

The Usage of Plant Extracts in Skincare



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فرع العقاقير والنباتات
الطبية

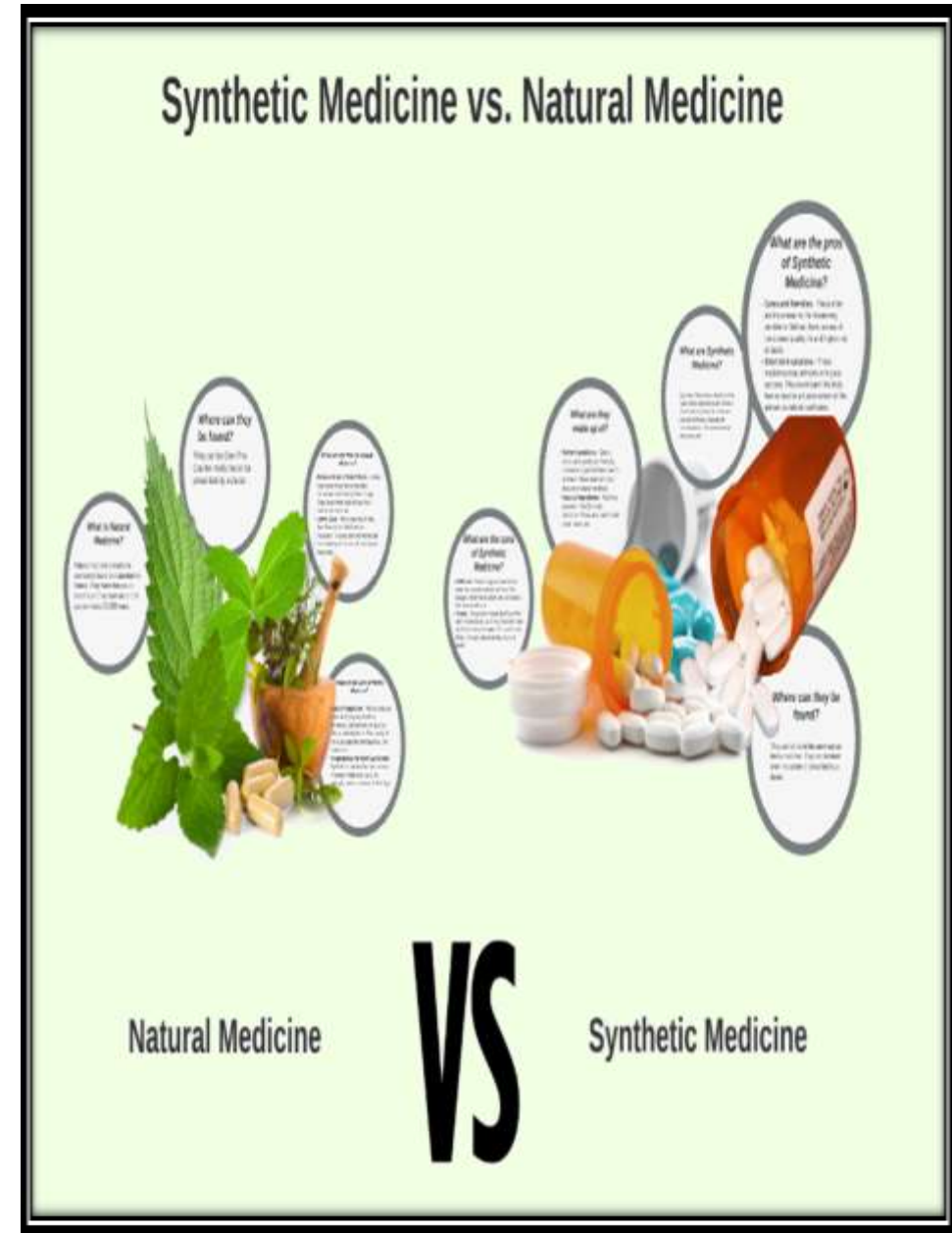
Objectives:

- The main benefit of plant extracts in skincare.
- How to prepare natural skincare products.
- Examples of commercial natural skincare products.

Introduction

- Natural ingredients have been used for centuries for skin care purposes.
- The natural products claimed to have efficacy to improve skin tone, texture, and reducing wrinkling, in addition to their dermatological effects.

