JAIPHAL MYRISTICA FRAGRANS: A PHARMACEUTICAL SEED

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Abstract- The oldest way of treating human illness/disorder is a tradition of using herbal drugs and herbal remedies. The demand for herbal remedies has increased over the last few years. Jaiphal is one of those herbal drugs prominent for its pharmaceutical assets.
Jaiphal which is traditionally known as Jatiphal and Javitri in India and in some Asian countries. It has one common name which is Nutmeg. Being a part of the family Myristicaceae, it is known for its flavour and therapeutic use. It is a good body detoxifier and stimulates the brain. The presence of eugenol, limonene, lignin, sabinene, camphene, myristic acid and myristicin make it a useful application in medicine. It has high contents of minerals, carbohydrates, and protein. It has various other properties such as antidiabetic, anticarcinogenic, antidepressant, antiobesity, antidiarrheal, and hepatoprotective. Its seed has 5-15% volatile oil, and fixed oil of 25-40% and these are used to treat conditions such as sprains and muscle pain. Nutmeg has applications in the medicines of Unani in terms of sexual disorders. It is observed that various nutrients are found in the Jaiphal seed which makes it a paramount seed. There are multiple benefits and importance for further research, therefore, more research on this topic will deliver information about its chemical properties and medicinal uses. Thus, proliferation of its vitamin will be an informative source in this direction.

Index Terms- Jaiphal, Jatiphal, Myristica, Nutmeg

I. INTRODUCTION

Jaiphal, known as Nutmeg, Myristica Fragrans in Latin is a native tree of Moluccas, or Spice Islands, of Indonesia. It is known for its seed which has various applications in the pharmaceutical field. The seed has a chemical composition of 5-15% volatile oil, and fixed oil of 25-40%. From this fixed oil is obtained which is viscous. Being a pharmaceutical seed, it has applications in therapeutic uses for example herbal drugs for Gastrointestinal tracts. But excessive use of its seed has altered effects as well. In excess dose, it is toxic to the brain and may result to cause epilepsy.

II. CHEMICAL PROPERTIES

Myristica fragrans, commonly known as nutmeg, is a spice that is obtained from the seed of the Myristica fragrans tree. It is known for its distinct flavor and aroma and is used in various culinary and medicinal applications. Here are some of the chemical properties of Myristica fragrans:

- Essential oils: Nutmeg contains essential oils, which are responsible for its characteristic aroma and flavor. The main components of the essential oil extracted from nutmeg are myristicin, elemicin, and safrole, which contribute to its medicinal properties.
- Volatile compounds: Nutmeg contains various volatile compounds, including terpenes, phenylpropanoids, and alkenyl benzenes, which are responsible for its unique fragrance and taste.
- Polyphenols: Nutmeg is a rich source of polyphenols, which are antioxidants that help protect cells from oxidative damage. These polyphenols include myricetin, quercetin, and kaempferol, among others.
- Fixed oils: Nutmeg contains fixed or non-volatile oils, which are composed of triglycerides of fatty acids. Myristic acid, oleic acid, linoleic acid are the considerable fatty acids scavenged in nutmeg.
- Proteins: Nutmeg contains proteins, which are essential nutrients required for various physiological functions in the body. These proteins are rich in essential amino acids like arginine, leucine, and lysine.
- Minerals: Nutmeg is a good source of minerals such as calcium, magnesium, and potassium, which play important roles in maintaining healthy bones, nerve function, and muscle function.

- Carbohydrates: Nutmeg contains carbohydrates, including starch and dietary fiber, which provide energy and support digestive health, respectively.
- Alkaloids: Nutmeg contains small amounts of alkaloids, including myristicin and safrole, which are responsible for its psychoactive properties. However, excessive consumption of nutmeg can lead to toxic effects due to these alkaloids.

These are some of the chemical properties of Myristica fragrans or nutmeg. It's important to note that while nutmeg has culinary and medicinal uses, it should be used in moderation and as part of a balanced diet, and consulting with a healthcare professional is recommended before using it for medicinal purposes.

