



TECHNICAL BOOK



**ANATOMY
OF THE
HAIR**

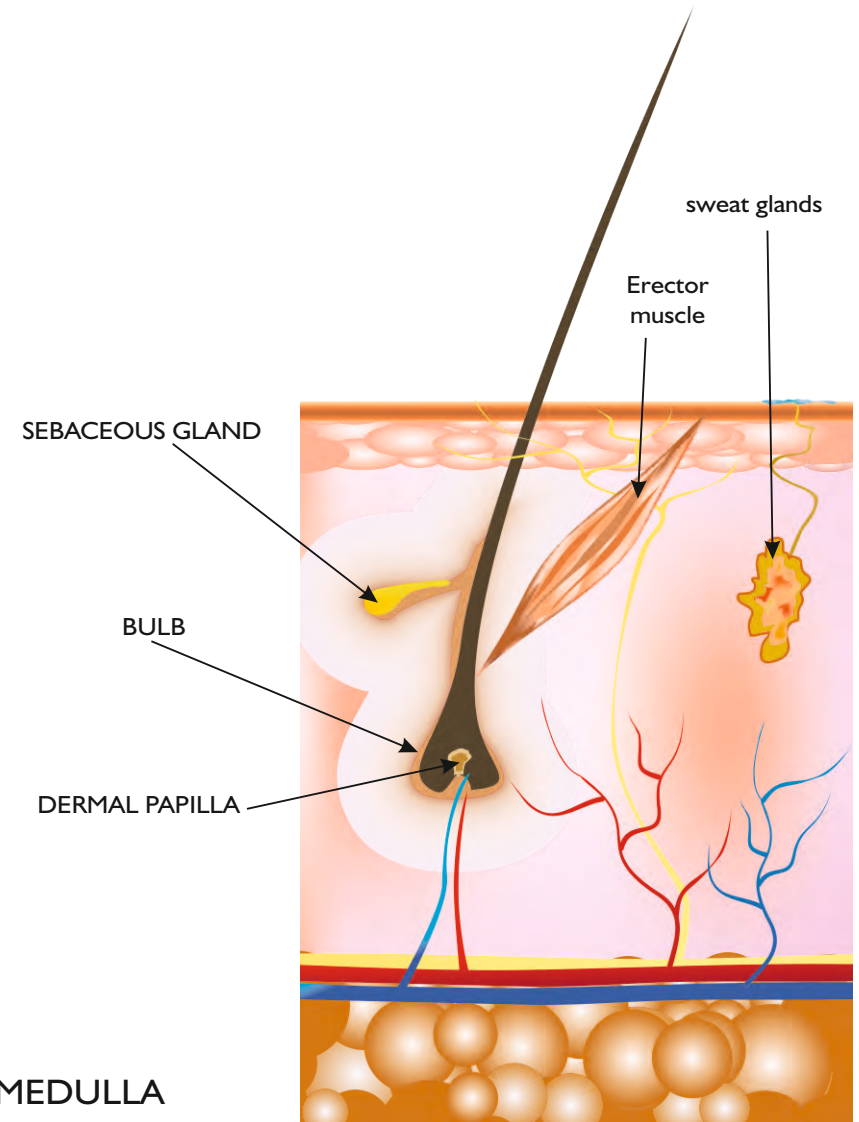
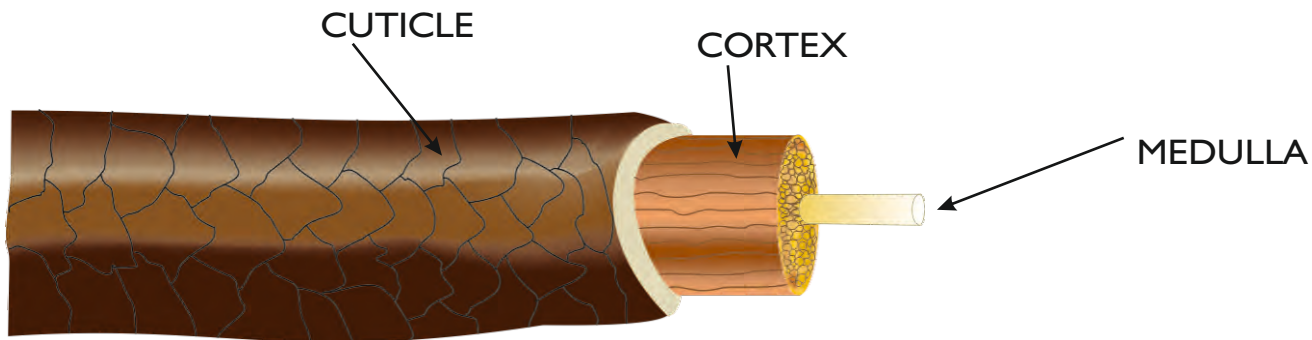
HAIR STRUCTURE

HAIR GROWS FAST BUT NEEDS TO BE IN GOOD PHYSIOLOGICAL CONDITIONS IN ORDER TO HAVE A REGULAR DEVELOPMENT.

Hair originates in hair follicles, invaginations of the epidermis into the dermis, more or less cylindrical in shape, which end deep down in a concave structure called bulb. It is here that cells multiply, allowing hair formation and elongation. The bulb contains richly vascularized dermal tissue, i.e. the dermal papilla, whose function is to generally nourish the hair. The hair's erector muscle contacts the follicle and here also opens the duct of the sebaceous gland, which secretes sebum, essential for the hair partial protection and external lubrication. Hair is endowed with its own sensitivity, so much so that it can be defined as a skin sense organ.

INDIVIDUAL HAIRS CAN BE DIVIDED INTO THREE PARTS:

- **CUTICLE:** corresponding to the hair's outer part, the most frequently damaged. Cuticle composition can vary depending on the type of hair.
- **CORTEX:** corresponding to the hair's intermediate part and making up most of its volume. The cortex consists in tapering cells, keratinized and pigmented, closely adhering to each other.
- **MEDULLA:** corresponding to the innermost layer, protected by cortex and cuticle. It is the least subject to aggression from chemical treatments.



THE CHEMICAL COMPOSITION OF HAIR

THE MAIN CHEMICAL ELEMENTS PRESENT IN THE HAIR ARE: 45% CARBON , 28% OXYGEN , 15% NITROGEN, 6.5% HYDROGEN, 5.2% SULPHUR. THE HAIR MAIN CONSTITUENTS, IN ADDITION TO WATER, ARE: KERATIN, LIPIDS, MINERALS AND PIGMENTS.