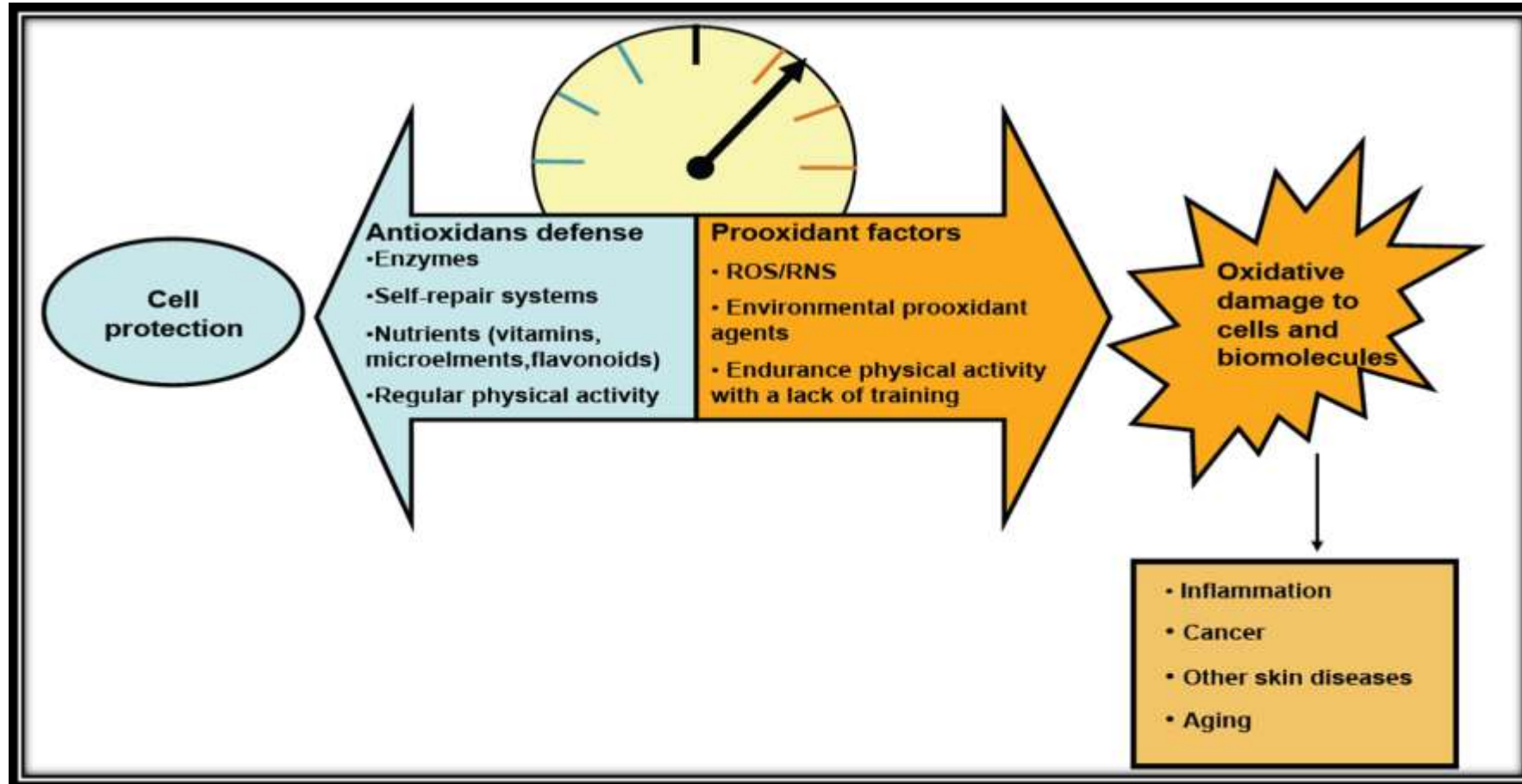
- Nowadays, they are becoming more prevalent in formulations due to:
- Consumers' concerns about synthetic/chemical substances as a result of excessive use which cause several side effects.
- Several properties of natural products such as antioxidant, anti-inflammatory, antiseptic and antimicrobial effect.



The main benefits reported for plant extracts in skincare include :

- Antioxidant activity.
- Antimicrobial activity.
- Tyrosinase inhibition effect.

