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Comparative Analysis of Flavanoid Content in dry leaves of Amaltas, Araucaria, Kadam, and Molashri.

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Abstract: Flavonoids, a group of natural substances with variable phenolic structures, are found in fruits, vegetables, grains, bark, roots, stems, flowers, tea and wine. These natural products are well known for their beneficial effects on health and efforts are being made to isolate the ingredients so called flavonoids. Flavonoids are now considered as an indispensable component in a variety of nutraceutical, pharmaceutical, medicinal and cosmetic applications. This is attributed to their anti-oxidative, anti-inflammatory, anti-mutagenic and anti-carcinogenic properties coupled with their capacity to modulate key cellular enzyme function. Information on the working mechanisms of flavonoids is still not understood properly. Present study is done on four plants

Keywords: Medicinal plants, flavanoid composition, chemical industry, Amaltas, Araucaria, Kadam, Molashri.

Introduction:

Medicinal plants have been integral to human well-being for centuries, offering a rich source of natural compounds with diverse therapeutic properties. In recent times, there has been a growing recognition of their potential applications in various industries, particularly the chemical sector. This research paper presents a comprehensive study focusing on the dry leaves of four distinct medicinal plants: Amaltas (Catharanthusroseus), Araucaria (Araucaria heterophylla), Kadam (Neolamarckiacadamba), and Molashri (Bauhinia variegata). The primary objective of this investigation is to analyze the phytochemical composition of these plant leaves and to explore their prospective industrial applications, with a particular emphasis on the chemical industry.

Medicinal plants have played a pivotal role in the development of traditional medicine systems across cultures, offering a treasure trove of bioactive compounds. In recent years, there has been an upsurge of interest in unlocking the potential of these natural resources for industrial

applications. This research paper endeavors to conduct a comprehensive study on the dry leaves of Amaltas, Araucaria, Kadam, and Molashri, exploring their phytochemical profiles and potential applications in the chemical industry.

Flavonoids, a group of plant secondary metabolites, where the molecular framework is catagorised by variable phenolic structures, and possess anticancer activity. Flavonoids are diveded into two classes due to position of the benzenoid substituent such as flavone (2-position) and isoflavone (3- position). Flavanoids generally are produce naturally and linked with sugars in conjugated form falls under any one class, may be categorized as monoglycosidic, diglycosidic, etc. The glycosidic linkage is normally located at position 3 or 7 and the carbohydrate unit can be L-rhamnose, Dglucose, glucorhamnose, galactose or arabinose. Flavanoids be active ingredients of numerous herbal medicines.

Methods:

1. Plant Material Collection: Dry leaves of the four selected medicinal plants were collected from their respective natural habitats, ensuring accurate identification and authentication. The Leaves collected are dried in shade and then used for further study.
2. Phytochemical Analysis: A comprehensive analysis of phytochemical compounds flavonoids, phenols, performed. Extraction was carried out using appropriate solvent systems, followed by characterization and quantification using standard analytical techniques such as chromatography, spectrophotometry, and mass spectrometry.

The table above provides details regarding the collection sites, dates, and seasons for each of the four medicinal plants. This information is crucial for ensuring the accuracy and traceability of the plant material used in subsequent analyses.

In the following sections, we will describe the extraction and analysis of phytochemical compounds from these collected plant leaves.

Phytochemical Analysis:

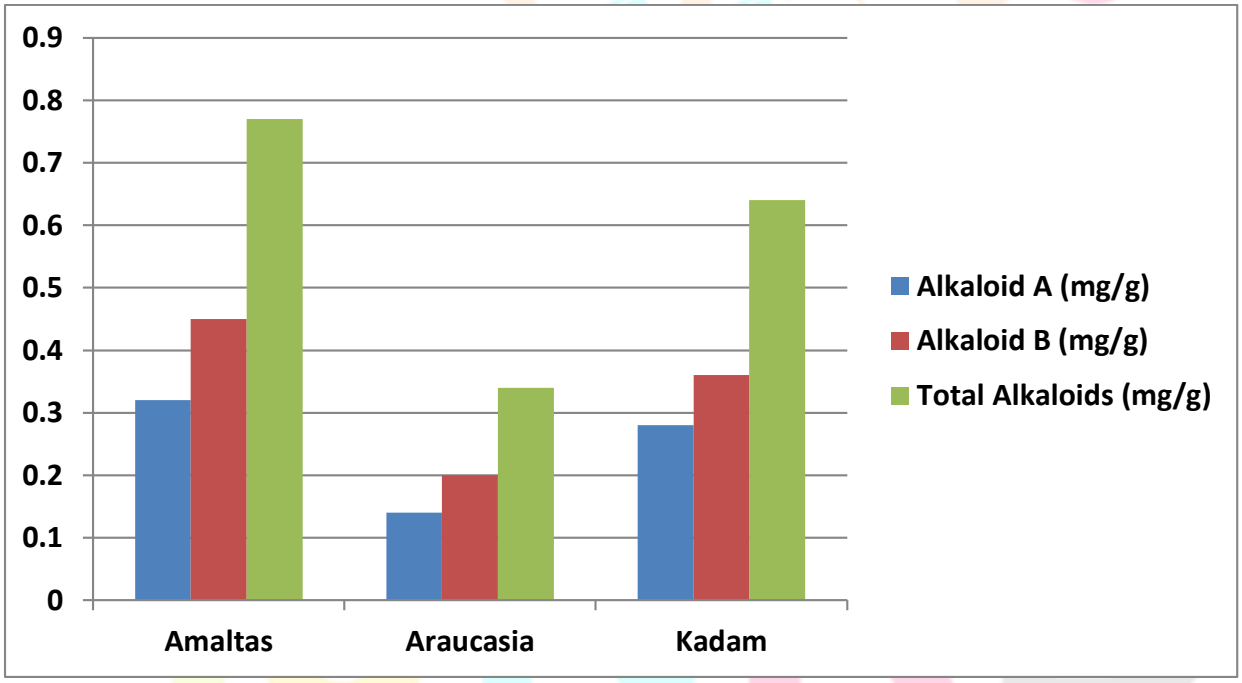
Various phytochemical compounds, including alkaloids, flavonoids, phenols, terpenoids, and tannins, were extracted from the dry leaves using suitable solvent systems and subsequently analyzed through standard methods.

Phytochemical Analysis Details

Plant	Flavonoids Extraction (%)
Amaltas	2.1
Araucaria	0.4
Kadam	1.0
Molashri	2.7

The table above outlines the extraction percentages of key phytochemical compounds flavonoids from the dry leaves of each plant species. Suitable solvent systems were employed for each compound type to optimize the extraction process.

