

Medicinal and Cosmetic Potential of Neem (*Azadiracta Indica*) Seed Oil: A Review

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Review Article

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ABSTRACT

Neem, an elegant medicinal plant was found to be the source of various bioactive compounds of medicinal and cosmetic importance. Oil extracted from its seeds is rich in such phytoconstituents. In this review an insight into some literature reports on the medicinal and cosmetic applications of natural phytoconstituents in the seed oil extract of neem was provided as an overview.

INTRODUCTION

The *Azadiracta indica* tree, a member of the *Meliaceae* family is a native to the seasonally dry, tropical woodlands of North-east India and perhaps parts of Asia^[1]. Neem tree is commonly found in towns and villages in the Northern part of Nigeria. It is mostly planted in large numbers along road sides.

Mechanical extraction is the most widely used method to extract neem oil from neem seed^[2]. Oil extracted from its seeds is composed primarily of triacylglycerols of oleic, stearic, linoleic, and palmitic acids. The seeds yield 40% of a deep yellow oil, well-known as 'Margosa oil' ^[3]. During the last five decades, apart from the chemistry of the neem compounds, considerable progress has been achieved regarding the biological activity and medicinal applications of neem. It is now considered as a valuable source of unique natural products for development of medicines against various diseases and also for the development of industrial products ^[4]. Of all other industrial uses of neem seed oil, like its use as lubricant and in pharmaceutical preparations like emulsions, ointments, poultices, and liniments, in India, it has been a major ingredient in soaps^[5]. It is also able to treat dandruff problems, dry and itchy scalps and also restore dry and damaged hair ^[6].

Taxonomic Identity

Neem is a member of the Mahogany family. It has similar properties to its close relative, *Melia azederach*. The word *Azadiracta* is derived from the Persian azadhirakt (meaning 'noble tree'). The taxonomic positions of neem are as follows:

Order: Rurales
Suborder: Rutinae
Family: Meliaceae
Subfamily: Melioideae

Tribe – Melieae
 Genus: *Azadirachta*
 Specie: *Indica*
 Latin: *Azadirachta indica*
 Indian: Holy tree, Indian lilac tree
 Hindi: Neem, Nim
 Sanskrit: Nimba
 Hausa: Dogon yaro
 Igbo: Ogwu akuma [7] .

Neem oil limonoids as bioactive cosmetic component

Azadirachta indica A. Juss. (Neem) is a source of several bioactive triterpenoids, however, only azadirachtins have been commercially exploited. Development of the Major Triterpenoids and Oil in the Fruit and Seeds of Neem (*Azadirachta indica*) was reported^[8]. Salanin and nimbin (Fig2) are the other major active potential bioactive compounds that can be used for product development as well as markers for selection and improvement of neem ^[9] The extraction of nimbin from neem seeds using supercritical carbon dioxide was investigated ^[10]. Nimbidin (Fig. 3) present has found to be effective in the treatment of skin diseases such as eczema, furunculosis, arsenical dermatitis, scabies and seborrheic dermatitis ^[11]. Neem oil Limonoids is a natural extract obtained from cold pressed neem seed oil and standardized to contain not less than 50% Total Limonoids and 1000 ppm Azadirachtin. Potential cosmeceutical applications include antibacterial, antifungal, antiparasitic, insect repellent, anti-pediculosis formulations for topical use in skin and hair care. Neemoids is a free flowing pale brown to yellowish brown powder obtained from cold pressed Neem seed oil used in formulations including creams, lotions, hand /body washes, shampoos, oils and related products ^[12].

Neem oil limonoids containing Azadirachtin (Fig.1) could be used in hair care formulations due to their antihead lice, antidandruff and antifungal activities ^[12].

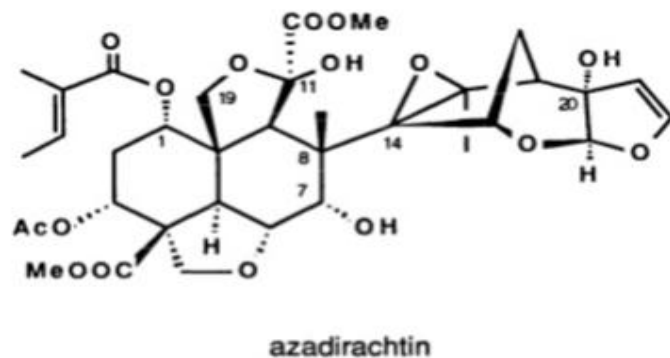


Fig1: The structure of Azadirachtin ^[5].