III. MOTIVATION

Existing Problems in pharmaceutical -> How Jaiphal can help to resolve them

The initiative of our project procures from the existence of sophisticated and crucial needs of the present pharmaceutical field. Various properties such as anticarcinogenic (ability to prevent or delay of cancerous cells), hepatoprotective (ability to prevent harmful effects to liver), anti-diabetic (maintain and stabilize glucose level in the blood), antidepressant, anti-diarrheal and anti-obesity, makes nutmeg a favorable seed. Furthermore, it also has applications in the domestic and industrial fields. The present day needs of current pharmaceutical scenarios also motivates this project. So, there is a requirement to focus on the current scenarios and explore various other seeds for development in the pharmaceutical field. In the upcoming years, there will be chief requirements of seeds like Jaiphal to improvise the use of such seeds for development. Hence, we in this review paper, layout board applications and nutrients of Jaiphal in the pharmaceutical paradigm.

IV. OVERVIEW

Nature has been the greatest source of medicines for a long time and today also used with great significance. The Origin of Nutmeg is from Banda, an island in Indonesia. It is also the largest source of Nutmeg. Also found in Sri Lanka and India. 10-20 metres is the aggregate height of a nutmeg tree. They are usually grown in tropical regions. Nutmeg seed colour is brown and has a pervasive smell and sour taste. Aroma of nutmeg makes it a promising seed. The structure of nutmeg is very compact and easy to break. Nutmeg is also used as a species in many countries and as a component mostly in meaty flavors. These are available in both ground and whole seed forms. There are multiple benefits of Nutmeg such as it works as a body detoxifier, sometimes it stimulates the brain. Carbohydrates, energy and mineral contents are rich in these seeds. Due to their potential ability to inhibit lipid peroxidation and the free radical scavenging activity of superoxide, arils of nutmeg have strong antioxidant properties.

Application

Nutmeg has various properties which has numerous application:

- Anti-microbial properties: It has strong anti-microbial properties against different microbes like Bacillus subtilis, Saccharomyces cerevisiae, Escherichia coli and twenty-five genera of bacteria. During extraction of nutmeg oils, it has been seen that nutmeg shows anti-bacterial properties against e. coli (pathogenic or nonpathogenic). Nutmeg seed shows high resistance against both gram negative and gram-positive bacteria. Against Streptococcus mutans, there is strong resistance power from methanol that is extracted from nutmeg. Therefore, extracted methanol is used in oral care industries.

- Insecticide and Repellent property: Studies shows extracted oil from nutmeg shows insecticide and repellent property against Lasioderma serricorne and oil also consist of powerful fumigant toxicity against stored product insects.

- Antifungal property: Extracted methanol from nutmeg provides strong anti-fungal properties against multiple plant pathogens. erythro-austrobailignan-6 (EA6) and multiple methanol compounds that are extracted from nutmeg showed various anti-fungal and anti-microbial properties on some targeted species.

- Antioxidant properties: Glycosidic properties available in nutmeg oil provides string

antioxidant properties. Most antioxidant properties were reported at 180°C. Eugenol compound or ingredient which is present in nutmeg finish oxidative property from rats imposed by CC14. Eugenol composition with different compounds stops the assemblage of lipid peroxidation products in erythrocyte (red blood corpuscle) and sustain antioxidant enzymatic activities.

- Anti-cancer properties: Phytoestrogen present in plants provides anticarcinogenic properties. In nutmeg oil, there are multiple constituents that are anticarcinogenic in nature. A study shows myrislignan is capable component for lung cancer management. Myrislignan shows potential anticancer properties in vivo and invitro cells.

- Anti-depressant property: N-hexane extracted from myristica fragrans oil shows anti-depressant property.

V. CONCLUSION

To enchance the taste and aroma of savory dishes we use different types of spices while cooking, nutmeg is one of those spices. Not only as a spice, nutmeg has numerous applications and plays a key role in pharmaceutical field. Abundant properties have been discussed in this review; each has unique pharmaceutical application. Its seed also contain various nutrients and these nutrients has crucial functions in different direction. Hence, vitamins proliferation of nutmeg seed will be informative for future explorers.