Oxidation stress and the antioxidant activity

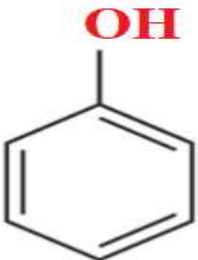
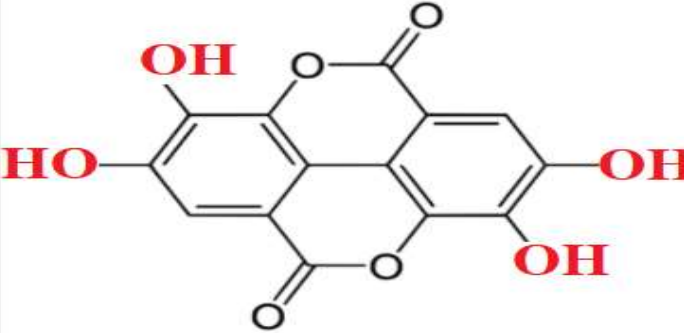
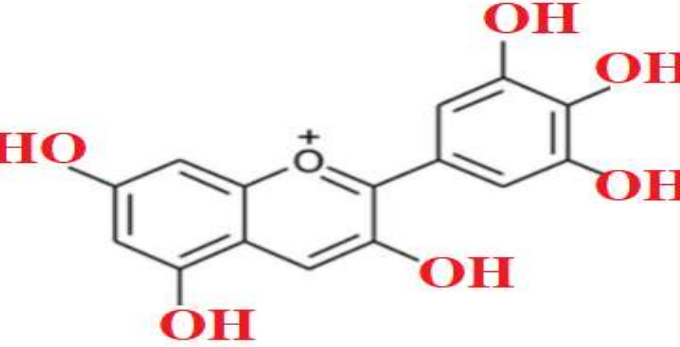


Schematic diagram representing the oxidative stress present within the skin

Antioxidant activity of natural compounds

- Natural compounds are effective as antioxidants:
- By preventing free radical formation through scavenging them or promoting their decomposition and suppressing disorders.
- Some compounds inhibit the initiation or propagation of oxidative chain reactions, thus preventing or repairing oxidative damage done by body's cells promoted by oxygen.

- Antioxidant activity of phenolic compounds varies according to the molecular structures.
- The structure–activity relationship suggests the number of hydroxyl groups as the most important factor determining the antioxidant activity of the phenolic compounds.

