**Original Review Article**

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ETHNO-MEDICINAL CLAIMS, PHYTOCHEMISTRY AND PHARMACOLOGICAL PROPERTIES OF *MANDRAGORA AUTUMNALIS* BERTOL.: A REVIEWSonam Bhutia*¹, Bibhuti Bhusan Kakoti²

1. Government Pharmacy College, Government of Sikkim, Sikkim University, Rumtek-Sajong, East Sikkim -737135, India.
2. Department of Pharmaceutical Sciences, Dibrugarh University, Dibrugarh, Assam, India.

ABSTRACT: *Mandragora autumnalis*, also known as mandrake and sometimes autumn mandrake, belongs to the family: Solanaceae is a perennial herbaceous plant with a large vertically tap-root, mainly branched and sometimes shaped like a person. Most *Mandragora* species possess more biologically active alkaloids, tropane alkaloids, etc. The gifted poison, cuscohygrin, apoatropin, 6-beta-ditigloyloxytropine, 3-alpha, hyoscyne, 3-alpha-tigloxytropine, and belladonnine are many alkaloids. Sitosterol and beta-methylesculetin (scopoletin) have been included in non-alkaloid constituents. *Mandragora* species have also been commonly used for a long time in ancient medicinal products, an extract that is used for its real or alleged effects of aphrodisiac, hypnotic, emetic, purgatory, sedative, and pain-killing. Tropane alkaloids are recognized to be medicinal agents as analgesics and anaesthetics and can be used among other purposes to enhance breathing, dilate pupils. Folk medicine has documented continued use of *Mandragora autumnalis*. In a single document, an effort was made to compile these phyto-constituent studies and the different ethno-medicinal and pharmacological characteristics of *Mandragora autumnalis* and provide a thorough review. This review emphasizes the requirement which individual constituents from this plant further be examined in depth and separated and characterized. **Keywords:** *Mandragora autumnalis*, Ethno-medicinal claims, Phytochemical, Pharmacological Properties.

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Corresponding Author: Sonam Bhutia*

Government Pharmacy College, Government of Sikkim, Sikkim University,
Rumtek - Sajong, East Sikkim -737135, India.

1.INTRODUCTION

Mandragora autumnalis is a perennial herbaceous plant with a large upright tap-root, often branched and sometimes shaped like a person, also recognized as mandrake or sometimes autumn mandrake by those in Solanaceae family. There seems to be a tiny stem, even though the leaves were born up to 60 cm (2 ft) across in a basal rosette. The petals are distributed in the middle of the rosette, each with 5 sepals, 5 petals, and 5 stamens. The sepals and petals are fused at the base, forming two cups in the shape of a bell to five lobes. The ovary has two chambers (locules) with only a long design. The fruit has several seeds and is bound to be a fleshy berry. The ovary has two (locules) chambers and a long style. The fruit has several seeds and will be a fleshy berry. It has flowers that vary in pigmentation but are typically violet or purple, 30–40 mm (1–2 in) long and yellow or orange and egg-shaped berries. In one study, *Mandragora autumnalis* is the main species of *Mandragora* found across the Mediterranean, in Tunisia, Algeria, Morocco, southern Portugal, southern Spain, southern Italy, Greece, Cyprus, Turkey, Syria, Lebanon, Israel, and Jordan, absent in northern Italy and a region on the coast of former Yugoslavia, where it is replaced by *M. Autumnalis*. *Mandragora autumnalis* is native only to the Levant in another treatment (from Syria). [1-4]

1.1 Taxonomy Of The Plant:

Kingdom : Plantae
Subkingdom : Tracheobionta-Vascular plant
Superdivision :Spermatophyta – Seed plants
Division :Magnoliophyta-Flowering plants
Class :Magnoliopsida-Dicotlyedon
Order : Solanales
Family : Solanaceae-Potato family
Genus : *Mandragora*
Species :*autumnalis*
Taxon Name :*Mandragora autumnalis* Bertol.

a) Synonym(s):• *Atropa mandragora* L.

- *Mandragora haussknechtii* Heldr.
- *Mandragora foemina* Thell.
- *Mandragora microcarpa* Bertol.
- *Mandragora officinarum* L.
- *Mandragora autumnalis subspecies microcarpa* (Bertol.) Nyman

b) Common Name(s):• French: Pomme d’amour

- English: Autumn Mandrake, Love Apple
- Spanish: Berenguenilla, Mandragora

2.0 Habitat and Ecology

Classical habitats include pastures, banks, fields, clear undergrowth, cultivated beds, mountain plain, river banks, ditches, pondmargins, river beds, olive groves, woodlands clearings, stony places, coastal side, low mountain pastures, woodland, waste ground, Mediterranean forest and sometimes found around stone tombs in cemeteries.[5-7]



Fig:1(*Mandragora autumnalis* plant with flower) Fig:2(*Mandragora autumnalis* plant with root)



Fig: 3(*Mandragora autumnalis* plant with Fruits) Fig:4(*Mandragora autumnalis* plant with leaves)

