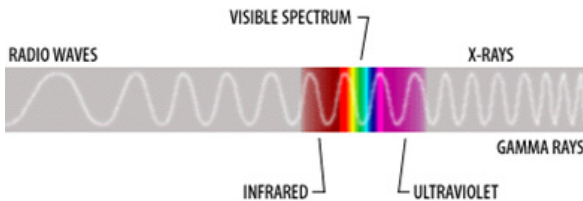


Figure 2.2.

This small segment is called the visible spectrum or visible light (see Figure 2.2).

The visible spectrum contains numerous colours that are distinguished by wavelength and amplitude.

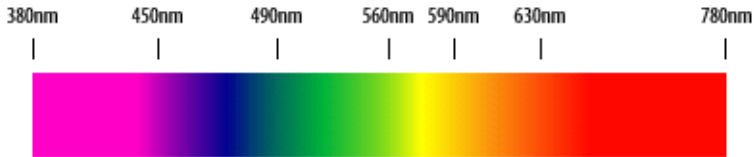


Figure 2.3. The Visible Spectrum

The Table .A. shows the estimated frequencies and wavelengths of different colours.

Table. A.

Colour	Wavelength in nm	Frequency in HZ
Violet	380 – 450	7.14×10^{14}
Blue	450 – 490	6.38×10^{14}
Green	490 – 560	5.66×10^{14}
Yellow	560 – 590	5.17×10^{14}
Orange	590 – 630	4.84×10^{14}
Red	630 – 780	4.28×10^{14}

The combination of these light waves produces white light, which is what we see from the sun and from most artificial light sources. This occurs naturally in a rainbow; it also occurs when white light is refracted through a prism. In fact, it was by experimenting with a prism in 1666 that Newton conclusively proved that what we see in these refractions are the constituent colours of white light; that is, that white light is not homogeneous (as had been previously supposed), but

a composite of myriad-coloured electromagnetic waves .

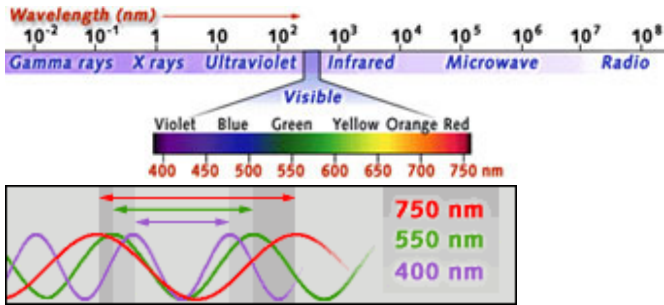
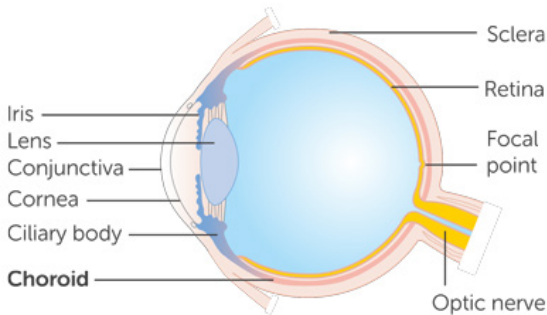


Figure 2.4. The Electromagnetic Spectrum

More simply, light is energy and the phenomenon of colour is a product of the interaction of energy and matter.

2.2. ~~How do we see colours~~



~~Figure 2.5. The Human Eye~~

~~Human eye can only detect that radiant energy whose wavelength falls into one particular octave (between 380-~~

9.4. Absorption of Colours through different medium (Chromotization)

This method of providing vibrations of needed colours to the body involves material medium for transportation of the colour energies. The medium could be anything like boiled or distilled water, milk, juice, syrup, sugar tablets, petroleum jelly or oils for an ointment.

9.4.1. Preparing chromotized water

For chromotizing water, a transparent glass bottle of required colour is filled up with water boiled and cooled, leaving one quarter of the bottle empty, it is capped and placed in the sunlight for 2 to 6 hours. And, if the sunlight is not available then electric bulb light can be used. In that case the bottle is placed at a distance of 2 or 3 feet from the bulb and the bulb should not be less than 100 watts. Caution is to be exercised that the bottle is to be kept in the light on a piece of wood or some other 'non-conductor surface and is to be kept so even after it is removed from the light so that the frequencies absorbed from the light in the form of colour vibrations and the charge produced in the water may not be earthed.