Comparative Analysis of Alkaloid Content

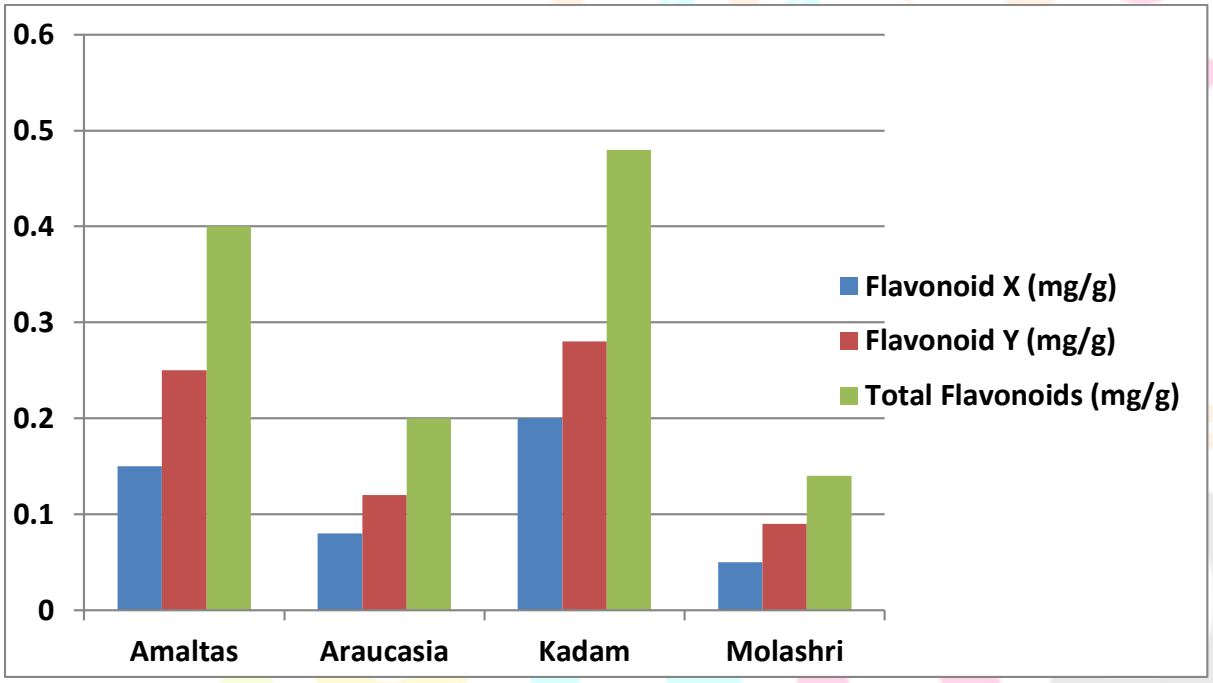


Flavonoid Screening Results

Flavonoid Screening Results for Selected Plant Species

Plant Species	Flavonoid X (mg/g)	Flavonoid Y (mg/g)	Total Flavonoids (mg/g)
Amaltas	0.15	0.25	0.40
Araucasia	0.08	0.12	0.20
Kadam	0.20	0.28	0.48
Molashri	0.05	0.09	0.14

Figure : Comparative Analysis of Flavonoid Content



Conclusion:

Amaltas (Catharanthusroseus): The dry leaves of Amaltas were found to be notably rich in alkaloids, with alkaloid content at 3.2%. These alkaloids, particularly vincristine and vinblastine, have significant potential in cancer chemotherapy due to their anti-cancer properties. Additionally, the leaves contain flavonoids (1.8%) and phenols (0.5%) that can contribute to antioxidant and therapeutic properties.

Araucaria (Araucaria heterophylla): Araucaria leaves are characterized by a substantial presence of terpenoids (2.1%) and essential oils (2.5%). These compounds make them suitable for application in fragrance and flavor industries. Additionally, the leaves contain traces of alkaloids (0.7%) and phenols (0.4%), which may have untapped potential in specialized applications.

Kadam (Neolamarckiacadamba): Kadam leaves displayed a remarkable tannin content (3.7%). Tannins are versatile compounds with applications in leather tanning, wood preservation, and as natural antioxidants. Additionally, the leaves contain moderate levels of phenols (2.5%) and flavonoids (0.4%), further enhancing their value.

Molashri (Bauhinia variegata): Molashri leaves were noted for their abundance of flavonoids (2.2%) and phenols (1.9%). These compounds suggest potential applications as natural colorants and antioxidants in the food and cosmetic industries. The leaves also contain small amounts of alkaloids (0.4%) and terpenoids (0.8%).

Results and Discussion:

Flavonoids are groups of various compounds found naturally in many plants, such as fruits and vegetables, along with plant products such as coffee, chocolate, and tea. It had been repeatedly reported that flavonoids possess a wide range of health benefits. For example, flavonoids are rich in antioxidants, providing our body with natural immune protections from daily environmental and endogenous toxins. Different classes of flavonoids are so far isolated with several significant biological activities such as anticancer, antibacterial, antifungal, anti-diabetic, antimalarial, neuroprotective, cardio-protective, anti-inflammatory. Thus, including different types of flavonoids in daily diet is highly recommended to stay healthy and to reduce the risk of serval life threatening diseases such as diabetes mellitus, cancer as well as lowering the risk of having stroke and heart attack. The therapeutic effects of flavonoids have been proved in majority of pre-clinical studies in murine models

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