11.1. The perfume and cosmetic sectors

Plants generate a considerable amount of antioxidants, preservatives, and synthetic colours. There is much demand for these both in the food industry (as we have seen before) and in the cosmetics industry. The perfume sector also uses important quantities of aromatic plants.

We can define phyto-cosmetics as the use of the active ingredients of plants for the care and appearance of skin and hair.

The use of different plants is determined by their physiological activity, which varies from plant to plant, so we can find a plant for nearly all our aesthetic needs.

The dermatological properties of plants are many and varied: tonics, astringents, anti-inflammatory, antiseptics, anti-scarring, cleansers, moisturisers, relaxants, emulsifiers, decongestant, refreshing, etc…

There is also a wide range of formats of cosmetic preparations. We can find preparations of plant extracts in creams, emulsions, lotions, gels, oils, soaps, deodorants, etc… cosmetics include the following type of products:

- essential oils
- perfumes and colognes
- beauty treatment, make-up, skin treatment
- sun-block and tanning preparations
- products for manicure and pedicure
- products for hair
- dental and mouth hygiene products
- products for shaving and aftershaves
- body deodorants
- bath products
- depilatory products
- other preparations

Spices used.
We are going to see some of the regulations edited by AENOR in December 2006 applied to raw materials for use in cosmetics. They also refer to the vegetable extracts used in the manufacture of cosmetic products.

- hydroglicolic extract of camomile (Chamomilla recutita L. Rauschert).
- hydroglicolic extract of calendula (Calendula officinalis L).
- hydroglicolic extract of rosemary (Rosmarinus officinalis L).
- hydroglicolic extract of ivy (Hedera helix L).
- hydroglicolic extract of green tea (Camellia sinesis L).
- hydroglicolic extract of butcher`s broom (Ruscus aculeatus L).
- hydroglicolic extract of oats (Avena sativa L).
- hydroglicolic extract of aloe (Aloe vera L).
- hydroglicolic extract of Indian chestnut (Aesculus hippocastanum L).
Other frequently used plants include:
  - **Soya.** A Chinese plant known for over 5,000 years. It has been recovered by cosmetic laboratories because of its anti-ageing effects. It is rich in isoflavones.
  - **Green tea.** An antioxidant against free radicals. Recently, white tea has also been incorporated into the cosmetics industry as it is thought to be more effective against free radicals.
  - Botanical extracts of *Gingko biloba*, *ginseng*, *lavender*, and *aloe vera*.
  - **Camomile**, which is used to make creams for sensitive skins.

### 11.2. The cosmetic industry. The perfume sector

#### A A brief history of perfume

To find the origins of perfume we must travel back to Ancient Egypt. Incense (the word is of Latin origin and means “through smoke”) and myrrh were the basic ingredients used by the Egyptians to aromatise ceremonies, healing rituals, but also as a beauty complement for women. Furthermore, they had a complete process for the preparation of perfumes which consisted in impregnating rose leaves with oil to preserve their fragrance. They would also macerate aromatic plants in oil and then drain the oil onto a cloth.

Later, the **Greeks** inherited these techniques and proceeded to improve them. The Romans imported raw materials such as **myrrh and incense from Arabia** and brought other substances from **India**.

The fall of the **Roman** Empire brought about a decline in use of perfumes in the West. The custom lived on only in **Arabia**, where plant distillation techniques were developed. **Baghdad** became the city of fragrances. Other ingredients were discovered such as **musk**, which they mixed into the **mortar** used to build palaces and mosques.

During the **Middle Ages**, the **Crusader** period saw a rise in commerce and trade between **East and West** and perfume was rediscovered. However, its general use did not come until the **XVI** century when **Catalina de Medici** imposed the perfume fashion in **Paris**.

Later on, the **Industrial Revolution** saw large-scale commercialisation of perfume. Perfumiers specialised in chemistry so as to develop better products, and perfumes stopped being a fashion to become a basic requisite for the beauty criteria of the times.