KERATIN is a fibrous scleroprotein composed of long amino acid chains with interposed vitamins and trace elements. It is an essential hair component and, due to its hardness, resistance and compactness, it is also called hard keratin. About 80% of the hair's weight is due to proteins, of which keratin is the main one and mostly composed of the following amino acids:

- 1) cysteine 17.5%
- 2) serine 11.7%
- 3) glutamic acid 11.1%
- 4) threonine 6.9%
- 5) glycine 6.5%
- 6) arginine 5.6%

AMINO ACIDS are the building blocks of proteins and are held together by bonds of various types to form a chain.

Disulfide bridges: they are formed when two cysteines are linked together by a disulfide bond. Such bonds are only broken by the action of chemicals (see hair perm and hair straightening).

Saline bonds: they contribute to the hair's shape and can be temporarily altered by water (washing and styling).

Hydrogen bonds: similar to saline bonds, they give solidity to the hair structure and can be modified by the elimination of water, by heat or by aggressive/non suitable products. When these bonds are subject to excessive modification the hair structure is damaged.

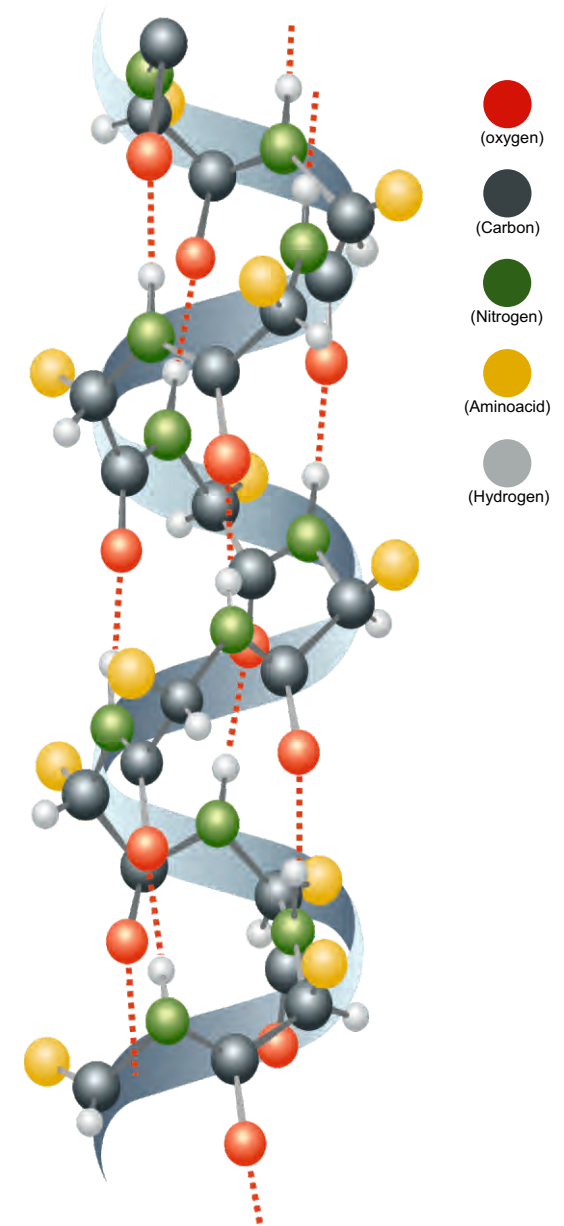
TRACE ELEMENTS are minerals present in the hair and represent an essential component of protein and enzyme systems. The main ones are:

- 1) iron: more abundant in red hair than in blonde and black hair.
- 2) magnesium: more abundant in black hair.
- 3) zinc: essential for the proper activity of the bulbar matrix germ cells. When this mineral is deficient the hair weakens and slows down its growth rate.
- 4) copper: essential for melanin synthesis and disulfide bridges formation.
- 5) lead: more abundant in chestnut-coloured hair.

People have different amounts of trace elements in their hair depending on the personal characteristics of each individual. The lack of protein and/or minerals may result in an alteration of hair constituents, leading to structural anomalies both internally and externally.

SKIN LIPIDS consist in lipids produced by sebaceous glands (75%) and, for the remaining 25%, in lipids of epidermal origin. Lipids present in the hair are, however, mostly derived from sebum. Sebum lipids are originally made up of: triglycerides, waxes, squalene and sterols, but within the hair follicles they may then be joined by corneal cells, water, diglycerides, monoglycerides and free fatty acids.

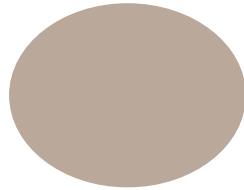
MELANIN is the substance responsible for hair pigmentation. It is produced by specific cells called melanocytes, located at the top of the dermal papilla. It is insoluble in water and soluble in strong acids (see bleaching, hydrogen peroxide). Melanocytes, using tyrosine (an amino acid) as a precursor, synthesize two major types of melanin: eumelanin, dark and present in black hair, and pheomelanin, lighter and present in golden, blonde or red hair. The graying of hair (white hair) is a physiological phenomenon due to reduced melanocytes activity with aging; the average age when white hair starts to appear is around 35 years, from the temples to the top.



TYPE OF HAIR

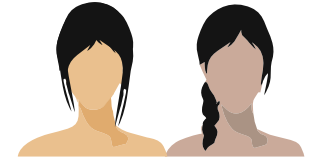
ASIAN

Geographical area:
China, Japan, India.
Mexico, Argentina, Brazil,
Cuba, Sud-America.



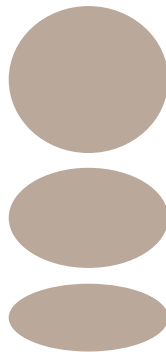
Physical Characteristics:

- Straight, smooth and shiny.
- Densely distributed.
- Round with large diameter.
- Shaft tends to be coarse and straight.
- Thick cuticle.
- Generally hair colour is dark or intense brown.
- Difficult to manage and treat with colour process.



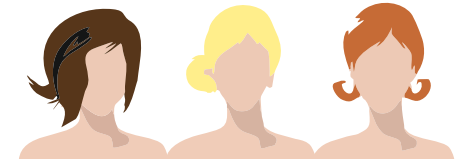
CAUCASIAN

Geographical area:
Europa



Physical Characteristics:

- Generally straight, curly or wavy.
- Small and evenly distributed.
- Oval or round of moderate diameter with minimal variation for geographic zone.
- Color may be blond, red, brown, or black.