		
<p>Phenol group</p>	<p>Polyphenol</p>	<p>Flavonoid (e.g. anthocyanin)</p>

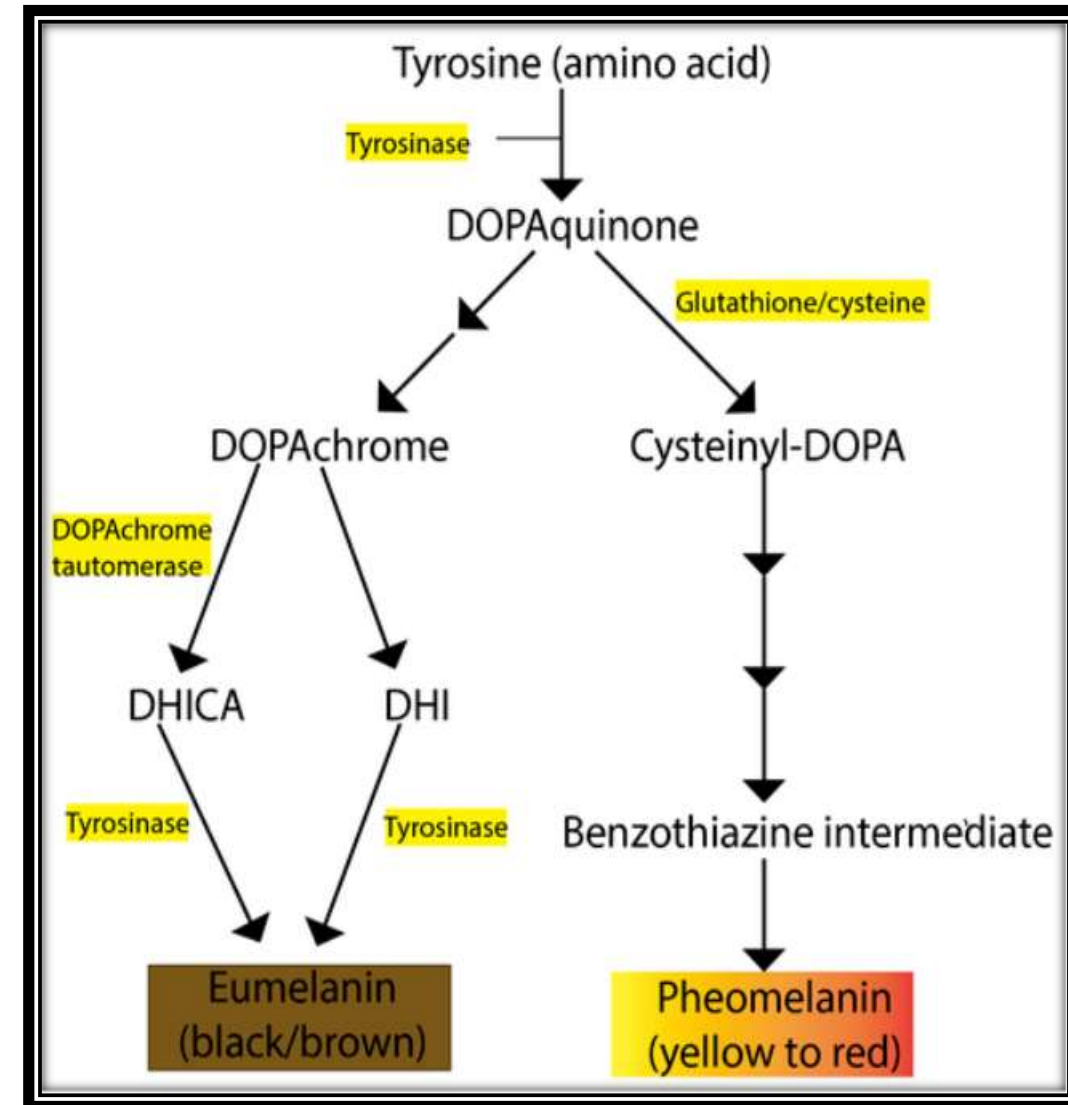
Antimicrobial Activity

- Increasing the microbial resistance to conventional antimicrobials result in increasing interest to the use of natural products in topical formulation.
- Antimicrobial activity of phenolic compounds through inhibiting the growth of pathogenic microorganisms by:
 - Interacting with the microorganism's cell membrane or cell wall.
 - Changes in membrane permeability which resulting in cell destruction.
 - Penetrate into bacterial cells and promote the coagulation of their content.



Tyrosinase inhibition effect

- Melanin is a human pigment responsible for the colour of eyes, hair and skin. It is produced and secreted by melanogenesis.
- Over-activity of tyrosinase leads to over-production of melanin. Abnormal accumulation and biosynthesis of melanin pigments are responsible for skin disorders.



- Examples of natural compounds that used for the disorder of hyperpigmentation of the skin through inhibition the catalytic activity of tyrosinase, and disrupt the synthesis or release of melanin pigments.
- **Kojic acid**, **arbutin** are some of the tyrosinase inhibitors used today.
- The **flavonoids**, due to their ROS-scavenging activity and ability to chelate metals.
- **Aloesin**, **hydroxystilbene derivates** and **licorice extracts** are frequently used in skin-lightening preparation.

Plant extracts used for skincare products

Castanea sativa (Chestnut)

- Several studies were conducted on **fruits** ,**leaves** and **flowers** of *C. sativa* revealing to be a good source of phenolic compounds (**Rutin**, **hesperidin**, **quercetin**, **apigenin**, **morin**, **galangin**, **kaempferol** and **isoquercitin**) with marked biological activity, mainly **antioxidant properties**.

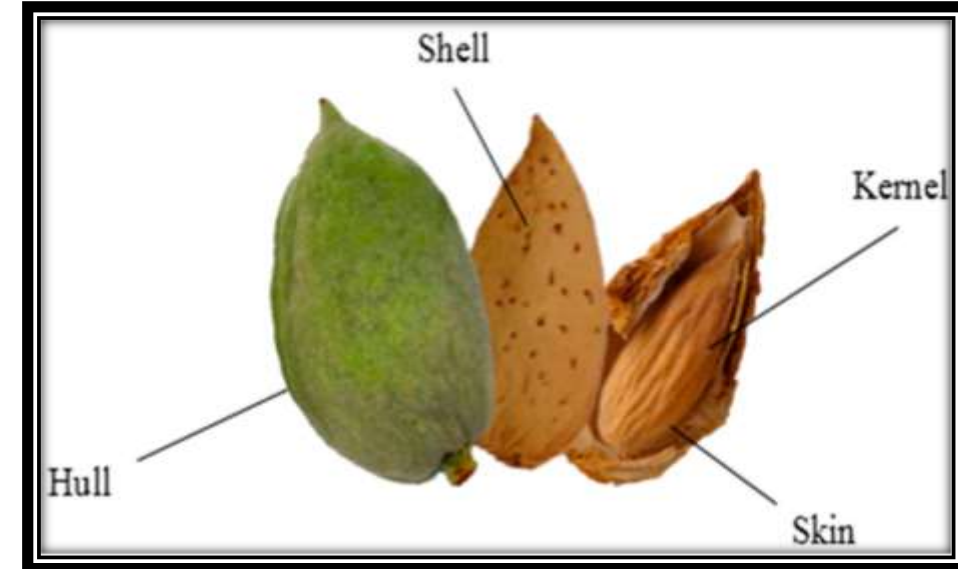


- The **antimicrobial activity** of a *C. sativa* leaves aqueous extract against *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*.
- A surfactant-free topical formulation containing an ethanolic *C. sativa* leaf extract could be relevant in the prevention and treatment of **oxidative stress-mediated diseases and photo-ageing**. The safety and stability of this formulation for topical use was verified.



