AFTER REVIEW

Review Article

Vanilla: A Review of Powerful Herb with Ayurvedic Medicinal Properties

Abstract

Vanilla, once a clandestine chocolate flavour enhancer in the Aztec emperor Montezuma's court, has transcended time to become an integral part of the global spice trade. Its origins trace back to Mexico, but today, approximately 90% of the world's annual vanilla production, amounting to about 1,000 metric tons of beans, comes from Madagascar, with nearly half of it finding its way to consumers in the United States. It's a revelation to many that vanilla bean pods are a product of an orchid, amplifying their perceived value. The vanilla orchid, scientifically known as Vanilla planifolia, is the only orchid species that yields an edible fruit. This orchid belongs to the largest family of flowering plants globally, boasting over 150 varieties of vanilla. However, only two primary types, Bourbon and Tahitian, are extensively utilized for commercial purposes. Vanilla holds an esteemed position as one of the most recognizable flavours worldwide. Despite its popularity, less than 1% of vanilla originates from a completely natural source- the Vanilla Orchid. Achieving the finest vanilla bean flavour demands meticulous effort, as farmers manually pollinate each delicate flower on every orchid, swiftly navigating the intertwining vines. The unique nature of vanilla cultivation is further emphasized by its geographical preference, flourishing within the 20-degree belt on either side of the Equator. Vanilla is native to the Americas, with the familiar Vanilla planifolia variety historically thriving in the wild across various regions, including Mexico, the Caribbean and parts of South America.

Keywords: Orchid, Herb, Ayurvedic, Aroma, Flavourful.

Introduction

Vanilla, scientifically known as *Vanilla planifolia*, is a perennial herb belonging to the Orchidaceae family. Its widespread use in both medicinal and flavouring domains spans across numerous centuries. The term Vanilla finds its origins in the Spanish word Vainilla, which is a diminutive form of Vaina, meaning sheath or pod, reflecting the appearance of the Vanilla bean (Anuradha, *et al.*, 2012) [2]. The Vanilla genus, Vanilla Swartz, encompasses approximately 110 diverse species, distributed across regions such as Pacific islands, Southeast Asia, New Guinea, tropical America, Africa and Indian Ocean islands.

The appeal of Vanilla lies not only in its name but also in its distinct sweet, comforting, warm and complex fragrance, obtained from dried and cured beans. Indigenous to South and Central America as well as the Caribbean, Vanilla was initially cultivated by the Totonacs of Mexico's east coast, later acquired by the Aztecs following their conquest of the Totonacs in the fifteenth century. Notably, Vanilla holds the exceptional distinction of being the sole edible fruit within the extensive orchid family, the largest family of flowering plants globally. With over 150 varieties, each Vanilla bean possesses a unique combination of taste, aroma and colour, similar to the diverse flavours found in grapes for wine (Li and Rosazza, 2000) [14]. In the realm of culinary arts, Vanilla plays a pivotal role, comparable to salt in savory dishes, significantly enhancing the overall flavours of sweet baked goods (Jamal Uddin *et al.*, 2015) [10]. Its influence is profound, elevating the taste and experience of cookies, cakes and a myriad of desserts. Vanilla's popularity extends to being a favoured ice cream flavour,

celebrated for its creamy and delectable nature, enriching a wide array of desserts and treats (Vikram*et al.*, 2016)[25]. Cary Frye, IDFA Vice President of Regulatory and Scientific Affairs and an ice cream expert, emphasized its distinctive flavour and its role in enhancing culinary delights.

INTRODUCTION IS TOO SHORT AND SIMPLE. PLEASE DESCRIBE WHY YOU INTEREST AND THE URGENTLY OF THIS TOPIC IN RELATION WITH AYURVEDIC. SINCE AYURVEDIC IS ONE OF YOUR KEYWORD BUT I DIDN'T FIND EVERYTHING ABOUT AYUVERDIC. PLEASE DESCRIBE WHAT IS IT, AND WHY IT IS IMPORTANT TO DISCUSS ABOUT VANILA IN RELATION WITH AYUVERDIC.

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Taxonomy of Vanilla planifolia:

- Kingdom (Plantae): This is the highest taxonomic level and includes all plants.
- Phylum (Tracheophyta): This level includes vascular plants, those with specialized tissue for conducting water and nutrients.
- Class (Liliopsida): This class includes monocotyledons, a group of flowering plants with a single seed leaf (cotyledon) in the embryo.
- Order (Asparagales): Asparagales is an order of flowering plants, which includes orchids among other families.
- Family (Orchidaceae): This is the family level and Vanilla planifolia belongs to the Orchidaceae family, which is known for its diverse and vast array of orchid species.
- Subfamily (Vanilloideae): This subfamily is specific to vanillas and a few related genera within the Orchidaceae family.
- Genus (Vanilla): Vanilla is the genus to which Vanilla planifolia belongs. The genus encompasses various species of orchids, but Vanilla planifolia is one of the most economically significant due to its vanilla bean production.
- Species (Vanilla planifolia): Vanilla planifolia is the specific species of the vanilla orchid that is primarily used for producing vanilla beans for culinary and industrial purposes.