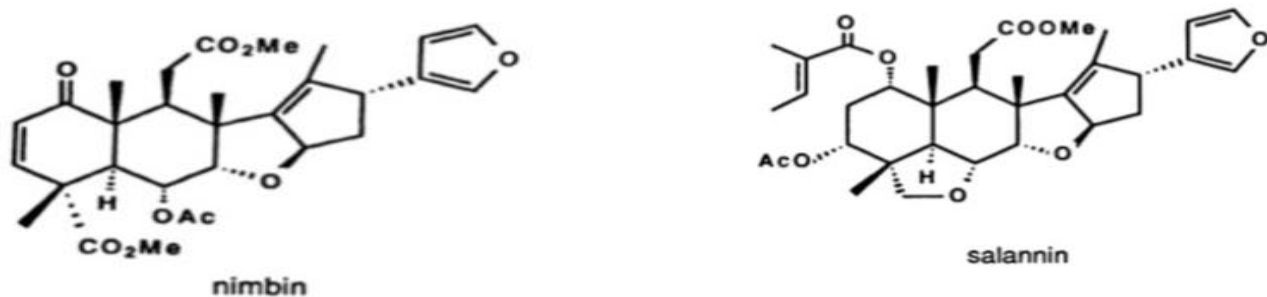


Fig 2: Structures of nimbin and salanin ^[5].



Fig 3: Structure of Nimbidin [5].

The undiluted neem seed oil was tested against various strains of bacteria, to yield zones of inhibition as shown in Figure 4.

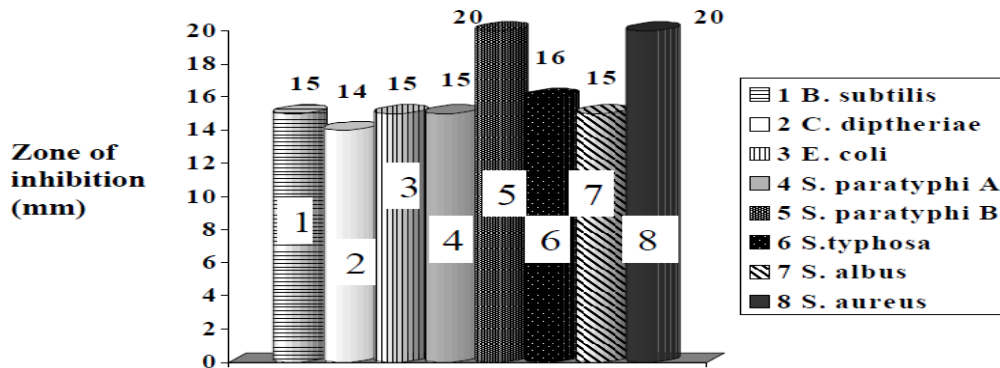


Fig 4: Inhibitory effect of Neem oil against bacterial cultures [12].

Research works and Reviews on Medicinal and Cosmetic Applications of Neem seed oil

A new shampoo based on neem (*Azadirachta indica*) highly effective against head lice in vitro was reported [13]. *Azadirachta Indica* (Neem) Seed oil as Adjuvant for Antimicrobial Activity was reported [14]. Physico-Chemical Stability Studies of Neem (*Azadirachta indica*) Seed Oil Cream was reported [15]. Chemical characteristics of toilet soap prepared from neem (*Azadirachta indica* A. Juss) seed oil was reported [16], the chemical properties of the soap were 63.75 %, 0.24 %, 0.06, 1.15 %, 12.6 % and 10.4 % as its total fatty matter, total alkali, free caustic alkali, percentage chloride (% Cl⁻), % moisture and pH respectively. Due to the phytoconstituents in neem oil and the favourable chemical characteristics of the soap, the authors concluded that can be used as medical and cosmetics toilet soap. Such neem soap may act to protect the skin [16].

Nigerian variety of Neem seed oil is was reported to be utilizable for soap making [17]. The properties exhibited by the soap solution indicated its suitability for commercial production [17]. Production of biodegradable detergent from *Azadirachta Indica* (neem) seed oil was reported [18], the synthesized detergent was characterized and compared favourably with commercially available detergents [18].

CONCLUSION

Natural products chemistry has nowadays remain one of the major areas that contributed tremendously in medicinal and cosmetic delivery. The previous research works reported the neem seed oil a natural product from neem tree as resourceful in this direction.

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