Prunus dulcis (Almonds)

- Almonds consist of an **outer hull** with an **intermediate shell** that contains **seed** covered by a **brown skin**.
- Almond hulls, skins and shells are rich in phenolic compounds and useful in the treatment of many disorders, including skin conditions like eczema and pimples.



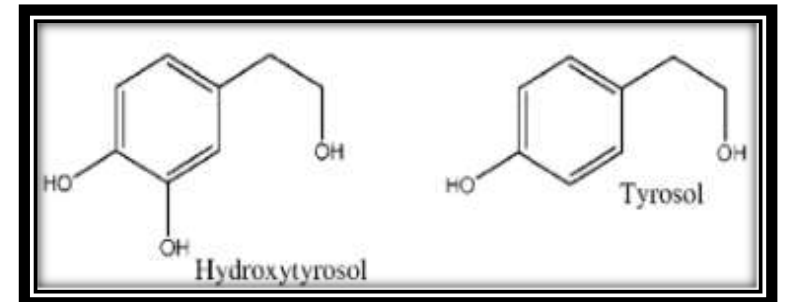
- Phenolic, flavonoid, phytosterol, lipid soluble vitamin and fatty acids contents of almond kernel have been reported as positive for antioxidant activities.
- Barreira et al., have evaluated the antioxidant properties of almond green husks, demonstrating good antioxidant properties with very low Median Effective Concentration (EC50) values.

ALMONDS GOOD FOR



Olea europaea fruits (olive)

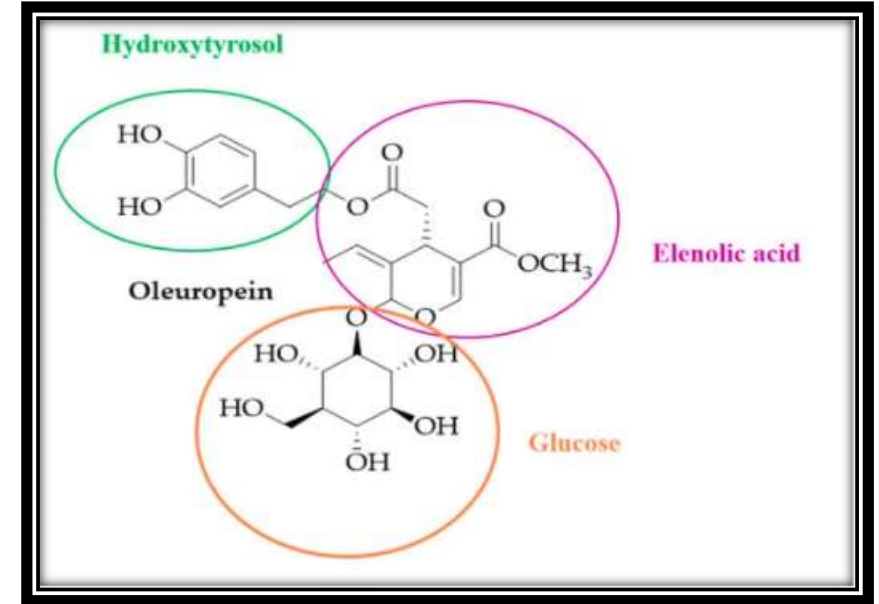
- Olive trees, fruits, olive oil and olive mill waste contain hydroxytyrosol and tyrosol which are phenolic compounds used for:
- Antimicrobial.
- Anticarcinogenic.
- Anti-inflammatory.
- Antioxidant activities.
- In addition to its application as food additive and has great potential as cosmetic ingredient.



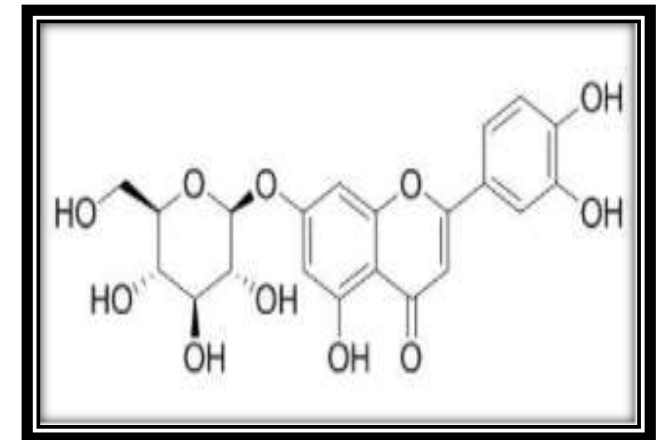
- Olive leaf has gained interest due to the numerous benefits for health, and for their antioxidant activity which is mainly attributed to:

- **oleuropein**, which can constitute up to **6%–9%** of dry matter in leaves.