Morphological Characteristics of Vanilla planifolia:
Vanilla planifolia is a member of the Orchidaceae family, with plants typically reaching a height of 8 to 10 feet.

- Vine and Growth Habit: Vanilla planifolia is a climbing vine that typically grows up trees or other support structures. The vines can reach considerable lengths, often extending 10 to 20 meters (30 to 65 feet) or more.
- Leaves: The leaves of Vanilla planifolia are flat and broad, hence the specific epithet planifolia, which means flat-leaved. The leaves are usually oblong, elliptical, or lance-shaped, measuring about 15-25 cm (6-10 inches) in length and 5-10 cm (2-4 inches) in width.

- Roots: Vanilla planifolia has a robust, fleshy root system that provides support and nutrients for the climbing vine. The roots play a crucial role in anchoring the plant to its supporting structure and absorbing water and nutrients from the soil.
- Flowers: The vanilla orchid produces showy, waxy and fragrant flowers. The flowers are typically cream to greenish-yellow in color, with a unique trumpet-like shape. Each flower is approximately 5-8 cm (2-3 inches) in diameter and has three outer sepals and three inner petals. The lip or labellum of the flower is often ruffled and has a distinctive yellow or greenish central strip.
- Inflorescence: The flowers of Vanilla planifolia are arranged in clusters or racemes that emerge from leaf axils along the vine. Each inflorescence can bear multiple flowers and the flowering period usually occurs during specific times of the year.
- Seed Pods (Fruit): After successful pollination, the flowers of Vanilla planifolia develop into long, slender seed pods, often referred to as vanilla beans or vanilla pods. These pods are typically green when young and turn yellowish-brown as they mature. The pods can measure between 15-25 cm (6-10 inches) in length (Takahashi *et al.*, 2013) [23].
- Seeds: Inside the seed pods, Vanilla planifolia contains numerous tiny, blackand aromatic seeds. These seeds are embedded within a sticky, pulpy substance and are responsible for the characteristic vanilla flavour and aroma.

Chemical Components:

Vanilla beans contain a rich array of chemicals, with over 300 individual compounds identified. Among them, more than 170 are volatile aromatic components (Jain and Himanshu, 2012) [9].

- Vanillin (4-hydroxy-3-methoxybenzaldehyde): Vanillin is the primary and most significant compound responsible for the characteristic vanilla flavour and aroma. It's the dominant flavour compound in vanilla beans (Sujalmi *et al.*, 2005) [22].
- Vanillic Acid: Vanillic acid is a derivative of vanillin and contributes to the overall vanilla flavour.
- p-Hydroxybenzaldehyde: This compound is another aromatic aldehyde that contributes to the overall aroma and flavour of vanilla.
- Vanillyl Alcohol: Vanillyl alcohol is an aromatic alcohol that complements the flavour profile of vanilla and is also a precursor to vanillin.
- Acetovanillone: Acetovanillone is another aromatic compound found in vanilla, contributing to its characteristic taste and fragrance.
- Vanilloyl Glucose and Glucovanillin: These are glucoside forms of vanillin, serving as storage and transport forms of vanillin within the vanilla beans.
- Eugenol: Eugenol is a phenolic compound that contributes to the overall flavour and aroma of vanilla. It has a spicy and sweet aroma.
- Isobutyric Acid: Isobutyric acid contributes to the overall flavour of vanilla and enhances its richness.
- Furfural: Furfural is a compound that contributes to the caramel-like aroma and flavour of vanilla.

Table 1: Primary constituents in cured Vanilla pod per gram of dry weight

Constituent	Approximate Percentage per gram of dry weight
Vanillin	1.5% - 2.5%
Glucovanillin	0.1% - 1.0%
Eugenol	0.01% - 0.2%
Acids (acetic, butyric)	0.02% - 0.2%

Phenols (including guaiacol)	0.05% - 0.3%
Alcohols (vanillyl alcohol, isovanillin)	0.05% - 0.2%
Sugars (glucose, sucrose)	10% - 20%
Water	15% - 25%
Cellulose and lignin	15% - 25%
Miscellaneous compounds	10% - 20%

Cultivation and Production of Vanilla

Vanilla, an exotic tropical climbing vine belonging to the orchid family, is grown for its extraordinary flavour. It ranks among the most expensive spices in the market, following Saffron and thrives by extracting nutrients from tree bark. Madagascar stands as the leading global producer of Vanilla. Typically, Vanilla plants yield their first crop approximately three years after planting and can continue producing for 12 to 14 years. India contributes about 2% of the world's Vanilla exports. In India, Karnataka leads the country in Vanilla cultivation, followed by Kerala and Tamil Nadu.Vanilla vines can be cultivated indoors, in greenhouses, or even in pots and containers. Optimal yields are obtained when Vanilla is grown under shade netting or as a monoculture, rather than an intercrop. Generally, Vanilla is a tropical orchid crop, requiring high humidity, shade and moderate temperatures to achieve maximum yield (Vanilla Cultivation Information Anandan, 2004) [1].

