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# EVALUATION OF PLANT BIOACTIVE COMPOUNDS WITH POTENTIAL BENEFICIAL EFFECTS IN SKIN CONDITIONS

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**Abstract:** Dermatitis caused by stress has come to play an important place in the incidence of pathologies that increasingly affect a large part of the population. Plants and their role in ameliorating, treating and stopping skin conditions are one of real significance. Food supplements are products specifically designed to improve and reduce certain human health problems. They are easily accessible, the side effects are diminished, they have high tolerance and efficacy, their cost is low and they are also a promising alternative to synthetic drugs. So, plants such as Aloe Vera, Nettle, Chamomile and Pomegranate extract are evaluated, with a high content of Resveratrol, which through the bioactive compounds in its composition have therapeutic effects on skin diseases.

***Keywords*:** Aloe Vera, Chamomile, Nettle, Oxidative Stress, Plants, Skin Conditions, Resveratrol.

## Introduction

In the last decade, with the development of technology and also due to the fact that people emphasis a balanced and healthy lifestyle, 'natural remedies' have been developed under the name of food supplements.

Ayurvedic principles and the Chinese traditional medicine are based on healing the body from a pathological standpoint (healing medical issues that come up throughout life), but also mentally, promoting a healthy lifestyle and balanced nutrition, in case of unbalance, utilizing natural treatments for remedy.

WHO (World Health Organization) recommends the orientation of scientific research more towards the study of medicinal plants, plus the

extract of natural compounds, with the aim of growing the therapeutic options.

Food supplements are products that improve the human body's wellbeing and reduce some of the problems that it might encounter. The legal bases for health supplements have been introduced in the United States, and the regulations have been included in the "Dietary Supplement Health and Education act of 1994".

In the following we aim to analyse the possibility of obtaining a dietary supplement that combines the beneficial effects that the Resveratrol could have by capitalizing on red grape pomace, along with Aloe Vera, nettle and chamomile extracts.

Besides Resveratrol, the chemical compounds in this dietary supplement are enriched with proteins, fats and carbohydrates, multiple vitamins and mineral compounds, but also numerous active ingredients obtained from Aloe Vera, that has an anti-inflammatory and calming effect, from nettle with antimicrobial, antiseptic, anti-inflammatory and remineralizing effect, strengthening cell and connective tissue resistance. Last but not least, in the supplement's structure extracts from the chamomile flowers will be introduced, with a strong toning and regenerating effect on the skin, beneficial for reducing itching.

**The role of plants in skin issues**

From ancient times, people have searched for different diseases from nature, and so it has been proven that plants and plant extracts play an important role in treating skin lesions disease. Utilizing plants dates back to the Paleolithic, according to the proof presented by archaeologists (Parsaeimehr *et al.*, 2017).

It is a well-known fact that plants synthesize and accumulate active principles, the so called secondary metabolites, with biological activity and important benefits on the human body, such as: terpenoids, flavonoids, phenolic compounds, nitrogen compounds (alkaloids) and those containing sulphur; these, to a large extent, are responsible for the antioxidant and antimicrobial activity (Lei *et al.*, 2016).

In the last 20 years, medication based on plants has become popular because side effects are significantly reduced in comparison with pharmacological ones, due to the fact that they are well tolerated by patients and also is also well received by the consumer due to the proper balance between price and quality for the entire population. Because the health of the client comes first, many researchers elaborated speciality studies and

demonstrated the importance and efficacy of plants in reducing, improving and avoiding some dermatological issues (Nahida and Hamdani, 2014).