AFRICAN

Geographical area:
Africa
Sud-America



Physical Characteristics:

- Generally frizzy, curly, fine or coiled.
- Densely distributed, clumped, may differ in size and shape.
- Flattened with moderate to small diameter and considerable variation.
- Generally hair color is black or intense brown.
- Is fragile and susceptible to breakage .



HAIR CHARACTERISTICS

FINE

The cuticle layer are minimal.



MEDIUM

The cuticle layers range from 5-10.



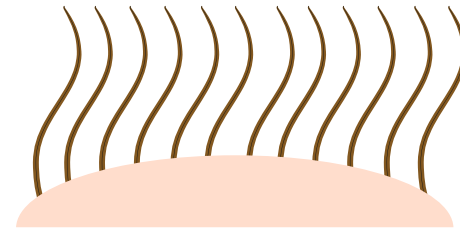
COARSE

The cuticle layers are high in number and range from 10+.

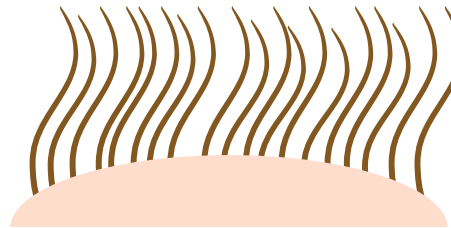


HAIR DENSITY

The density of the hair is determined by the number of active hair follicles per square inch on the scalp and is generally classified as thin, medium or thick.



THIN



MEDIUM



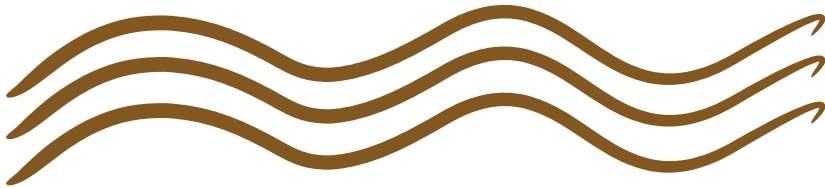
THICK

PHISICAL FACTOR / COLOUR RESULTS



Physical Factor / Straight hair:

- Provides maximum reflection of light due to the solid surface.



Physical Factor / Wavy hair:

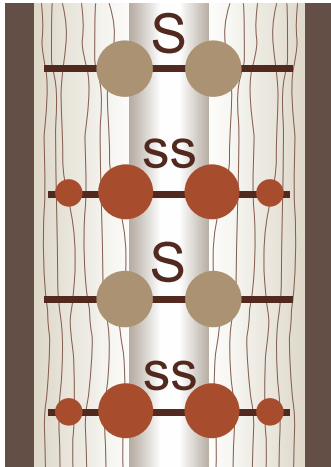
- Provides moderate amount of reflection.
- May absorb more color than straight hair.



Physical Factor / Curly hair:

- Provides the least amount of reflection.
- The curly texture absorb more light.
- The curly texture usually absorbs more color than straight hair.
- Heat is usually not necessary to process the color.

DIAGNOSIS FOR WAVING



DESCRIPTION / S BRIDGE (disulfide bridge)

This is a functional group consisting of two linked sulfur atoms (-S-S-), very important in stabilizing the tertiary structure of many proteins. The formation of disulfide bridges occurs by oxidation of the thiol groups of the amino acid cysteine. The disulfide bridge plays an important role in determining both structure and stability of the hair, made up largely of keratin protein chains. These chains are precisely held together by disulfide bridges. In some people, the formation of such bridges causes the protein chains to fold back partially on themselves, thus producing the phenomenon of curly hair.

DESCRIPTION / SS BRIDGE (more resistant disulfide bridge)

The SS disulfide bridge plays an important role in determining both structure and elasticity of the hair, since the hair must keep its original structure even after a waving treatment.

HAIR TYPES	RESISTANCE OF CUTICLES	RESISTANCE OF S BRIDGE	RESISTANCE OF SS BRIDGE
FINE HAIR	Red	Green	Green
THICK HAIR	Green	Red	Red
NORMAL HAIR	Green	Red	Green
COLOURED and TREATED HAIR	Green	Red	Green
DECOLOURED HAIR	Green	Red	Green

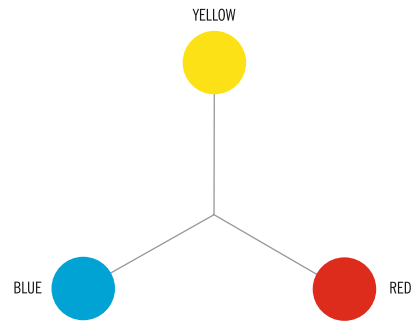


**COLOR
THEORY**

PRIMARY COLORS

RED, YELLOW and BLUE.

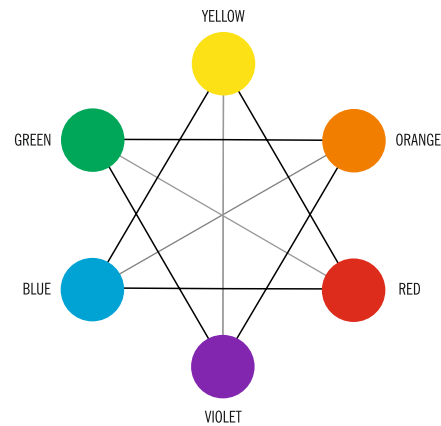
By mixing the primary colours in equal parts secondary colours are reached.



SECONDARY COLORS

ORANGE, GREEN and VIOLET.

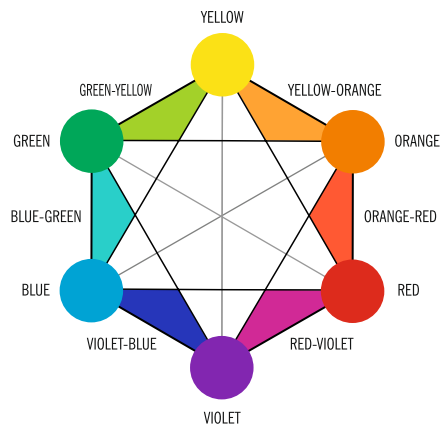
Opposite colours are called complementary colours.