This water can be prepared daily although a bottle once chromotized or charged and kept on a wooden or insulated surface maintains its charge up to 6 or 7 days. The recommended dosage of this chromotized water is half a cup or 2 ounces at one time. This dosage is to be repeated according to the intensity of the ailment to be treated and the disease to be cured.

9.4.2. Preparing chromotized oils

Different oils can also be chromotized and used for massage on the affected part of the body in the same way. Three fourth of a bottle of needed colour is filled with olive, mustered or sesame oil is capped securely and is kept in the sunlight for forty days or is kept under the bulb light for 200 hours continuously. The olive oil can also be administered orally and in that case its dosage is 5 ml or a teaspoonful only, once a day. When the chromotized oils are used for massaging the affected part of body, it is recommended that the massage is to be done in anticlockwise circular movements.

9.4.3. Preparing chromotized milk

Preparing milk or juice For chromotizing milk for babies, transparent cellophane sheet of required colour is wrapped around the feeding bottle and is kept in the sun on a wooden table for one or two hours. Another method of chromotizing milk or juice for babies and patients could be something like this. Prepare a box of wood, hard board or card board of an appropriate size; say one cubic foot, leaving one side open, cover the open side of the box with the needed coloured plastic or cellophane sheet. Place a glass of milk or juice in the box which can be kept in the sunlight or under the electric bulb light for one or two hours before taking the milk or juice. This will not only save the patient to take chromotized water or colourful light doses separately but also benefits the patient by providing the chance of having the required vibrations along with the food, without even knowing that he/she is under treatment of any type.

9.4.4. Preparing chromotized tablets

Tablets of milk of sugar, which are easily available with the homeopathy drug stores, can easily be chromotized when these are kept in the securely capped, transparent coloured bottles. For chromotizing the tablets the coloured bottles are kept in the sunlight for forty days or under a beam of artificial light for 200 hours. The bottles are to be kept on the wooden surface and during the Chromotization of the tablets the bottles are required to be shaken at the least once a day so that each and every tablet in the bottle could be exposed to the colourful vibrations and absorb them adequately. Tablets thus chromotized can be used up to six months and can also be recharged by placing the bottles in the sunlight for 50 to 60 hours. Another method of preparing the tablets is to prepare chromotized alcohol or some edible oil for 200 hours and then few drops of this preparation are to be put onto the tablets before use by the patient.

9.4.5. Preparing chromotized ampoules

Ampoules of distilled water can also be chromotized for use in clinics. For preparing the ampoules of needed colours either the ampoules are painted with a transparent glass colours and then are kept in the light for 200 hours or the ampoules are put in a coloured glass jars and these jars are kept in the sunlight for forty days or under a beam of light from 100/200 watts bulb for 200 hours. These chromotized aqueous ampoules can be administered orally as well as injected into the body under the supervision of a qualified chromo therapist for treating severe pains, stubborn ailments and chronic diseases. Except in extreme cases, under normal cir-

cumstances, one ampoule used as an injection is sufficient for one week i.e. the second dose is administered after one week. And, if the chromotized ampoule is taken orally then one ampoule once a day is quite sufficient dose to treat a disease.

APPLICATIONS OF COLOUR THERAPY

CHAPTER

11

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11.1. Effect of colours on different enzymes

Every living cell needs energy. The energy necessary for the complex functions of the cell comes from nutrients absorbed by the organism. In its primary form, however, the chemical energy of the nutritive compounds is not directly usable for the cell, but has first to be converted biochemically into a cellular usable form. The cellular energy transfer takes place in the mitochondria, and therefore these organelles have a key function for the cells. Examination of the energy range, which is relevant by the energy transfer from the nutrients into the high energy adenosine triphosphate (ATP) in the cell, shows also the influence of electromagnetic radiation in the form of visible light. This range corresponds obviously to the metabolic energy as far as the energy intake and energy release systems of the whole process are concerned. In other words the presence or absence of radiation of a special frequency, wavelength, intensity, diffusion or polarization in the cell is the deciding factor whether reactions take place or not.

Living cells exhibit a very weak photon emission. This phenomena of “ultra-weak” photon emission from living cells or organisms, is different from bioluminescence, which exhibits an intensity of a few up to some hundred photons per second and per square centimetre of surface area. These photons (Biophotons) or ultra-weak photon emissions of biological systems are weak electromagnetic waves in the optical range of the spectrum (light). This light emission is an expression of the functional state of the living organism and its measurement therefore can be used to asses this state.