At the beginning of the **XX** century, perfumes were given away in clothes shops, but gradually they began to be sold until the first exclusive perfume companies appeared.

With time, better techniques developed, and new ingredients for the making of perfumes were discovered. Nowadays, it is an important industry with millions of dollars in turnover and which designers depend on more even than on clothes.

#### B The structure of perfumes (the pyramid system)

For a long time, perfumes were thought to be evolving. But their fragrance and intensity were only due to evaporation, by this we mean volatility, and therefore to their gradual wearing off.

The **XX century** saw the start of perfume preparation using several fragrances. The first person to introduce this system of perfume preparation was André Guerlain in **1899**. From then onwards, a system known as the “pyramid” or “three layer system” was generally used. This structure divides a perfume’s fragrances into three types: **high, medium, and low**.

**High note:** this corresponds to fragrances which are quicker to evaporate because they come from more volatile substances. They last a very short time and are used to make a first impression.

**Middle note:** this emerges when the high note has disappeared and is basically the “heart” of the perfume. It lasts about four hours and contains the main fragrances of a perfume.
Finally, **the low note**: this corresponds to the least volatile fragrances. Its purpose is to “fix” the perfume and give it a global harmony. It is the longest lasting and may last up to two days.

How long a perfume lasts depends on the environmental temperature and on body chemistry as well as on fragrance concentration. The higher the concentration of essential or fragrant oils, the more expensive the perfume is.

**Perfume.** This is the highest concentration of a fragrance. It usually contains 20% of active ingredients, essential oils or fragrances. It lasts from 4 to 7 hours.

**Eau de perfume.** These contain about 10% of essential oils or fragrances and once applied to the body, last between 3 and 5 hours.

**Eau de toilette.** These contain approximately 5% concentration and, on the body, last less than 3 hours.

**Cologne.** These are very light concentrations -2 or 3%- and last up to 2 hours on the body.

C **Raw materials in the perfume industry.**

a. **Raw materials of vegetable origin.**

**Barks.** A typical example is cinnamon, without forgetting the sassafras root (**Sassafras albidum**). Both contain safrol, which is used in the synthesis of aromatic compounds.

**Flowers.** These are the principal source of aromas. Such species as jasmine, roses, fragrant olive (**Osmanthus fragrans**), mimosa, nard, and orange flowers and ylang-ylang buds are all examples.

**Leaves and shoots.** We should highlight patchouli, salvia, violets, rosemary, and citrus leaves. Sometimes the leaves are valued because of their “green” aroma, as with tomato leaves.

**Fruits.** Fresh fruits like apples, strawberries, or cherries, do not give the required aroma when extracted, so they are synthesised. Some exceptions are Verbena exotica (**Litsea cubeba**), vanilla, and juniper berries. The most frequently used fruits concentrate aroma in their peel, for example oranges, lemons, limes, and pomegranates.

**Resins.** They have been highly valued since ancient times, incense being a good example. They are very aromatic and have antiseptic qualities. Many civilisations and cultures have used them as medicines or as condiments for food. Some resins used in perfume-making include laudanum, incense, myrrh, and Peruvian balsam. Pine and fir resins are a valued source of terpenes, which are used in the organic synthesis of other synthetic aromatic substances.

**Roots, ryzomes, and bulbs.** These sub-soil parts of the plant are also used in perfume, for example vetiver or ryzomes of the ginger family.

**Seeds.** For example, coriander, aniseed, cocoa, nutmeg and cardamom seeds.

**Wood.** Oils and distillations obtained from wood are basic to perfume-making. They provide the perfume’s base. For example, sandalwood, birch, jacaranda, cedar, juniper, and pine.