3.0 Description

The boundary between the two species *Mandragora autumnalis* and *Mandragora officinarum* varies among authors, with some regarding them as the same species (see: Taxonomy above). *M. Autumnalis* are annual herbaceous plants with an immense upright tap-root, sometimes branched and sometimes shaped like a human. There are few or no stem, the leaves of the plant being borne in a basal rosette up to 60 cm (2 ft) across. The flowers are clustered shaped at the centre of the rosette, each with five sepals, five petals and five stamens. Both the sepals and petals are fused at the base forming two five-lobed bell-shaped cups. The ovary has two chambers (locules) and a long style. The fruit bears the fleshy berry with many seeds. The *Mandragora* plant species are mainly found in the Mediterranean regions, it bears the flowers that are varying in colour but mostly violet or purple, 30–40 mm (1–2 in) long, and berries are yellow or orange and egg-shaped, while the much less widespread *Mandragora officinarum* has somewhat smaller flowers, greenish-white in colour,

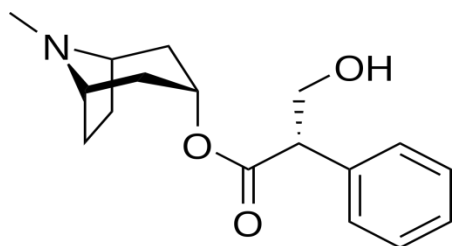
and berries that are yellow and globe-shaped.[8]

4.0 Ethno-Medicinal Claims

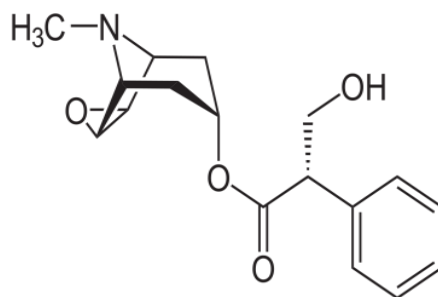
Historically, the Assyrians and Ancient Greeks named *Mandragora autumnalis* a medicinal plant and Dioscorides and Theophrastus listed it as a potent narcotic in texts. The fruits of this plant were used for treating fertility problems already in Biblical times and mentioned in the book of Genesis. *Mandragora autumnalis* is very rich in atropine and the scopolamine that make it very toxic and dangerous.^[9-15] Alkaloids which are present in the *Mandagora* plants use separately in low doses are well known by the advanced medicine, but in the antiquity it was not possible to separate them and their poisonous effects were added, getting to cause the death to that consumed its leaves, fruits or roots. The dried roots pounded into a powder of larger particles and sprinkled over pellets of bread eaten by women to gain weight and get fat. *Mandragora autumnalis* roots resemble either the male or the female body and used to cure ailments of that body. Used as herbal fertility, an aphrodisiac, anesthetic, painkilling, soporific (inducing sleep), have powerful narcotic, sedative, emetic and hallucinogenic activities. The fumigated dry leaves (smoked as a cigarette) possess beneficial action against asthma, bronchitis, cough, and throat pains. The leaves are harmless and locally used as cooling poultice, to treat genital organs and women's diseases. There are many superstitions regarding its ability to attract demons and cure various illnesses including mental diseases. The fruits considered tasty and an intoxicating sweet odour and the roots contain poisonous alkaloids which should be approached with caution. From the beginning, the plant is considered as a poison for criminal activities to enhance the long illness and to weaken the body without suspicion.[9-16]

5.0 Phytochemistry Or Phyto-Constituents

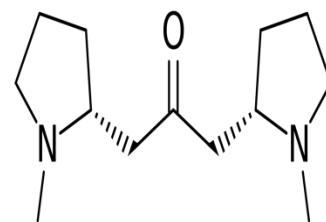
The results of an extensive investigation into the alkaloid constituents has shown the presence in the species, of (a) hyoscyamine, (b) hyoscyne, (c) cuscohygrine, (d) apoatropine, (e) 3a-tigloyloxytropine and (f) 3,6-ditigloyloxytropine. (g) Beta-belladonnine was also detected in the dried roots (Jackson & Berry, 1973).[17-20]



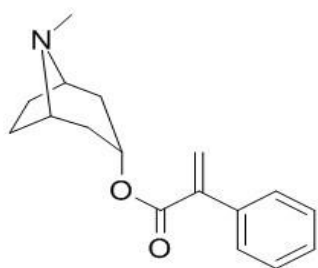
(a)



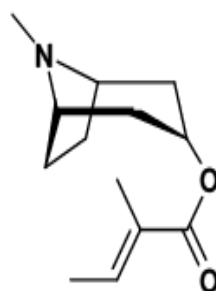
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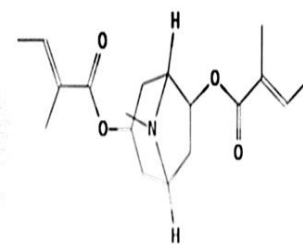
(c)