The discovery of biophotons emission also lends sci-

entific support to some unconventional methods of healing based on concepts of homeostasis (self-regulation of the organism), such as various somatic therapies, homeopathy and acupuncture. These biophotons have much more powerful potency of regulating biochemical reactivity than enzymes alone which enhance biochemical reactivity by means of lowering the activation energy due to complex binding to the substrate. If we could provide that energy to the enzymes directly, by irradiating them with particular wave length, process of curing a disease will be more rapid, because the action of different wavelengths (visible light) in micron scale particles, cells, organelles and large biomolecules may influence biological processes through stimulation of conformational changes in enzymes.

Here we discuss the method of absorption (in vitro) of visible range radiations/colour within the enzymes; glucose oxidase, cholesterol oxidase + cholesterol esterase, lipase and SOD, in order to confirm the changes produced in our body as a result of Colour therapy.

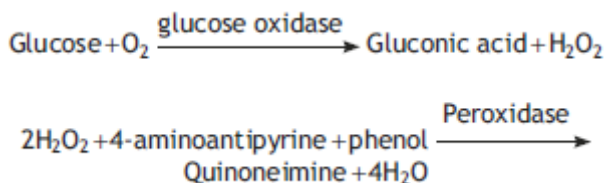
To study the effect of visible range electromagnetic radiations on the enzymatic reactions, we used commercial test kits can be used in the clinical laboratories for estimating the concentration of analytes of interest in the blood. These are calibrated kits and were used without any further pre-treatment.

Four different enzymes glucose oxidase, cholesterol esterase + cholesterol oxidase, lipase and super oxide dismutase (in vitro) were chromotized (absorbance of visible range radiations) in solution form and their catalytic activity was studied as compared to non-chromotized controls. Glass tubes were chromotized by wrapping coloured cellophane

filter sheets of specific wavelengths given in table.1, then the tubes containing enzymes solutions were irradiated with 12 watt incandescent light for 10 minutes from the distance of about 0.80 m (32 inches). The selection of colours was made according to the theory of Colour therapy, to cure particular ailment. In case of glucose oxidase, violet, yellow and green colours were selected. For cholesterol oxidase + esterase and lipase violet, green and red colours, for SOD red, yellow, green, blue and purple colours were used.

11.1.1. Glucose Oxidase

Glucose oxidase (EC: 1.1.3.4; 10KU/L) was part of a Diasys kit, where one unit of glucose oxidase is the amount of enzyme that catalyses the transformation of 1.0 micro mole of glucose to gluconic acid per minute at 25°C. The assay was carried out as per following reaction scheme. This enzyme is isolated from aspergillus. The buffer used in the kit is the phosphate buffer (pH 7.5)



The calorimetric indicator is the quinonemine generated from 4-aminoantipyrine and phenol by hydrogen peroxide, when catalyzed by peroxidase.

(Measured spectrophotometrically $\lambda = 546\text{nm}$)

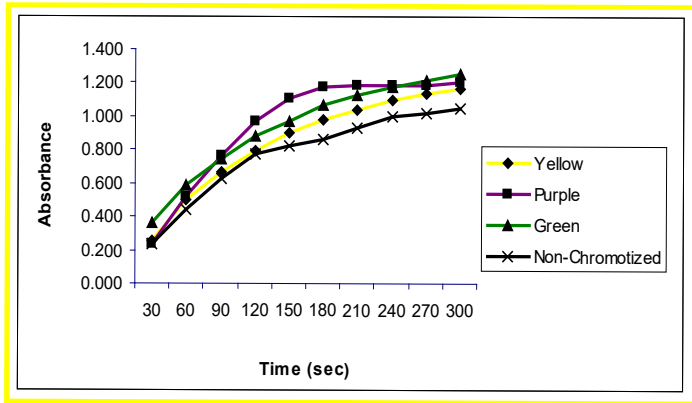


Figure 11.1. The absorbance pattern of different wave-lengths in glucose Oxidase (in vitro).

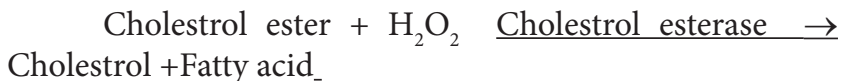
11.1.2. Cholesterol (esterase + Oxidase)

Cholesterol is hydrolyzed into free cholesterol and fatty acids by cholesterol esterase.