TERTIARY COLORS

MIXING a Primary colors and Secondary colors

Red and Orange = Red-Orange
yellow and Green = Yellow-Green
Blue and Violet = Blue-Violet



COMPLEMENTARY COLORS

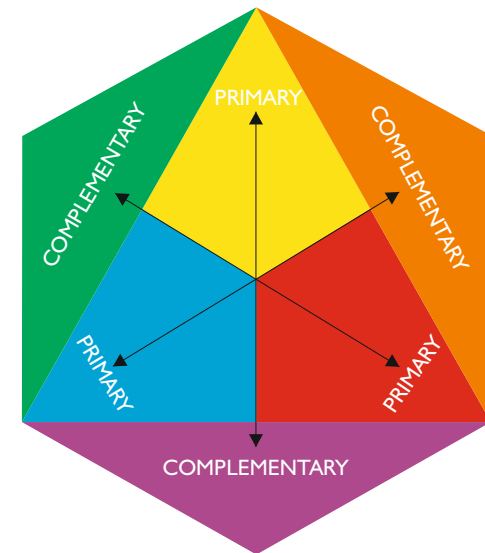
Colors across from each other on the color scheme

Yellow-Violet, Red-Green, Blue-Orange.

When two complementary colours are mixed together they neutralize each other.

E.g. Red neutralizes Green.

A complementary colours is always found between a warm colour and cold colour.



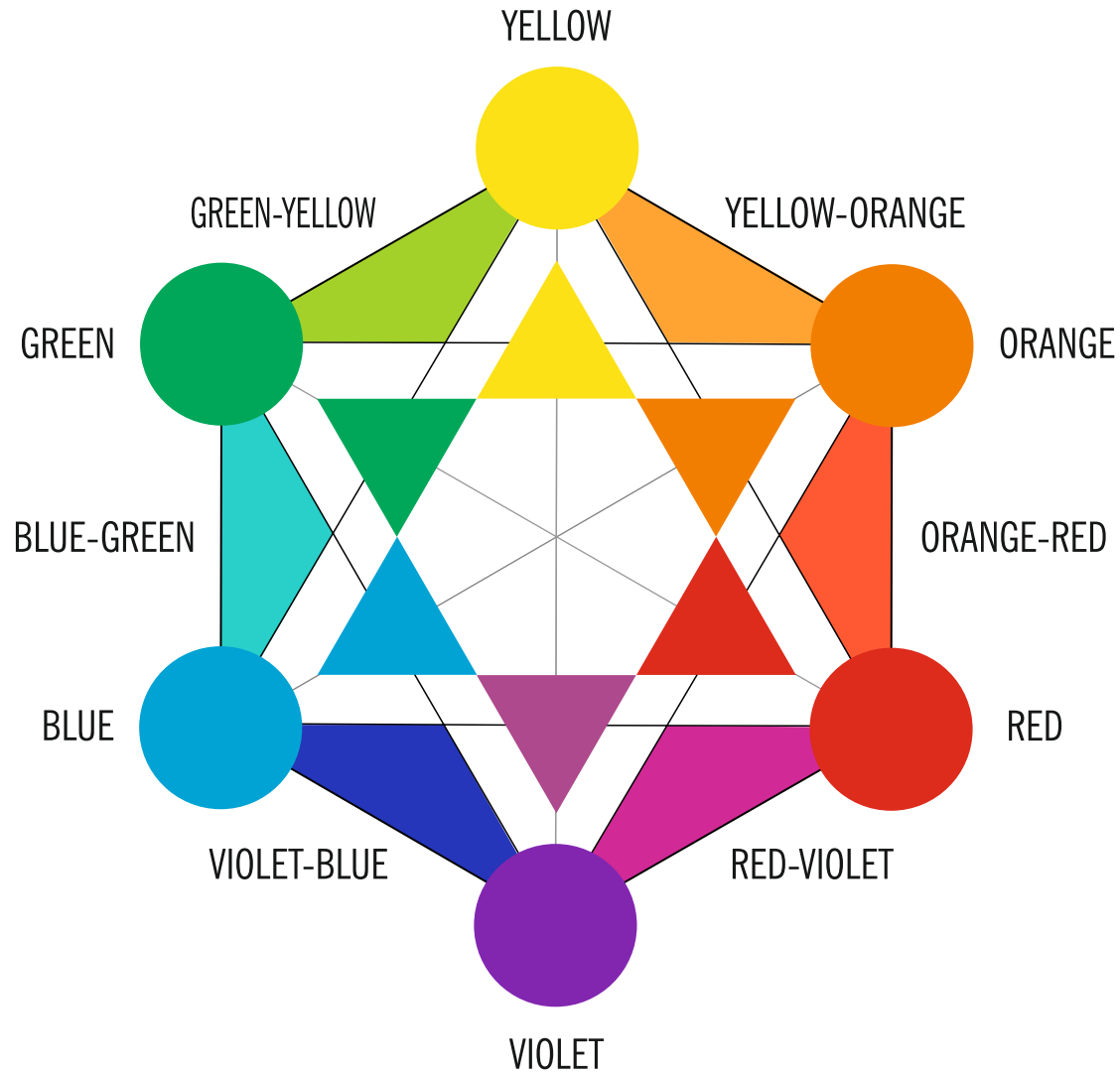
OSTWALD COLOR SYSTEM

German chemist Wilhelm Ostwald (1853-1932) brought the conceptual color solid to full-blown theory in *Color Science*.