These are some of the vegetable species used in perfume-making:

- Camphor (**Cinnamomum camphora**)
- Angelica (**Angelica archangelica**)
- Celery (**Apium graveolens**)
- Arnica (**Arnica montana**)
- Azahar (orange flower) (**Citrus aurantium**)
- Fir balsam (**Abies balsamea**)
- Peruvian balsam (*Myroxylon pereirae*)
- Tolu balsam (*Myroxylon toluiferum*)
- Cinnamon, bark and leaves (*Cinnamomum zeylanicum*)
- Atlas cedar (*Cedrus atlantica*)
- Cloves (*Eugenia caryophyllata*)
- Estragon (*Artemisia dracunculus*)
- Eucalyptus (*Eucalyptus globulus*)
- Bladder wrack (*Fucus vesiculosus*)
- Blackcurrant buds (*Ribes nigrum*)
- Fennel (*Foeniculum vulgare* Dolce)
- Hyacinth (*Hyacinthus orientalis*)
- Jasmine (*Jasminum grandiflorum*)
- Sweet lime (*Citrus aurantifolia*)
- Lemon (*Citrus limonium*)
- Blue camomile (*Chamomilla matricana*)
- Marjoram (*Origanum majorana*)
- Mint (*Mentha viridis, Mentha spicata, Mentha piperita*)
- Mimosa (*Acacia cecurrens*)
- Bitter orange (*Citrus aurantium* Amara)
- Narcissus (*Narcissus poeticus*)
- Nard (*Polianthes tuberosa*)
- Pennyroyal (*Mentha pulegium*)
- Aromatic retama (*Spartium junceum*)
- Mountain rue (*Ruta montana*)
- Carrot seeds (*Daucus carota*)
- Tuya (*Thuya occidentalis*)
- Ylang-ylang (*Cananga odorata*)

Diamonds (Emporio Armani©):
- Raspberry
- Lychee
- Rose
- Patchouli
- Amber
- Violet
- Geraniol
- Linalool
- Eugenol
- Cinnamal
- Farnesol
- Limonene
- Citronellol
- Citral

b. Raw materials of animal origin.

Ambergris (grey amber). This substance is found in the entrails of cachalot whales. It is solid and opaque, grey in colour with yellow and black veins. It smells like musk. In perfume-making it is called amber, but we should not confuse it with the yellow amber used by jewellers. (Definition from the Real Academia Española dictionary).

Castoreum. A crass, pomade-like substance, of a chestnut colour and resinous appearance, having a strong and unpleasant smell. It is secreted by two glands found in the abdomen of beavers. It is an anti-spasmodic medicine.

Civet/algalia. This is a sticky substance, having a consistency like honey’s, which is originally white but turns brown. It has a strong smell and an acrid taste. It is produced by a feline of the *Viverridae* family, related to *Herpestes edwardsi*. 
Musk. A greasy, sticky substance, of an intense hue, it is secreted through glands by certain mammals. Because of its spreadableness and aroma, musk is used as the base material for several cosmetic products and perfumes. Nowadays it is protected, so a synthetic form is used. Before, musk was obtained from the male *moschus moschiferus* (muskrat), but this meant killing the animal. Although musk is only usually produced by young males, hunters were not usually very particular about the age and sex of the animals they killed. This led to a serious drop in numbers of the muskrat population and eventually led to a ban on hunting them. Because of its rarity and high price, and also for legal and ethical reasons, many perfume businesses will only use the synthetic component in their products. However, the synthetic form stays in the environment for a long time, and residues have been found in human fat, mother's (breast) milk, and even at the bottom of the Great Lakes.

c. **Other natural sources.**

**Lichens.** For example, *Evernia prunastri* and *Pseudoevernia furfuracea*.

**Algae.** *Fucus vesiculosus*, commonly called Sargasso. They are not used very much because they are expensive and have a lesser yield than their synthetic equivalents.

d. **Industrial perfume-making.**

Another important sector in terms of the amount of raw materials it uses and the market it creates is industrial perfume-making. This industry manufactures all sorts of products such as detergents, air-fresheners, floor-cleaners, soaps, washing-up liquids, etc... These are some of the spices and constituents used:

The essential oils of lemons, bergamot, cedar, cypress, citronella, juniper, lavender blossoms, eucalyptus, geraniums, jasmine, lavender, lilac, linalool, marjoram, pine, rosemary, salvia, sandalwood, terpineol, thyme.

11.3. **References.**