(EC: 3.1.1.13; 300u/L; 3.0 units per assay).

The cholesterol is oxidized into cholesterol 3-one and H₂O₂ in the reaction catalyzed by cholesterol oxidase (EC: 1.1.3.6; 100U/L stock; 1.0U/assay).

The assay was carried out as per following reaction scheme,



H₂O₂ is processed further as shown in the scheme

above.

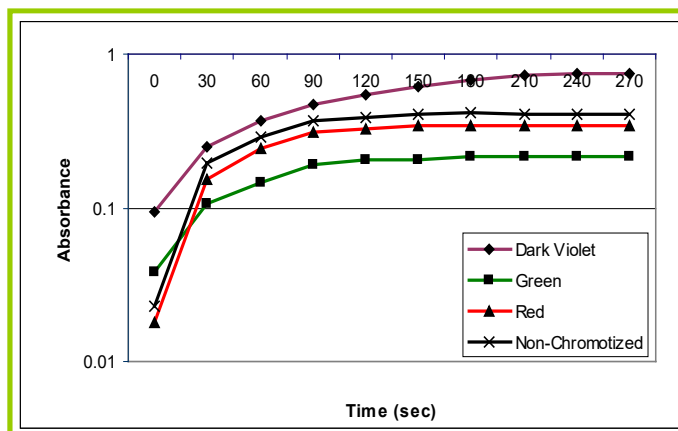


Figure 11.2. The absorbance pattern of different wave-lengths in Cholesterol (Oxidase+ Esterase) (in vitro).

11.1.3. Lipase

Lipase (EC: 3.1.1.3; 2KU/L) catalyzes the hydrolysis triglycerides into glycerol and fatty acids. The following assay procedure was adopted for this enzyme.

Triglycerides + H₂O $\xrightarrow{\text{Lipase}}$ Glycerol + Fatty acids

Glycerol + ATP $\xrightarrow{\text{Glycerol kinase}}$ Glycerol 3 –Phosphate + ADP

Glycerol 3 p+O₂ $\xrightarrow{\text{Glycerol phosphate oxidase}}$ Dihydroxy acetone phosphate +H₂O₂

H₂O₂ is treated as in the case of above two enzymatic schemes.

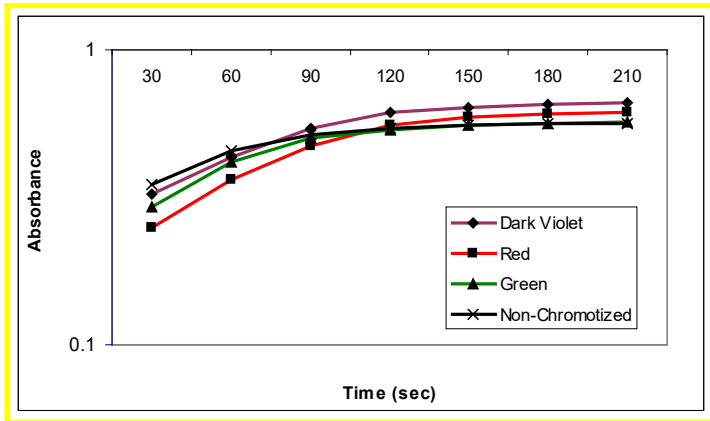


Figure 11.3. The absorbance pattern of different wave-lengths in Cholesterol (Oxidase+ Esterase) (in vitro).

11.1.4. Super oxide dismutase

Super oxide dismutase (SOD) is one of the most important antioxidant enzymes and present in all oxygen-metabolizing cells. Therefore, research on SOD activity will be important for the understanding of antioxidant mechanisms of life. Super oxide dismutase is an enzyme that catalyzes the conversion of super oxide free radicals to oxygen and hydrogen peroxide. In biological systems the sources of the electrons are generally enzymes and reducing substances. While reducing substances act as antioxidants by reducing more reactive species, electron-donors act as pro-oxidants by reducing less reactive species via reactions which are typically mediated by the cyclical reduction/oxidation of transition-metal ions. Super oxide dismutase catalyzes the dismutation of super oxide and hydrogen peroxide, respectively.

The result shows that each enzyme responded to specific frequency/colour in particular. Non chromotized (control) as well as chromotized (visible range radiation absorbance) enzymes show Gaussian behaviour of absorption.

