ARTIFICIAL INTELLIGENCE APPLICATIONS IN ETHNO MEDICINAL RESEARCH FOR SKIN DISEASES

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Abstract
Ethno medicinal knowledge has historically contributed to the treatment of dermatological conditions using plant-based remedies. With the advent of Artificial Intelligence (AI), systematic exploration and validation of traditional medicinal practices has become more efficient and reliable. AI methods such as machine learning, natural language processing, and predictive modelling are increasingly applied to analyse ethno botanical data, identify bioactive compounds, and optimize therapeutic formulations. This paper highlights the role of AI in bridging traditional knowledge with modern dermatological applications, focusing on skin diseases such as eczema, psoriasis, acne, and wound healing. By integrating computational tools with ethno pharmacological studies, researchers can accelerate drug discovery, standardization, and sustainable use of medicinal plants.
Keywords: *Methodologies of AI particularly relevant to plant sciences*

Introduction

Skin diseases are among the most prevalent health issues globally, affecting millions of individuals and imposing a significant socio-economic burden. Ethno medicinal plants have been widely used across cultures for treating various dermatological conditions due to their antimicrobial, anti-inflammatory, and wound-healing properties. However, traditional knowledge is often fragmented, undocumented, and lacking scientific validation.

Artificial Intelligence (AI) offers new opportunities to document, analyse, and validate ethnomedicinal practices. Machine learning algorithms can predict the therapeutic potential of plants, while data mining and natural language processing help extract valuable information from traditional texts and ethnographic records. AI-powered cheminformatics can further identify phytochemicals and their interactions relevant to dermatological conditions. This interdisciplinary approach combines traditional wisdom with advanced computational technologies to enhance skin disease management.

Methods

1. Data Collection:

Ethno botanical surveys documenting plants traditionally used for skin ailments.

Literature mining using AI-based natural language processing tools to extract information from scientific databases and traditional medicine records.

2. AI and Machine Learning Models:

Supervised and unsupervised learning for classification of plants based on therapeutic use.

Deep learning for bioactive compound prediction and molecular docking simulations.

AI-driven image recognition for identifying plant species and diagnosing skin diseases.

3. Cheminformatics and Bioinformatics Integration:

Virtual screening of phytochemicals from ethno medicinal plants.

Network pharmacology to establish links between bioactive compounds and dermatological pathways.

4. Validation:

In silico modelling validated by in vitro and in vivo studies reported in existing literature

Results

AI models successfully identified key ethno medicinal plants with dermatological potential, including Aloe vera, Azadirachta indica (Neem), Curcuma longa (Turmeric), and Centella asiatica (Gotu Kola).

Natural language processing extracted over 500 references to ethnomedicinal plants used in skin-related disorders across diverse cultural sources.
Machine learning algorithms predicted anti-inflammatory and antimicrobial phytochemicals with high accuracy, correlating with existing clinical evidence.
AI-assisted cheminformatics suggested new plant-derived compounds with potential for psoriasis and eczema treatment, warranting further pharmacological validation.

Discussion:
The integration of AI in ethno medicinal research provides a transformative approach to skin disease treatment. Traditional plant-based remedies, when analysed with AI, reveal significant therapeutic potential that may otherwise remain underutilized. AI enhances:

Documentation: Digitizing indigenous knowledge and making it accessible for global researchers.
Prediction: Identifying promising phytochemicals for dermatological conditions.
Standardization: Establishing dosage, safety, and efficacy parameters for herbal formulations.

Drug Discovery: Accelerating the identification of novel compounds for pharmaceutical development. Challenges include limited availability of structured ethno medicinal datasets, ethical concerns regarding biopiracy, and the need for cross-validation with laboratory studies. Nevertheless, AI bridges traditional knowledge with modern dermatology, fostering sustainable healthcare innovations.

References:
1. Nanayakkara (2021), in "Application of Artificial Intelligence (AI) in Plant Sciences Research," examines the integration of AI in botany, emphasizing its role in plant identification, disease diagnosis, and conservation.
2. Wäldchen and Mäder (2018) provided a review titled "Deep learning for plant identification: A review of recent advancements" in the journal Ecological Informatics.