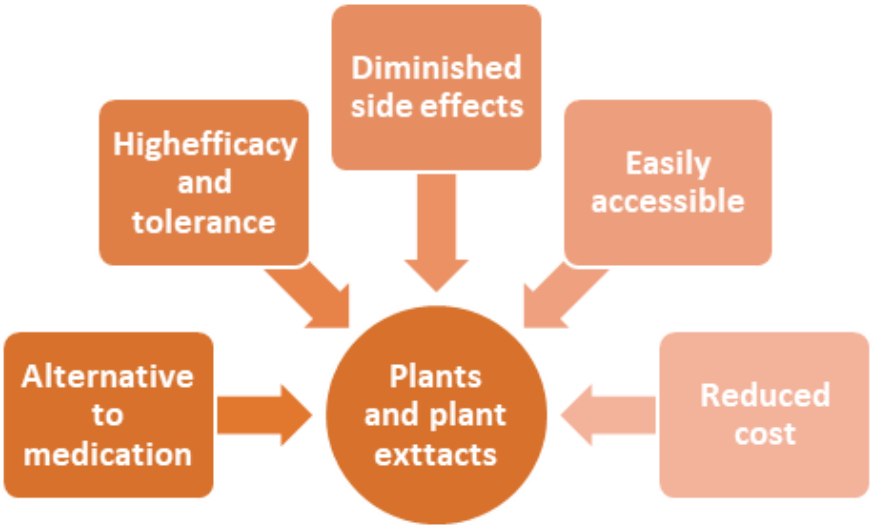


Figure 1. Advantages of using plants and plant extracts

Among these medicinal plants, of real interest and efficacy are: Aloe Vera *(Aloe Barbadensis)*, Nettle *(Urtica dioica)* and Chamomile *(Matricaria recutica)*.

**Resveratrol**

Resveratrol is a phytoalexin, a non-flavonoid polyphenolic compound, which is found in the structure and composition of various fruits and vegetables such as: *Polygonum cuspidatum* root (Ko-jo-kon), hazelnuts, berries (blueberries, blackberries, raspberries, cranberries), etc.), as well as in red grapes, hence the cardio protective properties of the wine derived from them (Meishiang *et al.*, 1997).

It is famous for its antioxidant properties, more specifically, Resveratrol monopolizes and coats reactive oxygen species (ROS), thus increasing the ability and potential of enzymes to metabolize it (Carrizzo *et al.*, 2013). Phenolic compounds have the ability to donate hydrogen

molecules to neutralize free radical species generated under conditions of oxidative stress.

Psoriasis is a chronic inflammatory condition found in about 2% of the Earth's surface. Resveratrol intervenes and attacks the main necrosis factor (TNFalpha) thus preventing its development. Medical tests were performed on human subjects with this type of disease, and results indicated that the pathological symptoms decreased by 50% in a relatively short interval, 14 days (Salehi *et al*., 2018).

It is known that there is an interdependent relationship between oxidative stress and the impact it has on the skin, more precisely on skin conditions that can occur as a result of stress. The author Mary Ndiaye and her collaborators have shown in several interesting studies that Resveratrol has the ability to induce apoptosis in human melanoma cell lines and also noted the intracellular decrease of reactive oxygen species (ROS) in cancer cells (Ndiaye *et al*., 2011).

**Aloe Vera** *(Aloe Barbadensis)*

The miracle plant used in Antiquity is of great importance in our day. Originating from Spain and South Africa, it was later introduced in multiple countries on different continents (Basmatker *et al*., 2011).

Traditional uses reveal that Aloe has countless beneficial effects on the body, namely: it has an anti-inflammatory, antibacterial, antiseptic role, helps to restore and tone damaged tissues and last but not least removes the feeling of itching (itching of the skin) (Joseph and Raj, 2010).

Aloe Vera has been and is used for a wide range of skin disorders, from infectious problems to allergies, treatment of deep, malignant wounds, ulcers, bruises, hives, eczema and many other types of skin diseases (Akaberi *et al*., 2016).

Its chemical composition shows a percentage of 99-99.5% water, and in the remaining about 1% there are about 75 nutrients, but also about 200 bio-active compounds such as: vitamins, minerals, amino acids, saponins, salicylic acid and last but not least lignans. In the leaves, there are important sources of organic acids, phenolic compounds, minerals, vitamins and enzymes (Abid *et al*., 2018). In vivo and in vitro experiments attest to anti-inflammatory, antibacterial, ant arthritic, but also anti-obesity, anti-diabetic properties, a fact proven on diabetic guinea pigs (Shabnam *et al*., 2014).

The moisturizing properties of Aloe help to hydrate the skin well and at the same time contribute to water retention in tegument. Aloe also activates fibroblasts that contribute to skin elasticity and smoothing through

the intake of collagen and elastin fibres (West and Zhu, 2003). Studies have been performed on mice with skin diseases (Psoriasis), and as a result there has been a significant increase in the thickness of the epidermis, a significant improvement in this type of disease. At the same time, research was done on 60 human subjects, finding that Aloe Vera was effective in 83.3% of patients, while for placebo, the control of the cure rate was low, 6.6% (Syed *et al*., 1996).

A promising prospect in terms of the beneficial properties of this plant is that it can be used as a sustainable excipient in oral tablet formulations, which is proven by improving the bioavailability of vitamins found in Aloe leaf extracts and their gel (Sánchez-Machado *et al*., 2016).