Colour therapy creates photo-biomodulation effect which activates enzymatic process in cells to promote metabolism. Most enzymes need light (energy) for proper functioning. Studies have shown that different wavelengths affect different enzymatic reactions. Different wavelengths regulate living process by acting as catalysts in enzymes activity. This particular frequency when provided to the enzymes (in vitro) lead to the changes which might be occurring in vivo as well. This process facilitates Colour therapy to address diseases.

Photo-biomodulation is characterized by its ability to induce photo-biological processes in cells. Exact action spectra are needed for determination of photo accepters as well as for further investigations into cellular mechanisms of photo therapy. These light signals are responsible for the biochemical reactions in the cells. Everything has a very characteristic light emission.

According to the theory of Colour therapy, each part of the body has its own frequency response; different colour frequencies are required for different organisms. Therefore, these enzymes responded differently. It means that mechanism of absorption of specific frequency/wavelength in visible region (induced by Colour therapy) influences the enzymatic activity. The other interesting aspect of these observations is that these correlate well with the conventional Colour therapy in use for centuries. For example, purple colour is being used for diabetes, as supported in our case by the experimen-

tal observation in which purple colour enhances the activity of enzyme responsible for oxidation of glucose. Obesity is curable with violet colour, as in this study violet has responded to those enzymes responsible for fat reduction. Similarly red colour showed positive results in case of SOD, as according to the theory of Colour therapy, it is used for cancer treatment. Enzymes use binding energy from the binding of substrates to assist in catalysis because the enzyme is flexible. The framework may absorb energy in a very efficient way and put this energy to use or assisting with catalysis. It is evident from the comparison that different wavelengths in visible region show different level of absorbance. Red showed increase in absorbance pattern as compared to all other colours while yellow the least absorption.

In the study of SOD, it is aimed to understand the influence due to different colour wavelengths on the activity of this enzyme. Some studies showed that electromagnetic field on living systems have some effects on enzymes related to growth regulation, calcium balance in the cell and on gene expression. SOD is one of the enzymes that are involved in the reaction with super oxide radicals. In this study, the absorbance measurements resulted in a differentiation between the control-enzyme samples that were not exposed to any colour and the irradiated samples with different wavelengths in visible region. The results are very promising.

Several studies concluded that magnetic and electromagnetic fields have different responses for biosystems such as neural and neuromuscular activity, tissue growth and repair, glandular secretion, and cell membrane function.

Application of colours (wavelengths in visible region) resulted in an increase of the activity of SOD, when the en-

zyme was treated with substrate. The observations in this study showed that the response of Sod under 644 nm wave-lengths is significant.

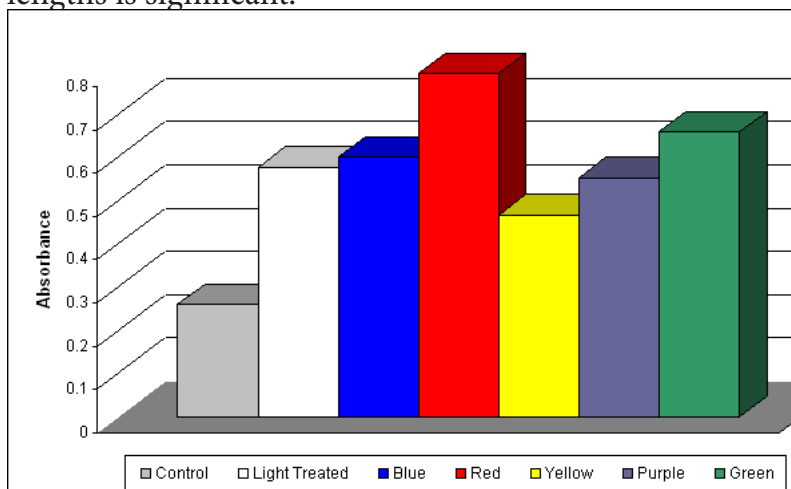


Figure 11.4. Comparison of Absorbance of different wave-lengths in Superoxide Dismutase

~~11.1.5. Treatment of cutaneous Leishmaniasis by Colour therapy (IN VIVO).~~

~~Leishmania comprises a genus of flagellate protozoan parasites with a world wide distribution and with more than 20 species that are pathogenic in humans. This parasitic disease is transmitted by the bite of the infected female phlebotomine sandflies. The trypanosomatid parasite of the genus leishmania is the etiological agent in a variety of disease manifestations, collectively known as Leishmaniasis.~~