- Flavonoids (**luteolin 7-O-glucoside**), which contribute to **13%–27%** of the total radical scavenging activity.



Chemical structure of oleuropein



Chemical structure of luteolin 7-O-glucoside

Quercus Robur (Oak)

- *Q. robur* bark and leaves extracts have shown free radical scavenging activity against superoxide anion, hydroxyl radical and singlet oxygen. In addition to their iron chelating activity, as well as strong absorption in the Ultraviolet Radiation B (UVB) range.
- Extracts from oak leaves are rich source of ellagic acid, rutin and hyperoside, and phenolic compounds.



Glycyrrhiza glabra (Licorice or sweet wood)

- It was one of the most widely known medicines in ancient history. Licorice is good for skin eruptions, including dermatitis, eczema, pruritus and cysts.
- Licorice root contains glycyrrhizin, which has a sweet taste (30–50 times the sweetness of sugar).
- Also contains Glabridin, which is an iso flavane and has been shown to inhibit tyrosinase activity in B16 murine melanoma cells.



- Another interesting study demonstrating that plant **root extract** effectively inhibit diacetyl formation, without bacterial effects. **Diacetyl** is a key contributor to **unpleasant odors** emanated from the axillae, feet and head regions, produced by resident skin bacteria. Therefore, this study provide new insight that can contribute to the development of **effective deodorant agents**.
- Petroleum extract of Glycyrrhiza glabra **promotes hair grow** since treated animals developed **longer, denser**, and took **less time** for hair cover the denuded skin of female rats, compared to **control** and **minoxidil**-treated groups.

Pinus pinaster

- Pycnogenol® is a nutritional supplement of standardized extract of French maritime pine bark, has favorable pharmacological properties.
- The extract is standardized to contain 70% ± 5% procyanidins (oligomers of catechin and epicatechin subunits), taxifolin and a range of phenolic acids (derivatives of benzoic and cinnamic acids).



- Pycnogenol® has attracted special attention in the field of **Dermatology** like in:
- Human skin conditions including **chronic venous insufficiency** and **skin inflammation**.
- Furthermore, Pycnogenol® protects against **oxidative stress** in several cell systems by doubling the intracellular synthesis of **anti-oxidative enzymes** and by acting as a potent **scavenger of free radicals**.
- Benefits human skin by increasing **skin hydration** and **skin elasticity** due to an increased synthesis of extracellular matrix molecules such as **hyaluronic acid** and possibly **collagen**.

Natural ingredients for beautiful skin

- Skincare is based on a regimen of **cleansing, moisturizing and barrier protection.**
- **Eucalyptus essential oil:** It has anti-inflammatory properties for your skin; even very small amounts are cleansing. When used as a fragrance and refreshing effect.
- **ALMOND OIL:** As a moisturizing ingredient for your skin, also helps your skin retain its own natural moisture.
- **ALOE:** Aloe heals wounds and soothes sun exposure. It's also a great gentle moisturizer for your skin.

- **CHAMOMILE TEA:** The skin benefits include healing properties for acne and rosacea, as well as exfoliating benefits. It's a great anti-inflammatory ingredient for under-eye puffiness.
- **COCONUT OIL:** Coconut oil is found in a solid form, which then melts with your body temperature. It's highly moisturizing and helps improve under-eye wrinkles.
- **Lavender essential oil:** It has a calming aroma and enhances your skin's complexion through its antifungal and antiseptic properties, which are healing to acne. It also improves under-eye darkness.

Natural Skincare Recipes

• Lavender Toning Mist

- ½ cup purified water
- 5–7 drops lavender essential oil
- **Preparation and Application**
 - Fill a spray bottle with the purified water, and add the lavender essential oil. You have just made a great summer misting toner with **moisturizing** properties.
 - Lavender oil is healing for **acne**-prone skin. It's also **refreshing** with a **delightful aroma**.