COOL COLORS
BLUE - GREEN - VIOLET



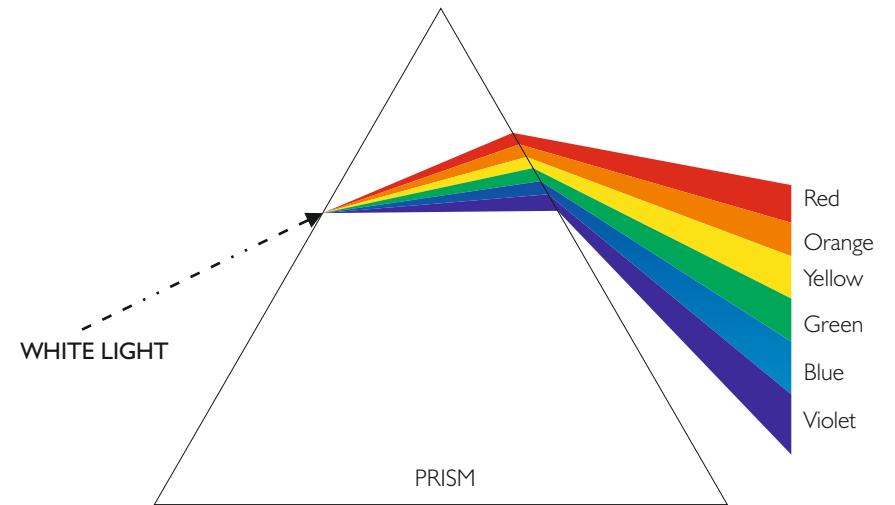
WARM COLORS
RED - ORANGE - YELLOW



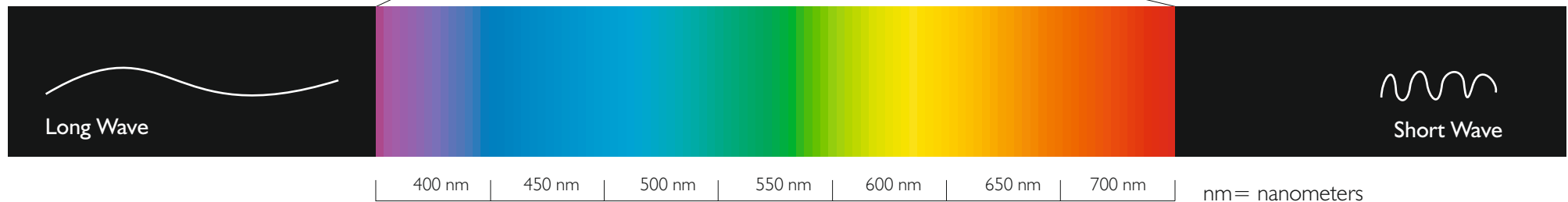
COMPOSITION OF LIGHT

White light is composed of a large number different frequencies. Each frequency produces a distinctive color sensation. The different components of light can be made visible by dispersion of light. The rainbow is a good example of light dispersion. When a beam of white light passes through a refracting material (prism), each component is refracted differently. The white light is separated into different component colors.

Color is a reflection of different light frequencies. Hair with a red color reflects only the red light frequencies. The other colors which are available on white light are absorbed. When all colors are absorbed, light ceases to exist and you see the opposite of light, which is dark.



Visible Light



MELANIN

Natural colour pigment is called melanin, and it is produced in specialised cells in the skin called melanocytes. It is present in both the cortex of hair and in skin. Melanin in hair is further categorised into 3 types:

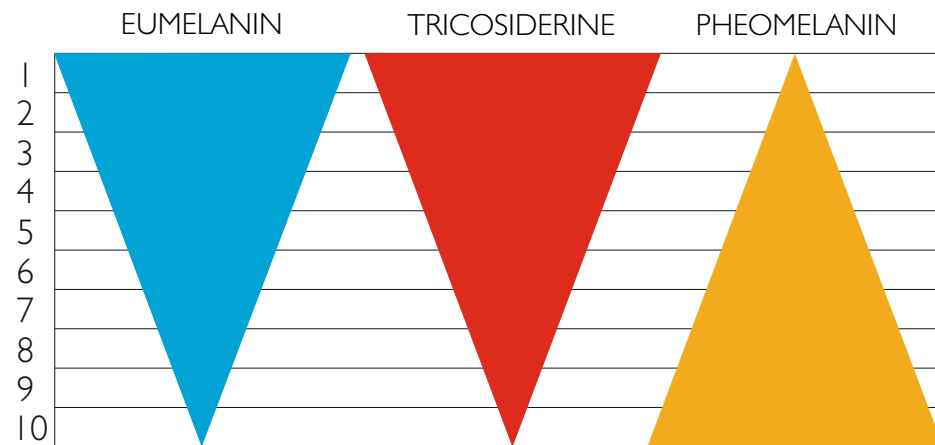
- Eumelanin
- Tricosiderine
- Pheomelanin

Depending on their concentration, they create the various shades (hair colour levels);

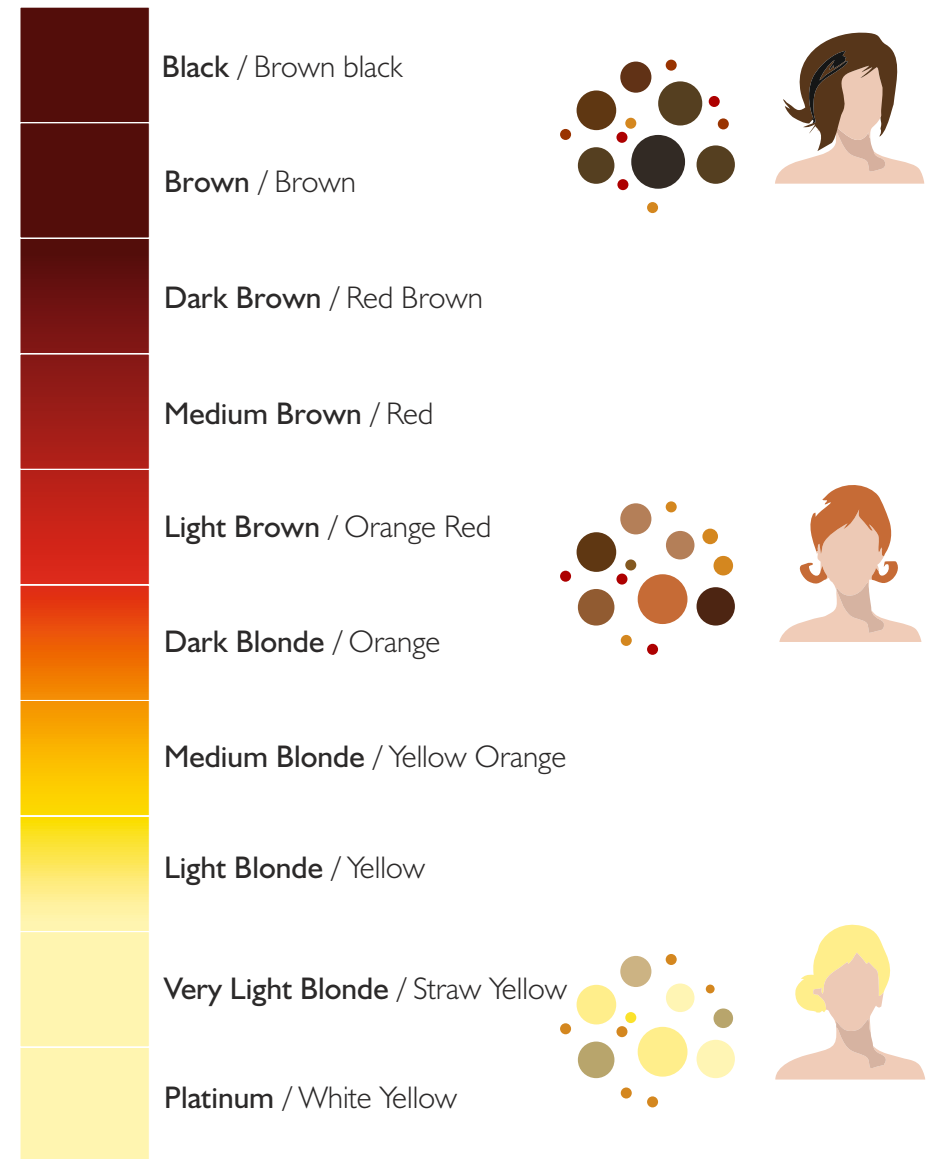
- 1) Eumelanin: Mainly **BLUE REFLECTION** - It is the melanin that defines the hair colour level. It lightens very easily. (Black and brown creating level).
- 2) Tricosiderine: Mainly **RED REFLECTION** - It is the melanin that completes the hair colour level and defines the copper/red reflection. It lightens with difficulty.
- 3) Pheomelanin: Mainly **YELLOW REFLECTION** - It is the melanin that defines the gold/yellow reflection. It lightens with much difficulty.