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REFERENCES

[1] https://www.peertechzpublications.com/articles/IJPSDR-6-125.php#:~:text=It%20is%20popularly%20known%20as,obtained%20from%20the%20se ed%20cover

[2] https://www.britannica.com/topic/nutmeg

[3] https://merlionnaturals.in/blogs/the-merlion-naturals-blog/what-is-difference-betweenjavitri-and-jaiphal-mace-vs-nutmeg

[4] https://thehealthyayurveda.com/jaiphal-nutmeg-benefits-uses-side-effects/

[5] Physico-chemical Properties of Nutmeg (Myristica fragrans hours) of North Sulawesi Nutmeg Dino Rahardiyan*a, Mario Poluakana, Emma Mauren Mokob agribusiness Department, Faculty of Agricultural, De La Salle Catholic University, Manado, 95000, Indonesia biology Department, Mathematics and Natural Sciences Faculty, Manado State University, Tondano, 95619 Indonesia

[6] https://www.britannica.com/topic/nutmeg

[7] Myristica fragrans (Jaiphal): A Significant Medicinal Herbal Plant Isha Kumari1, Hemlata Kaurav2, and Gitika Chaudhary3 1 Research Executive, Shuddhi Ayurveda, Jeena Sikh Lifecare Pvt. Ltd., Zirakpur 140603, Punjab, INDIA 2 Research Executive, Shuddhi Ayurveda, Jeena Sikh Lifecare Pvt. Ltd., Zirakpur 140603, Punjab, INDIA 3 Research Executive, Shuddhi Ayurveda, Jeena Sikh Lifecare Pvt. Ltd., Zirakpur 140603, Punjab, INDIA

[8] https://www.semanticscholar.org/paper/Phyto-pharmacological-potential-of-Jaiphalfragrans-Hamiduddin/0b23fb31585a2cdcd75e29618bb974e1e9079ea7

[9] https://alameenunanimch.org/wp-content/uploads/2021/09/Qureshi-Mohd.-Siddique-3.pdf

[10] https://www.researchgate.net/publication/350798602_Myristica_fragrans_Jaiphal_A_Sig nificant_Medicinal_Herbal_Plant

[11] https://www.peertechzpublications.com/articles/IJPSDR-6-125.php

[12] https://www.easyayurveda.com/2014/11/26/jaiphal-nutmeg-myristica-fragrans-uses-doseside-effects/

[13] Physico-chemical Properties of Nutmeg (Myristica fragrans houtt) of North Sulawesi Nutmeg , Dino Rahardiyan*a, Mario Poluakana, Emma Mauren Mokob aAgribusiness Department, Faculty of Agricultural, De La Salle Catholic University, Manado, 95000, Indonesia bBiology Department, Mathematics and Natural Sciences Faculty, Manado State University, Tondano, 95619 Indonesia

[14] Abourashed EA, El-Alfy AT. Chemical diversity and pharmacological significance of the secondary metabolites of nutmeg (Myristica fragrans outt.). Phytochem Rev. 2016 Dec;15(6):1035-1056. doi: 10.1007/s11101-016-9469-x.

Epub 2016 May 10. PMID: 28082856; PMCID: PMC5222521.

[15] Nutmeg: A review on uses and biological properties Namra Naeem1, Rafia Rehman1, Ayesha Mushtaq1*, Jihene Ben Ghania21Department of Chemistry, University of Agriculture, Faisalabad-38040-Pakistan and 2Department of Biology, Faculty of Sciences, University of Tunis. E.I Manar Tunis

[16] Phyto-pharmacological potential of Jaiphal (Myristica fragrans Houtt): A spice of medicinal importance and its utilization in Unani Medicine Mohd Akhtar Ali1 , Hamiduddin2 , Mohammad Zaigham2 , Mohd Ikram2 1 Department of Ilmul Saidla, Unani Pharmacy, Z.H. Unani Medical College & Hospital, Siwan, Bihar, India, 2 Department of Ilmul Saidla, Unani Pharmacy, National Institute of Unani Medicine Kottigepalya, Bengaluru, India

[17] https://www.rxlist.com/nutmeg/supplements.htm

[18] Abourashed EA, El-Alfy AT. Chemical diversity and pharmacological significance of the secondary metabolites of nutmeg (Myristica fragrans Houtt.). Phytochem Rev. 2016 Dec;15(6):1035-1056. doi: 10.1007/s11101-016-9469-x. Epub 2016 May 10. PMID: 28082856; PMCID: PMC5222521.

[19] https://www.researchgate.net/publication/336825717_Nutmeg_A_review_on_uses_and_biological_properties

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