• Papaya Milk Mask

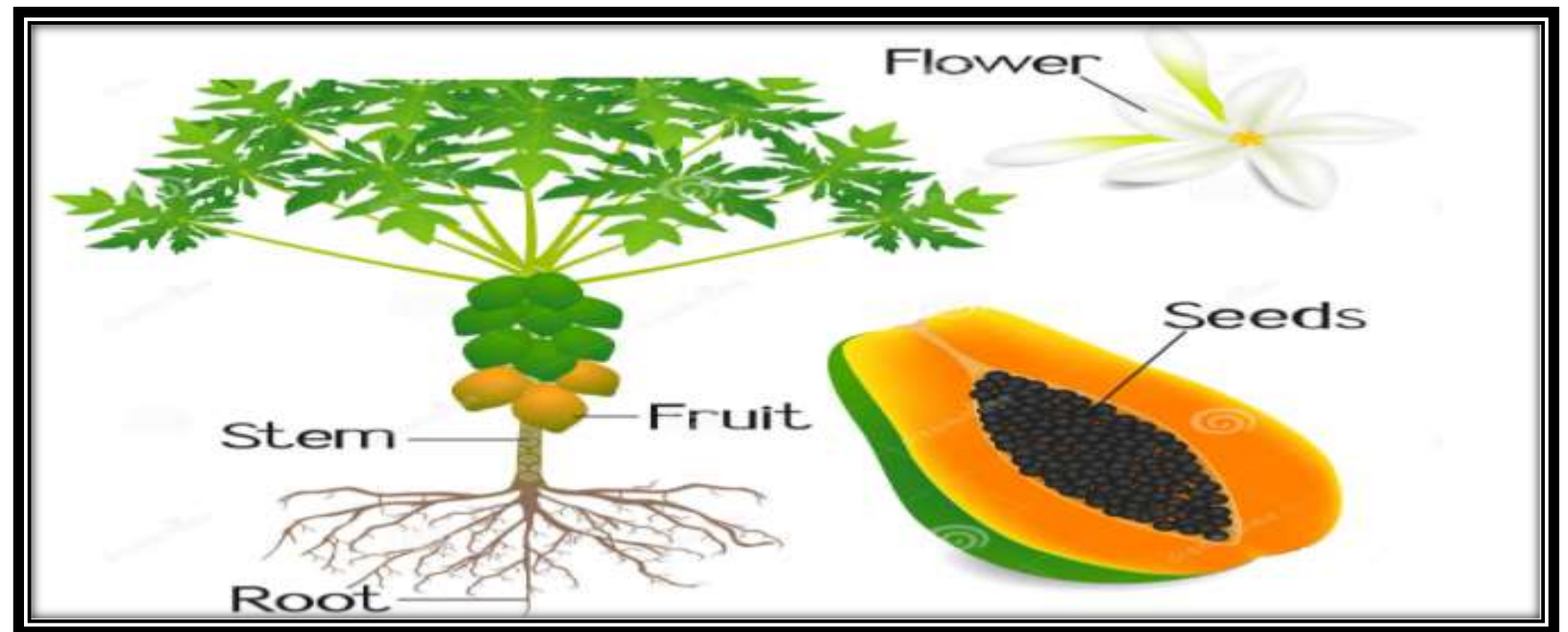
- ½ papaya
- 1 tablespoon whole milk
- 1 tablespoon honey



• Preparation and Application

- Prepare papaya by slicing the fruit lengthwise, discard the seeds, and scoop it into a small bowl. Add honey and milk and mash until blended smoothly. Apply to clean face, avoiding your eye area, and leave the mask on for 15 minutes.
- Rinse with warm water and splash some cold water afterward to seal your pores.

- Papaya is **exfoliating** and helps **remove dead skin cells** to reveal a **brightened, glowing complexion**. The combination of papaya and milk is the most gentle and natural exfoliant. Honey is nature's moisturizer, and this nicely balanced mask provides a subtle exfoliation with hydration.
- This mask should feel really cleansing, and your skin should be soft to the touch afterward.



- **Honey Almond Moisturizer**

- 2 tablespoons honey

- 1 teaspoon sweet almond oil

- **Preparation and Application**

- Mix the honey and almond oil. Apply a thin layer to your face, avoiding the eye area. Let nature's ingredients nourish your dry skin for 15 to 20 minutes as a deeply moisturizing mask.

- Almond oil helps your skin retain its natural moisture in addition to boosting hydration when applied topically. Honey is nature's sweetest moisturizer.

• Floral Healing Facial

- 3 cups water
- 3 carrots
- 2 tablespoons dried calendula flowers
- 4 tablespoons organic honey
- 2 tablespoons sweet almond oil

• Preparation and Application

- Cut carrots into chunks with the skin on (the nutrients are in the skins, so no need to peel, just wash well). Bring a medium pot of water to a boil. Throw in carrots. Boil until the carrots are soft, about 15 minutes. Mash them in a bowl. Add the organic honey and almond oil. Add calendula flowers. Mix until you have a smooth orange paste. Place in the refrigerator for 10 minutes to cool. Leave on for 10 minutes and rinse with cool water to seal the pores.



- Calendula is a beautiful flower that is closely connected with skin health. It's commonly used to relief skin inflammation, bruising, slow healing wounds, and eczema.
- Calendula also has antifungal properties and is widely known to be antimicrobial and an excellent skin purifier.
- Carrots are rich in vitamin A, known for supporting acne-prone skin.
- Sweet almond oil is a wonderful natural moisturizer.