Eumelanin is generally considered to be responsible for the lightness or darkness of hair, referred to as the level. Very dark hair must contain large amounts of both eumelanin and pheomelanin.

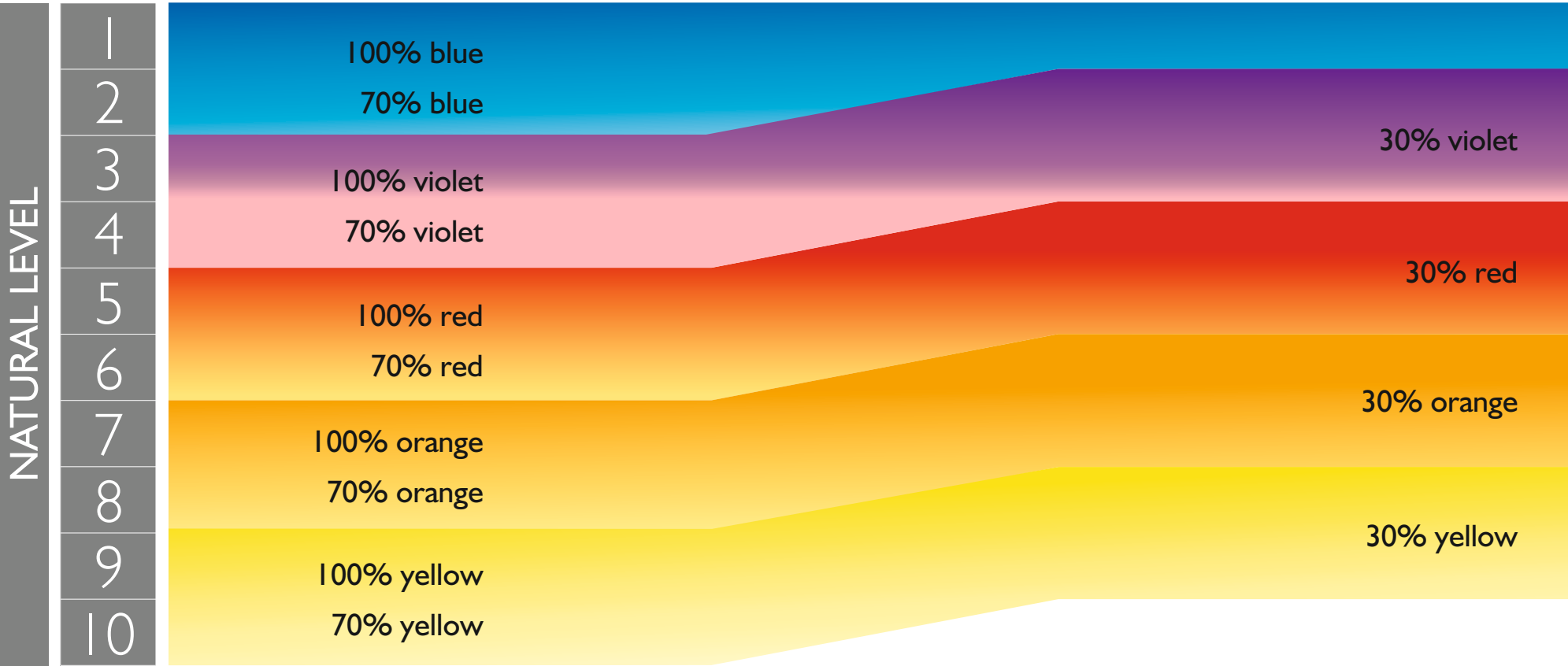
The pheomelanin is not visible because the eumelanin is overriding it. Once the eumelanin is removed, the pheomelanin becomes visible. Pheomelanin pigments are responsible for the warmth present in natural hair. The lighter the natural colour, the more the tone is visible. Pheomelanin pigments are smaller than eumelanin and rounder in shape, therefore more difficult to remove. Pheomelanin is seen as red through to yellow and is also referred to as undertone when lightening.