~~The infection can cause a wide range of clinical manifestations and is considered to be one of the most threaten~~

COLORS AND DISEASES

CHAPTER

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12.1. Diseases of digestive system, Liver and Pancreas

- | | |
|-----------------------------------|-----------------------------------|
| 1. Peptic Ulcer | Yellow and green |
| 2. Gurgling, Bloating, Flatulence | Orange and Green |
| 3. Worms Infestation | Yellow and Blue |
| 4. Gastro-Enteritis | Yellow and violet |
| 5. Dysentery | Yellow / Orange and Green |
| 6. Cholera | Yellow, Orange and Green |
| 7. Constipation | Yellow and orange |
| 8. Irritable Bowel Syndrome | Yellow/orange and blue |
| 9. Dyspepsia | Yellow and Orange |
| 10. Hiccup | Yellow and blue |
| 11. Chrones Disease | Yellow and Green |
| 12. Ulcerative Colitis | Orange and Green |
| 13. Hemorrhoids (Bleeding) | Yellow, Green and Blue |
| 14. Hemorrhoids (Non Bleeding) | Orange, Green and Blue |
| 15. Fistula ANO | Yellow, green and Blue |
| 16. Jaundice | White, Yellow, Blue and green |
| 17. Hepatitis | Purple, Yellow white and blue |
| 18. Cirrhosis
Blue | Purple, Orange, Green and
Blue |
| 19. Ascites | White , yellow |

- | | |
|------------------------------|-----------------------------------|
| 20. Diabetes Mellitus
red | Purple, Yellow and blue or
red |
| 21. Hematemesis | Green, Red and Orange |

12.2. Diseases of Respiratory System

- | | |
|--------------------|----------------------|
| 1. Cattarah/Coryza | Blue and Yellow |
| 2. Bronchitis | Yellow and Orange |
| 3. Asthma | Orange |
| 4. Pneumonia | Blue and Orange |
| 5. Tuberculosis | Blue, Orange and Red |

12.3. Diseases of Heart and Circulatory System

- | | |
|--------------------------|------------------------------------|
| 1. Palpitation | Blue and Orange |
| 2. Angina
ple | Blue,Orange,Yellow and Pur-
ple |
| 3. Myocardial Infarction | Blue, yellow and orange |
| 4. Anaemia | Red,Orange or Pink |
| 5. Low Blood Pressure | Red or Pink and Orange |
| 6. High Blood Pressure | Green, blue and White |
| 7. Purpura | Blue, Yellow, Green and Red |

12.4. Sexual Diseases

- | | |
|--------------------------|--------------------------------|
| 1. Spermatorrhoea | Green, Yellow and Purple |
| 2. Masturbation | Green, Yellow, Blue and Purple |
| 3. Impotence | Red, Blue and Violet |
| 4. Premature Ejaculation | Green, Blue, Yellow and Purple |
| 5. Nocturnal Emission | Green, Yellow and Violet |

12.5. Diseases of Kidney and Ureter

- | | |
|---------------------------------------|----------------------------------|
| 1. Bed Wetting | Red, blue, Purple and Orange |
| 2. Urinary incontinence | --do-- |
| 3. Gonorrhoea | Green, blue and yellow |
| 4. Pyelonephritis | Blue, Green and yellow/Orange |
| 5. Acute Pyelonephritis | Blue, Green and yellow/Orange |
| 6. Renal Colic | Orange, green, purple and yellow |
| 7. Cystitis, Urinary Tract Infections | Blue and Green |
| 8. Haematuria | Blue and Green |

12.6. Diseases of Nervous System

1. Bilious Headache	Yellow, blue and green
2. Migraine	Blue
3. Vertigo	Blue, Yellow and Purple
4. Dysphemia	Violet, Blue and Orange
5. Epilepsy	Blue and Green
6. Encephalitis	Blue, green and yellow
7. Meningitis	Blue, Purple and Yellow
8. Paralysis	Red, Blue and Orange
9. Hydrocephalus Violet	White, Blue, Orange and Violet
10. Bell's palsy –Facial Nerve Palsy	Red, Blue and Purple
11. Parkinson's disease	Blue, Yellow
12. Fainting	Red, Green and Blue
13. Apoplexy	Red, Blue and Violet
14. Sciatica green	Yellow, blue, orange and green