- The tea tree essential oil (extracted from the plant called *Melaleuca alternifolia*) give your hand sanitizer a scent of camphor-like freshness, in addition to antibacterial, antiviral, antifungal, and anti-inflammatory properties.
- lavender: it is very helpful in a hand sanitizer that uses isopropyl alcohol, is sometimes harsh on some people's skin if used repeatedly, so Lavender counters such harshness with its calming effect and nice-smelling that toning down the strong smell of the isopropyl alcohol .
- As for Aloe Vera, it provides moisture to your skin; otherwise you might have extra dry skin due to the high alcohol content in your potent hand sanitizer.



Chamomile-Aloe Recipe

- Ethyl alcohol –2/3 cup
- Chamomile essential oil – 3 drops
- **Method of Preparation**

Aloe Vera gel –1/3 cup
Thyme – 2 drops



- Mix the ethyl alcohol and the Aloe Vera gel in a bowl until the contents are evenly distributed. Then add the drops of chamomile and thyme essential oils and mix thoroughly.
- Not only does chamomile give your hand sanitizer an apple-like aroma, it also quells any anxiety you may have during a pandemic. This is because it has an antioxidant known as apigenin, which relaxes the muscles as well the brain.
- As for thyme, it has antimicrobial properties that make your hand sanitizer even more effective in fighting disease-causing organisms.

Examples of commercial natural skincare products

Aloe Vera Moisturizing Cream

- Helps to soften your skin and keeps it lovely smooth and glowing.



- Key Ingredients: for soothing: Aloe Barbadensis Leaf Juice.

Ingredient name

what-it-does

<u>Water</u>	<u>solvent</u>
<u>Cetyl Alcohol</u>	<u>emollient, viscosity controlling</u>
<u>Stearyl Alcohol</u>	<u>emollient, viscosity controlling, emulsifying, surfactant/cleansing</u>
<u>Isopropyl Myristate</u>	<u>emollient, perfuming</u>
<u>Petrolatum</u>	<u>emollient</u>
<u>Propylene Glycol</u>	<u>moisturizer/humectant, solvent, viscosity controlling</u>
<u>Glycerol Stearate</u>	<u>emollient, emulsifying</u>
<u>PEG-100 Stearate</u>	<u>surfactant/cleansing, emulsifying</u>
<u>Dimethicone</u>	<u>emollient</u>
<u>Euphorbia Cerifera (Candelilla) Wax</u>	<u>perfuming, viscosity controlling</u>
<u>Diazolidinyl Urea</u>	<u>preservative</u>
<u>Hydrogenated Polydecene</u>	<u>emollient, perfuming, solvent</u>
<u>Hydrogenated Polyisobutene</u>	<u>emollient, viscosity controlling</u>
<u>Carbomer</u>	<u>viscosity controlling</u>
<u>Methylparaben</u>	<u>preservative</u>
<u>Triethanolamine</u>	<u>buffering</u>
<u>Aloe Barbadensis Leaf Juice</u>	<u>soothing, moisturizer/humectant</u>
<u>Propylparaben</u>	<u>preservative, perfuming</u>
<u>Fragrance</u>	<u>perfuming</u>

Aloe Vera Moisturizing Cream

It is a nourishing formula, enriched with **multiple** plant extracts. Provide moisture and nutrition for your skin to make it soft and hydrated.



Key Ingredients:

Hamamelis Virginiana Extract for soothing, antioxidant, antimicrobial/antibacterial.



Aloe Vera Moisturizing Cream



Face moisturizer toner



Aloe Vera Moisturizing Day Cream
Reduces wrinkles and fine lines

Gentle Exfoliating Cleanser

- Exfoliating facial cleanser gently polishes away embedded impurities and dead surface cells, revealing clean.



Key Ingredients: **Moringa Seed extract** for gently purifies.

Orange extract softens, refreshes and renews radiance.

Extra-Firming Day Cream

- An anti-aging day cream that visibly firms, lifts, and fights wrinkles to promote younger-looking skin.



Key Ingredients: **Extracts of Kangaroo Flower and Mitracarpus**, this advanced formula leaves skin looking smooth, firm, radiant, and deeply hydrating moisturizer.



Essential oils for skin whitening



- Anti-inflammatory effect.
- Treat acne scars and age spots.
- For lightening and brightening of skin.
- Antioxidant powers.
- Repair skin damaged.



- Help block damage and pigmentation from the sun.
- Help reduce skin redness and wrinkles.



- Helps to lighten dark patches of skin due to its skin repair qualities and rich content of vitamin E.
- Moisturizing, anti-inflammatory and antioxidant properties.



*Thank
you*