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Short communication

Potential use of Sambucus nigra ointments for skin treatment in ethnomedicine in Republic of North Macedonia

Viktorija Maksimova[1*], Elena Drakalska Sersemova[1], Mirela Vasileva[2]

[1]*Faculty of Medical Sciences, Goce Delcev University, Krste Misirkov bb, 2000 Shtip, Republic of North Macedonia*
[2]*Clinical Hospital-Stip, Ljuben Ivanov bb, 2000 Shtip, Republic of North Macedonia*

Introduction

Sambucus nigra L., is a medicinal aromatic plant widely known and often represented in Macedonian flora. It is a small flowering tree from Caprifoliaceae family, used as edible and medicinal plant. It has been used as antiviral, anti-inflammatory, diaphoretic, and antitussive agent in traditional preparation for a long time ago. But, beside this commonly known pharmacological effects, there are some other aims in which this plant has been used in ethnomedicine. It is known that some semisolid forms, prepared from the local citizens have been used for external treatment of wounds and scars. This review aims to examine the bioactive compounds characteristic for emollient, antioxidant, and vulnerable effects of elder flower unguentum and types of preparation that could be effective in this kind of skin treatment.

Materials and methods

This review aims to collect the data of previously known preparations in ethnomedicine and examine their justification in the treatment of wounds, burns and scars based on the scientific literature. As a material we have used scientific papers giving the chemical and therapeutic properties of elder flower and other parts of the plant, but also and some prescription from local citizens they have used in preparations of a specific elder ointments, and their specific methods of extraction.

There is not systematic assessment in this review. Search strategy included exploration of PubMed databases, by using key words related to Sambucus nigra, elder flower, Sambucus chemical composition, ethnomedicine, therapeutic use of sambucus.

Results and discussion

Recent studies have shown that black elder or *Sambucus nigra* extracts are traditionally recommended for treatment of cold, influenza and influenza like illnesses. (Mahbouibi, 2021). Among different parts of *Sambucus nigra* that could be used, its flowers and berries are considered as medicinal parts. Elder flowers have been approved by German commission E for colds, while berries, leaves and barks are still not approved by WHO, ESCOP, and German Commission E (Ulbricht et al., 2014). In folk medicine, elder flowers have been used for treatment of conjunctivitis, constipation, diabetes, diarrhea, dry skin, headaches, and rheumatism (WHO, 2004). Often, elder flowers are used for flu and cold in conventional dosage form as infusion, ethanolic extract or tincture, but lately it is incorporated in coated tablets and fluid dosage forms, as a multicomponent drug. According to the official monographs there is only *per os* posology of a given liquid extracts, but in contrast, there have been some uses in ethnomedicine that promote its external use in form of *unguentum* (ointments). According to Suntar et al. (2010) one percent concentration of *Sambucus ebulus* methanol extract has shown a considerable wound healing activity in both linear and circular excisions in animal model. It is assumed that this this pharmacological property is related to the flavonoid content, especially, quercetin 3-O-glucoside as highly represented flavonoid glycoside. Their results were supported by histopathological examination of wound models.

Taking in consideration that *S.nigra* flowers also contain high content of quercetin it is expected that its preparations also possess this wound healing properties (Cavero et al., 2013; Süntar et al., 2010).

Type corresponding author e-mail

Not only quercetin, but many other flavonoids, such as: kaempferol, isoquercetin, rutoside (Kaack et al., 2006) astragalin, rutin and hyperoside have been identified in elder flowers. They also contain phenolic acids in their free or glycoside form, including caffeic, ferulic, chlorogenic and p-coumaric acids. Terpenoids as well as triterpenes, sterols, and essential oils (0.03–0.14%) with a high concentration of free fatty acids amounting to 65% (Newall et al., 1996). Other substances identified in flowers include organic acid as well as ascorbic, fumaric, citric, tartaric, valeric and malic acids (Mikulic-Petkovsek et al., 2016).

On the other side, prescription in ethnomedicine obtained by local citizens shown that not only flower, but green parts as well as stems, leaves from elder are used in the ointments for wound healing effect. They have used 1:2 (green part/oily base) and applied short time heating to this mixture to prepare the ointment. Młynarczyk et al. (2018) have reported that elder leaves contain 3.3% of whole protein in which glutamic acid, aspargic acid and alanine were the dominant amino acids. In comparison to the other parts of elder, sambunigrin was found as most represented in elder leaves with highest concentration of 27.68–209.61 μg/g FW (Senica et al., 2016). Elderberry bark contains typical compound as lectins, sharing a high amino acids sequence homology and some of them having the N-glycosidase activity, which is typical for type II ribosome-inactivating proteins (RIPs). Type II RIPs occur mostly in elderberry bark (Tejero et al., 2015). Although, alanine is popular as moisturizing skincare ingredient, it was found that beta-alanine can stimulate the biosynthesis of nucleic acids and collagen and could be considered as an enhancer of the process of wound healing (Nagai et al., 1986). Lectins usually known by their toxicity, have shown antimicrobial activity in a wide range of microorganisms (Mishra et al., 2019). Thus, the antioxidant, emollient, antibacterial properties can justify the use of elder in ethnomedicine as wound healing and skin protective agent.

Conclusion

Elder flowers, leaves, and barks have high content of specific secondary bioactive metabolites. Flavonoids and organic acid known as antioxidants, mostly represented in flowers, sambunigrin and alanine in leaves and lectins in barks, could be responsible for wound healing, emollient, antimicrobial effects of elder extracts. Detailed information about method of preparation of the oily extraction procedure and prescription for preparation of the ointments should be collected in our further investigation to examine the exact chemical composition in this kind of elder extracts. Complex composition of elder parts could justify their use not only in treatment of cold, flu, cough, but also in treatment of wounds, burns, scars, and skin disorders, as they have been used in ethnomedicine.

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