**Nettle** *(Urtica dioica)*

Nettle, native to Europe, America and North Africa, is a perennial plant with an important history in medicine and diet. This plant can be consumed as such, in the form of tea / juice, or certain substances beneficial to the body can be used, substances that we extract from its leaves, flowers or stem.

Nettle has a strong significance for the scientific world, which is why multiple studies have been conducted on this topic, as it has been shown to have anti-inflammatory, antifungal, antimicrobial, anti-mutagenic, anti-diabetes and many other properties (Khan *et al*., 2016).

The burning effect, sting when touched, is due to the following constituents that enter its structure, such as: acetylcholine, histamine and serotonin (Upton, 2013). Nettle extracts can have beneficial effects on pathological conditions in the human body, due to the high level of flavonoids, carotenoids, sterols/ phytosterols, vitamins, minerals and many other bio-active substances that are part of its composition (Zenão *et al*., 2017). Nettle leaves contain remarkable amounts of vitamin C (20–60 mg / 100 g, in dried leaves), B and K complex vitamins, as well as many mineral salts: Potassium (532–613 mg / 100 g), Sodium (16 –58 mg / 100 g), Phosphorus (50–265 mg / 100 g) (Upton, 2013).

Ghaedi together with the other researchers demonstrated in a recent study (2015) that the active substances in nettle and a few other plants such as Chamomile and Sage flowers do not inactivate each other, they do not become toxic when combine, but suitably increase the potency of microbial inactivation, supplementing the antifungal, antimicrobial and anti-inflammatory role, due to tannins, volatile oils, phytosterols and other secondary metabolites (Ghaedi *et al*., 2015).

**Chamomile** *(Matricaria recutica)*

Chamomile is a perennial plant that can be found in all corners of the earth. Initially it was grown in wild areas and later cultivated in Europe, America and North Africa. Traditional medicine considers chamomile as an antiseptic, antibiotic, disinfectant, bactericidal, fungicidal, vermicide agent, with multiple roles including anti-inflammatory, antioxidant, sedative, antispasmodic, antipruritic and analgesic being used in diseases of the oral cavity and oropharynx (Guimarães *et al*., 2013).

The main constituents of chamomile are: phenolic compounds, flavonoids, terpenes, asylum compounds with anti-allergic role.

Its importance in treating eczema, wounds, skin irritations, hemorrhoids, but also other conditions is recognized (Chandrashekhar *et al*., 2011).

A study conducted in 2011 demonstrates the effectiveness of chamomile against itching. Specifically, V.M. Chandrashekhar, together with the other researchers involved in the study, demonstrated the antipruritic role of methanolic extract in chamomile flowers. The test was performed on guinea pig mice that were injected subcutaneously with a complex of itchy compounds. The methanolic extract from chamomile flowers was administered orally; one hour before the injection of the complex of compounds that initiates the itching sensation. The result was as expected, the mice treated with methanolic extract from chamomile flowers showed a much decreased percentage of injuries caused by scratching compared to the control group. The standard group showed a percentage of 38% protection, while mice administered chamomile flower extract had a protection of 51.17%: 77.21% and 87.52%, values related to the amount of chamomile methanolic extract, namely 100, 200 and 300 mg / kg (Chandrashekhar *et al*., 2011).

## Conclusions

From the information presented in the above research document we can confidently make the following statements:

- Resveratrol has a strong anti-inflammatory, antioxidant and anti-aging role, plus very good efficacy in treating and fighting several skin diseases. At the same time, the major suppressive effect of cancer cells should be noted.

- Aloe Vera *(Aloe Barbadensis)* has over 70 active ingredients and anti-inflammatory, antiseptic, immunomodulatory properties and a strong calming effect, ideal for treating first and second degree burns, but also to accelerate the healing time of wounds.

- Nettle *(Urtica dioica)* contains important sources of vitamin A, C, D, E and K, but also antioxidants and lecithin, and this helps fight stress and fatigue. Recent studies confirm the anti-fungal, antimicrobial and anti-inflammatory role of the Nettle.

- Chamomile *(Matricaria recutica)* is a delicate medicinal plant with complex healing powers. This is a good immunostimulant, due to the high phosphorus content that helps the proper functioning of all organs. Chamomile is considered in specialized research as an antiseptic, antibiotic, disinfectant, bactericidal, fungicidal, vermicide agent, with multiple roles including anti-inflammatory, antioxidant, sedative, antispasmodic, antipruritic and analgesic.

We can conclude that plants, through the bioactive compounds they contain, can contribute to the treatment of various diseases, having obvious therapeutic effects.

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