MELANIN CONCENTRATION



RESIDUAL - DOMINANT PIGMENTS



PH SCALE

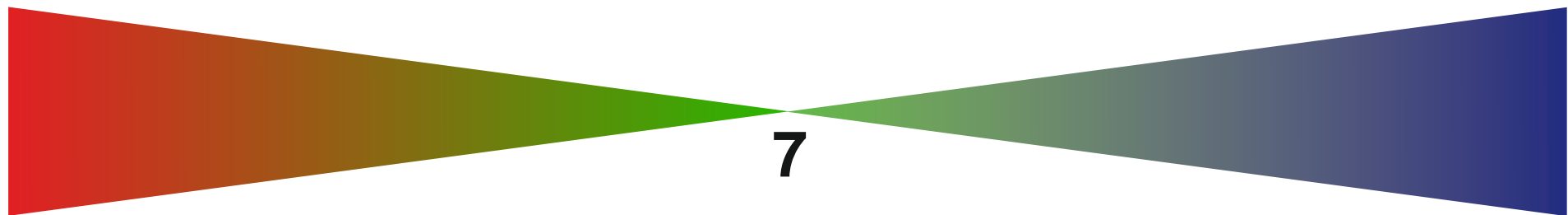
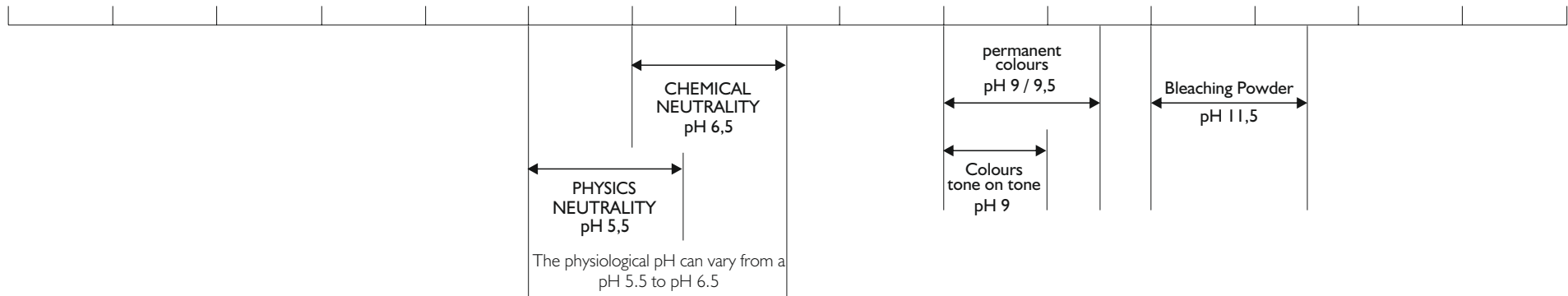
High Alkalinity / opens the cuticle

From 0 to 6.9 the pH is defined as acidic
All alkaline transformation substances create forced opening of hair squama.

High Acidity / closes the cuticle

From 7.1 to 14 the pH is defined as alkaline
All acidic substances have a squama closing action,
rebalancing the physiological pH

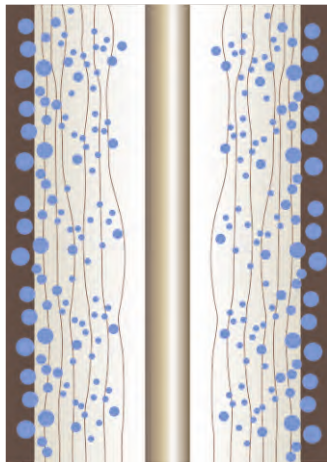
NEUTRAL



COSMETIC COLOUR TYPES

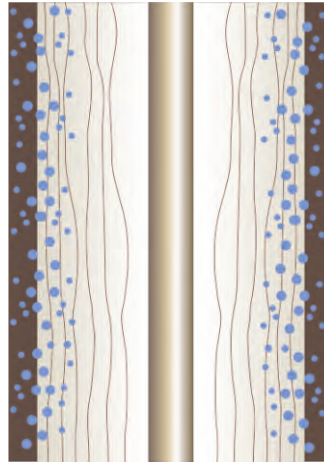
PERMANENT HAIR COLOUR (10/20/30/40 vol.)

This type of colour has a longer life than temporary colour (6-8 shampoos). Once they have been mixed with the activator the pigments become active and, because they are small in size, they penetrate into the cuticle. Semi-permanent colour gives longer-lasting colour and reflexes, it can be used to create new reflexes and to mask or cover even percentages of grey hair. For application the hair must be washed and dried. Processing times are generally between 20 and 30 minutes, but can be reduced by half on fine and treated hair, to prevent excessive deposit.



SEMI-PERMANENT HAIR COLOUR TONE ON TONE (7/10 vol.)

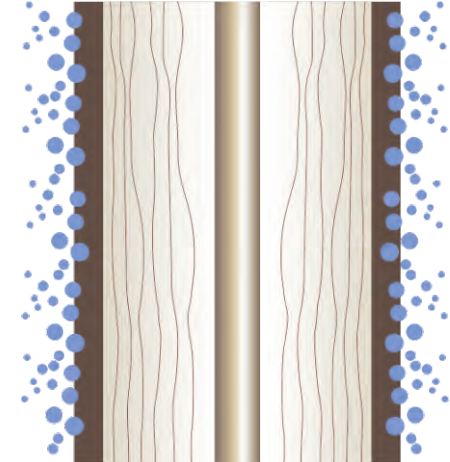
Semi-permanent colour it is predominantly made up of large molecules mixed with small molecules that slightly penetrate the cuticle scales and completely coat the cuticle layer of the hair. The colour molecules do not enter the cortex, meaning that semi-permanent hair colour cannot lighten the hair, it can purely darken and add tone. Semi-permanent colours not cover white hair 100%. Results last generally from 4 -10 shampoos.



TEMPORARY COLOUR (no activator use)

This is the simplest method, excellent for customers who have doubts about using colour, or to attract younger customers who want professional advice on how to change their hair colour whenever they want, but without the restrictions imposed by permanent colour. The temporary colour is applied on clean hair and on towel dried. If the hair is sensitive, or has been chemically treated (perm), the application time must be calculated with greater care, to prevent one result too intense.

TEMPORARY PIGMENTS
COLOR SHAMPOO
COLOR CONDITIONER/CREAM
COLOR MOUSSE

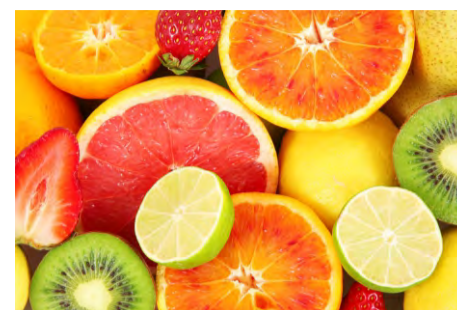


Characteristics

tutto c o l o r s

formula enriched with fruit acids

colour chart with 74 nuances



Natural range:

Natural: natural “cold” reflection

Bahia natural: natural “warm” reflection

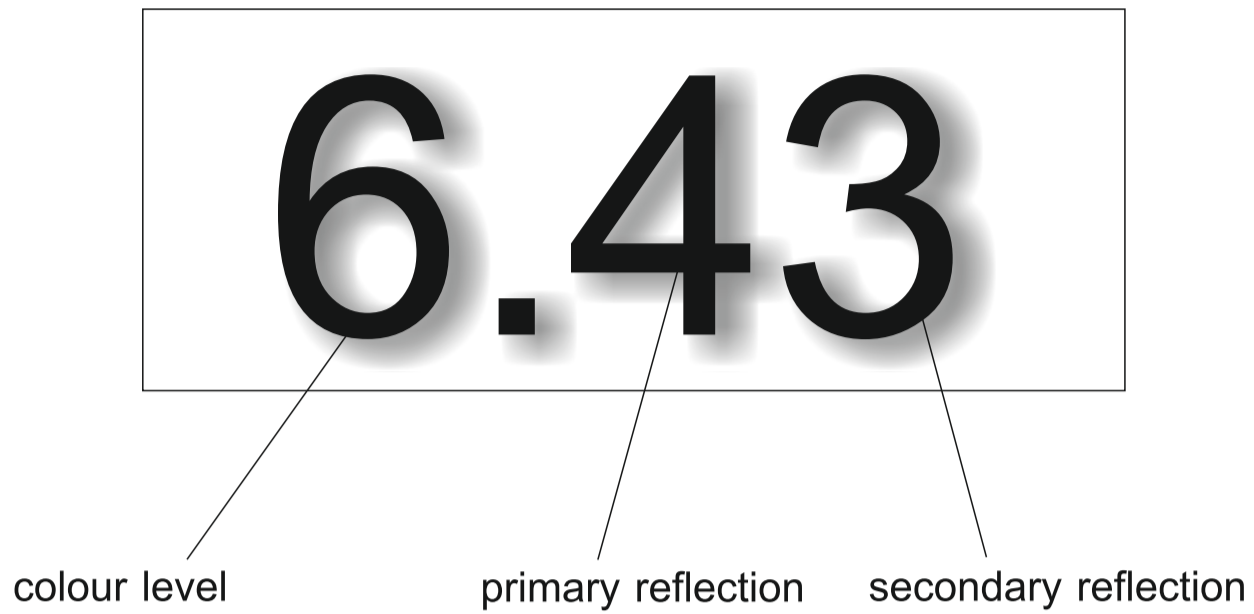
fancy range:

- Ash
- Beige - Brown
- Golden – Copper Golden
- Copper – Golden Copper – Intense Copper
- Red Copper – Red
- Violet - Mahogany
- Super Lightening
- Correctors

tutto c o l o r s



3,4 fl oz (97gr.)



COLOUR LEVELS	
1	black
2	brown
3	dark brown
4	medium brown/ brown
5	light brown
6	dark blonde
7	medium blonde
8	light blonde
9	very light blonde
10	platinum blonde

REFLECTIONS	
1	ash
2	iris / violet
3	golden
4	copper
5	mahogany
6	red

Over 50% coverage of white hair

natural base percentage	reflection shade percentage
$\frac{1}{2}$ natural (depending on the desired results) or $\frac{1}{2}$ natural bahia (depending on the desired results)	$\frac{1}{2}$ reflection shade

treatment	result	Mix	activator	Waiting times	lightening
permanent colour	lightening / cover 100%	1: 1 ½	10-20-30-40 volumes	30/40 minutes	1-3 levels
High lifts	colour results are reliable to target colour	1: 2	40 volumes	40/50 minutes	4 levels
Tone on Tone	cover 70% white hair cosmetic colour result	1: 2	7 volumes	20/25 minutes	---

activator

2,1%	7 volumes
3 %	10 volumes
6 %	20 volumes
9 %	30 volumes
12 %	40 volumes



activator : Waiting times

activator	result	Waiting times
2,1 % 7 volumes	tone on tone and colouring semi-permanent	20'-25' minutes
3 % 10 volumes	tone on tone colouring and when darkening	25'-35' minutes
6 % 20 volumes	to cover, to achieve one tones of lightening	35'-40' minutes
9 % 30 volumes	to cover, to achieve two tones of lightening	40'-45' minutes
12 % 40 volumes	to cover, to achieve three tones of lightening	45'-50' minutes

Dilute: 1+1.5 (50 ml. colouring cream + 75ml. Peroxide)

Super Lightening range: 1+2 (50 ml. Colouring cream +100 ml. peroxide)

Bleaching powder Blue

BLUE pressed bleaching powder

natural fragrance with essential oils of : **anise**

- lightening up to 7 shades
- does not run and stays mouldable during application
- attenuation of yellow/orange reflections
- non-volatile pressed powder
- 500 g. format (as shown in the photo)
- convenient 3 kg refill format (box of six 500 g. packets)

Mixing and Waiting times:



hydrogen peroxide	mixing	waiting times	result
10 - 20- 30- 40 volumes	1:1 / 1:3 depending on the lightening method	10-45 minutes depending on the desired results	streaks, highlights balayage

WHITE pressed bleaching powder

natural fragrance with essential oils of : **anise**

- lightening up to 7 shades
- does not run and stays mouldable during application
- non-volatile pressed powder
- 500 g. format (as shown in the photo)

Mixing and Waiting times:



hydrogen peroxide	mixing	waiting times	result
10 - 20- 30- 40 volumes	1:1 / 1:3 depending on the lightening method tempo	10-45 minutes depending on the desired results	streaks, highlights balayage



Waving Biosolution n.0 – coarse and difficult hair

with : milk proteins

- strength and hold of curls
- maximum protective effect for hair
- conditions and nourishes thanks to the milk proteins
- 500 ml bottle
- delicate fragrance



Waving Biosolution n.1 - normal hair

with : milk proteins

- strength and hold of curls
- maximum protective effect for hair
- conditions and nourishes thanks to the milk proteins
- 500 ml bottle
- delicate fragrance



Waving Biosolution n.2 – treated, coloured and sensitised hair

with : milk proteins

- strength and hold of curls
- maximum protective effect for hair
- conditions and nourishes thanks to the milk proteins
- 500 ml bottle
- delicate fragrance



Liquid Neutraliser for Permanent

with : milk proteins

- neutralises and stabilises the waving
- protective effect
- conditions and nourishes thanks to the milk proteins
- 1000 ml bottle
- delicate fragrance



LIQUID REMOVER

with : milk proteins

- cleanses and removes colouring stains from skin
- delicate non-abrasive formulation
- does not irritate skin
- 125 ml bottle



STAIN AWAY cream

with : Aloe Vera

- removes colouring stains from skin
- rich in micronised crystals
- for difficult stains
- 150 ml bottle
- pleasantly delicate fragrance



CREAM FILM screen for skin

with : Aloe Vera

- prevention of irritations by technical service
- skin anti-stain screen
- isolating and film-forming action
- 150 ml bottle
- pleasantly delicate fragrance



SILVER SHAMPOO anti-yellow shampoo for white hair or hair with streaks

with : Marc extract and Silk Proteins

- violet pigment attenuates the yellow reflections on grey hair, light blonde hair or hair with streaks
- moisturising cleansing action
- 350 ml bottle
- delicate fragrance