12.7. Diseases of Hormones

1. Hyperthyroidism	Blue, Green and Yellow
2. Hypothyroidism	Violet and Orange

12.8. Psychiatric Illnesses

- | | |
|-----------------------------------|--------------------------------|
| 1. Schizophrenia | Green, Blue and White |
| 2. Depression | Green, Yellow, blue and Orange |
| 3. Mania | Blue, Yellow and White |
| 4. Acute Psychosis | Violet, Blue and White |
| 5. Dementia | Blue, Red, Green and Orange |
| 6. Night mares | Yellow, blue and green |
| 7. Insomnia | Blue, Yellow and Violet |
| 8. Hysteria | Blue, Green and Yellow |
| 9. Panic Attacks | Blue, Red, Green and Yellow |
| 10. Phobia | Orange, red and blue |
| 11. Obsessive-Compulsive Disorder | Blue/Indigo |
| 12. Tension Headache | Blue, Green, Violet and Purple |

12.9. Skin Diseases

- | | |
|-------------------------------------|--------------------------------|
| 1. Freckles, Lentigo, Choasm violet | Green, Pink, yellow and violet |
| 2. Acne Pimples violet | Green, Blue, yellow and violet |
| 3. Prickly Heat | Green, blue and white |

- | | |
|---------------|-----------------------------|
| 4. Urticaria | Green, Blue and yellow |
| 5. Ring Worm | Blue, Green and Violet |
| 6. Psoriasis | Blue, Green and Yellow |
| 7. Leukoderma | Red, Green, Yellow and Gray |

12.10. Children's Diseases

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|--------------------|----------------------------|
| 1. Teething | Blue and Yellow |
| 2. Bronchitis | Sky blue, orange and green |
| 3. Gastroenteritis | Yellow/Orange |
| 4. Marasmus | Blue, Yellow and Orange |
| 5. Whooping Cough | Orange, blue and yellow |
| 6. Small pox | Blue and Red |
| 7. Chicken Pox | Blue, Green and Yellow |
| 8. Tetanus | Blue and Green |
| 9. Measles | Orange and Blue |

12.11. Gynaecological Diseases

- | | |
|-----------------------------|--|
| 1. Dysmenorrhoeal
violet | Green, yellow, red, blue and
violet |
|-----------------------------|--|

2. Amenorrhea	Orange, violet and red
3. Menorrhagia	Violet, green and blue
4. Vulvulitis	Violet, Green and blue
5. Leucorrhea	Violet, green and blue
6. Infertility	Violet, green, red and Blue
7. Abortion low	Blue, Green, Violet and Yel-
8. Hypo lactation	Orange, green and violet

12.12. Ear, Nose and Throat Diseases

1. Mouth Ulcers	Blue and yellow
2. Acute Pharyngitis	Blue and Yellow
3. Chronic Pharyngitis	Blue and Orange
4. Allergic Rhinitis	Blue and Green
5. Epistaxis	Blue and Green
6. Sinusitis	Blue, Orange and violet
7. Toothache	Blue, yellow and green
8. Bleeding Gums- Pyorrhea	Blue and Orange

Eye Diseases

1. Ametropia	Blue, Green and Violet
--------------	------------------------

- | | |
|---------------------------------------|-----------------------------------|
| 2. Night Blindness | Blue, Indigo and yellow |
| 3. Ophthalmia Conjunctivitis
Green | Blue, Indigo, Yellow and
Green |
| 4. Styne | Green, Blue and Violet |
| 5. Blepharitis | Indigo, blue and Green |
| 6. Conjunctivitis | Blue, Indigo and Green |

12.13. Rheumatoid Diseases

- | | |
|-------------------------|--------------------------------------|
| 1. Rheumatoid Arthritis | Orange, red, blue, violet and yellow |
| 2. Gout | Orange, red, blue, and yellow |
| 3. Anorexia | Red, Green, Blue and Yellow |
| 4. Obesity | Red, Black or Violet and Yellow |

12.14. Other Diseases

- | | |
|--------------------------------|-------------------------|
| 1. Teeth Grinding During Sleep | Red Blue and Yellow |
| 2. Weakness | Orange, Red and Blue |
| 3. Dandruff | Blue, Orange and Green |
| 4. Heat Stroke | Blue, Green and Orange |
| 5. Typhoid | Blue, Indigo and Yellow |

- | | |
|-------------|---|
| 6. Malaria | Indigo and Green |
| 7. HIV AIDS | Blue, Green, Yellow, Orange, Red and violet |
| 8. Cancer | Red, Orange and Yellow |