Extraction of Anticancer Compounds from Nutmeg Mace for Cancer Treatment.

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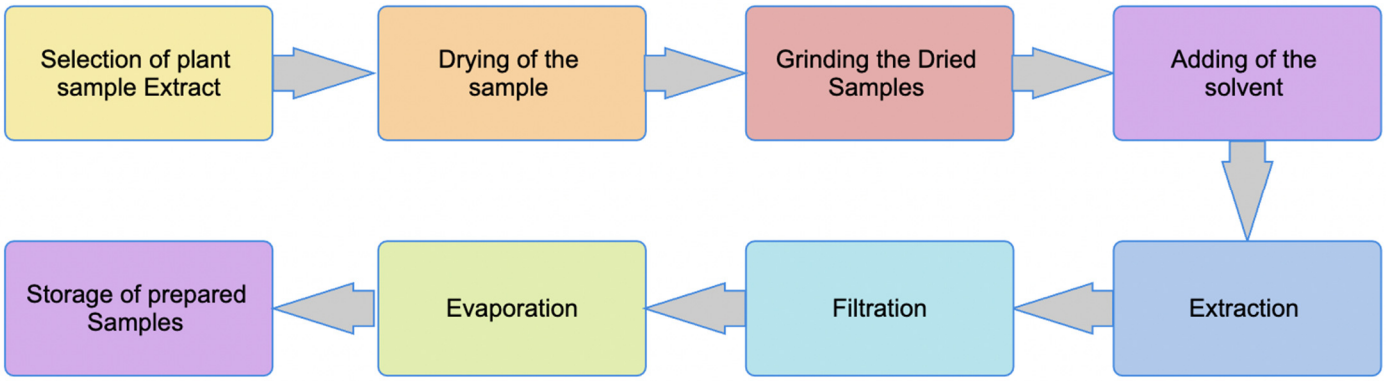
ABSTRACT:
Nutmeg mace is the aril of the nutmeg seed, this has been historically used for cooking and its medicinal properties. Recent research has thrown light on the potential of cancer treatment due to the presence of certain bioactive compounds such as myristicin, macelignan and elemicin. In this review we will focus on the extraction methods of these anti-cancer compounds, their mechanism of action and therapeutic potential. The paper also examines in-vitro and in-vivo studies demonstrating the efficacy of nutmeg mace extracts against various cancer cell lines. The data collected highlights potential of nutmeg mace as a source of new anticancer agents. However, additional research and clinical trials are necessary to fully portray its potential and confirm its safety.

Keywords: Nutmeg mace, anticancer, ethanolic extraction, cancer treatment, myristicin, macelignan and elemicin.

INTRODUCTION:

Nutmeg, a well known spice from the tree *Myristica fragrans* , comprises three distinct parts: the flesh, the nutmeg seed, and the mace. The seed of nutmeg is encased in a hard shell and turns black when it matures. Surrounding this seed is the mace, both of which are primarily harvested for their use as spices. The outermost layer, the flesh, envelops the mace and seed but is typically discarded during harvesting , where only the seed and mace are collected. This practice results in the utilization of only a small fraction of the nutmeg fruit[1]. Spices and herbs, including nutmeg, are known to contain a variety of chemical compounds with antioxidant properties. These compounds, such as vitamins, carotenoids, terpenoids, alkaloids, flavonoids, lignins, simple phenols, and phenolic acids, play a crucial role in protecting the body by inhibiting the damage caused by reactive oxygen species (ROS) on membrane lipids, DNA, and proteins. Nutmeg, specifically, is recognized for its medicinal applications as a stimulant and carminative. It is employed to treat conditions such as flatulence, vomiting, nausea, and digestive issues, and its oil is used for ailments like urinary and bladder inflammation, bad breath, dyspepsia, impotence, insomnia, and skin diseases. [7] The seed and mace of nutmeg are rich in active compounds, including the narcotic myristicin. Nutmeg butter, which also contains elemicin and myristicin, exhibits narcotic and psychotropic properties.Given these bioactive components, nutmeg, particularly its mace, is of significant interest for its potential anticancer properties. [8] This study focuses on the extraction of anticancer compounds from nutmeg mace and their application in cancer treatment, exploring the therapeutic potential of this often-overlooked part of the nutmeg fruit.[9,13]

Methodology : The initial process before extraction of a sample includes meticulous preparation of the sample by ensuring the preservation of all the essential biomolecules,it is done by prioritizing the high quality sample .in this study the sample being used is the Nutmeg mace, mostly the dried sample is preferred over the fresh for its stability and ease of handling for long time duration.The mace is grinded into a fine powder ,this increases the surface area, facilitating more efficient extraction of the bioactive compounds.it is important to ensure that the grinding equipment is clean and that the process is conducted swiftly to prevent any potential contamination or loss of volatile components[2].this preparation is important for an efficient extraction to take place, as the solvents must make contact with the target analytes and particle size smaller than 0.5 mm is ideal for efficient extraction [3,14].The grounded sample is weighed and placed in a percolator ,to the sample add the solvent used in 1:10 ratio w/v submerge the plant sample. The solvent used for extraction is ethanol (HPLC grade), Seal the container and place it on a shaker or stirrer to ensure thorough mixing. Allow the extraction to proceed for a specified duration, commonly 24 - 48 hours, at room temperature or slightly elevated temperatures to enhance extraction efficiency[4].After the extraction period, filter the mixture to isolate the liquid extract from the solid residue. Use filter paper or a vacuum filtration system for this step.Concentrate the ethanolic extract by evaporating the solvent using a rotary evaporator at controlled temperatures to avoid degradation of the bioactive compounds[5].Store the concentrated extract in airtight containers, preferably at low temperatures, until further analysis or use[6].Perform qualitative and quantitative analyses of the ethanolic extract to identify and measure the bioactive compounds present. [15]



DISCUSSION:

Bioactive compounds and their effects Myristicin exhibits anti proliferative effects on different types of cancer cell lines by triggering apoptosis and inhibits the cell cycle progression .Elemicin demonstrates cytotoxicity against cancer cells through mitochondrial dysfunction and oxidative stress .Macelignan is known for its anti-inflammatory and antioxidant properties its also has promising cancer cell growth inhibition and metastasis.[10,11,12]

CONCLUSION:

Nutmeg mace contains a huge array of bioactive compounds with promising anticancer properties. the nutmeg mace has essential bioactive compounds like myristicin and elemicin. The advancement in extraction techniques have facilitated the isolation of these compounds, allowing for detailed study of their mechanisms of action. While preliminary studies are encouraging, further research is necessary to translate these findings into clinical practice. The integration of nutmeg mace extracts into cancer therapy could offer a novel, natural adjunct to existing treatments

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