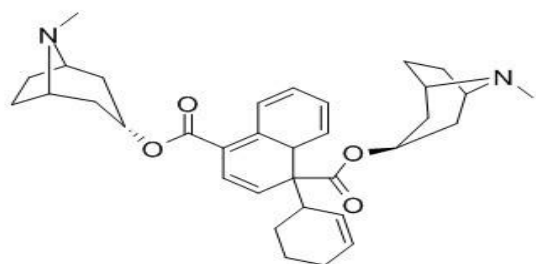
(d)



(e)



(f)



(g)

6.0 Established Pharmacological Activities

6.1 Anti-oxidant activity

Enzyme inhibitory potentials shows more effective against cholinesterase (AChE and BChE), tyrosinase, α -amylase and α -glucosidase. Generally, the methanolic extract of flowers (F-Met) the plant have strongest antioxidant effect with the highest level of phenolics. Total phenolic and flavonoid content present in the ranges of 26.10-46.92 mgGAE/g extract and 3.60-26.11 mgRE/g extract, respectively.[21-24]

6.2 Anti-microbial activity

The experimental result of ethanolic root extracts of *Mandagora* species has shown the remarkable antibacterial potency against all tested bacterial strains at concentration 250 µg/ml, the other plant parts extracts did not show any activity against selected bacterial strains compared with the reference antibiotic gentamycin. Different plant parts obtained from *Mandagora autumnalis* (root, leaf, unripe fruit, ripe fruit) were tested for three types of dermatophytes (yeast and rubrum) using poisoned technique method at different concentrations (25, 50, 100 and 250 µg/ml). None of the above parts of the plant showed any significant activity at the suggested concentrations.^[21-23]

6.3 Enzyme inhibitory activities.[25-31]

Mandagora autumnalis extract shows the remarkable inhibitory effects on cholinesterase, tyrosinase, α-amylase and α-glucosidase. The Fruit-Methnolic extract is the most potent activity for AChE, while Leave-Ac exhibited remarkable inhibitory activity on BChE. Alpha amylase inhibitory activity of extracts decreased in the order of L-Ac [1.86 mmolACAE/g extract] > F-Ac [1.27 mmolACAE/g extract] > L-Met [0.51 mmolACAE/g extract] > F-Met [0.46 mmolACAE/g extract]. The highest tyrosinase inhibitory activity is Leave-Ac [29.68 mgKAE/g extract].

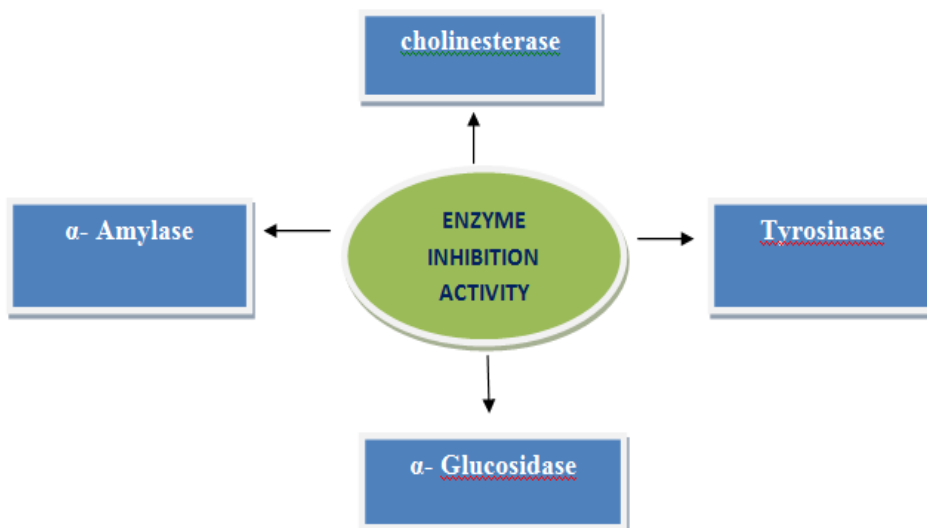


Fig: Different Enzyme activity

2. CONCLUSION

The presented review gives us the present state of knowledge regarding the ethno-medicinal importance of *Mandagora autonalis* regarding the taxonomical classification, synonyms and local names, habitat and ecology, description, ethno-medicinal claims, pharmacological activities, etc. As per the above information, the literature in this area is not abundant, but its contribution is significant. Today mandrake is almost a forgotten plant. For more than 100 years, chemists were curious to solve “the secret” of the chemical principle of the “magic” root and the “apples” of love. It is surprising that such a famous plant has been so little studied for its content compounds. The chemical

constituents of the plant are magical one and possesses many health benefits like (hallucinogenic, anti-anxiety, analgesic, hyptonic and have poisonous effect also), still some more analytical works are needed be done. Further research can bring new and unexpected information for the magical plant.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

No Animals/Humans were used for studies that are base of this research.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

The authors confirm that the data supporting the findings of this research are available within the article.

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CONFLICT OF INTEREST

Authors have no conflict of interest.

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