Table 2: Vanilla producing countries in the world

Sl. No.	Country	Vanilla Production (Metric Tons)
1.	Madagascar	2,100 - 2,500
2.	Indonesia	600 - 800
3.	Comoros	200 - 300
4.	Papua New Guinea	200 - 300
5.	Mexico	150 - 250
6.	Uganda	100 - 200
7.	India	50 - 100
8.	Tanzania	50 - 100
9.	Reunion	40 - 60
10.	Seychelles	10 - 20

Sources: Food and Agriculture Organization of the United Nations (FAO) 2021-2022.

CLIMATE REQUIREMENTS

1. Climate

Vanilla flourishes in a hot and humid climate, best suited between Mean Sea Level (MSL) and an elevation of 1,500 m.The ideal climate boasts moderate rainfall, ranging from 1,500-3,000 mm, evenly distributed over 10 months throughout the year.For optimum cultivation, temperatures should range between 15-30 °C (59-86 °F) during the day and 15-20 °C (59-68 °F) during the night. Ideal humidity levels hover around 80%, with a preference for 45% shade and growth thriving under filtered light (Gokare, 2000) [7].

2. Soil Type

Vanilla crops thrive in loose, friable soils, ranging from loamy to sandy loam and laterites. Maintaining a pH range of 6.5 to 7.5 in the soil is essential for optimal growth. Additionally, higher organic matter content enhances Vanilla yield (Vanilla Cultivation Information Guide, 2018).

3. Land Preparation

To support Vanilla vines during growth, various structures can be employed, including living trees, nonliving rock pillars, or iron pillars.

4. Water

Adequate water is necessary for Vanilla plants, but caution should be taken to avoid overwatering. The best practice is moderate watering, allowing the top layer of the soil to dry out by 2-3 inches before watering again (Howard *et al.*, 2003) [8].

5. Fertilizer

For optimal growth, Vanilla plants should be fertilized with orchid fertilizers every 2 weeks during the spring and summer months.

6. Companion Crops

Banana and Arrowroot are ideal companion crops for Vanilla, while Beans and Peas should be avoided as companions.

PRODUCTION PROCEDURE

1. Planting

Vanilla cultivation is typically done during the months of August to September, when the weather is neither too rainy nor too dry (Kumar and Balamohan, 2013) [12]. Growing Vanilla plants from seeds can be challenging, taking 3-5 years before they can produce pods. It's often more practical to purchase established plants. Propagation can be done through shoot cuttings or seeds, with shoot cuttings being the preferred method in commercial cultivation. Longer cuttings initiate flowering in the second year, while shorter cuttings take 3 years to flower. The choice between these methods depends on individual preferences (Pokorna and Smutka, 2011) [18].

2. Caring

Vanilla plants have specific requirements for optimal growth and productivity. They root and sprout within two months. Fertilization and irrigation are crucial for their growth, with preference for organic fertilizers such as farm animal manure, green leaves, compost, groundnut cake and bone manure. Watering at least twice a week from February to May is recommended. It takes 2 to 7 years for the plant to reach a size suitable for flowering, often growing up to 20 to 40 feet in length. Despite the time and effort involved, the end result justifies the investment (Shanmugavalli *et al.*, 2009) [19].

3. Pollination

Vanilla flowers necessitate pollination for bean/fruit production. Unfortunately, the bees responsible for Vanilla flower pollination are on the brink of extinction worldwide. Consequently, manual pollination is required, technically termed as hand pollination, for Vanilla flora.

Artificial pollination is performed manually using a pointed bamboo splinter, rigid glass, or a sharpened toothpick to achieve fruit set. The optimal time for this process is between 7 AM and 12 PM, primarily in the morning. It is recommended to pollinate only the initial 7 to 10 flowers at the lower part of the inflorescence. Additionally, maintaining 10 to 12 inflorescences per vine is advised to obtain beans of maximum length, girth and exceptional quality (Anandan, 2004) [4].

The fruits commence rapid growth post-pollination. They achieve full size within seven weeks but are ready for harvest only after nine to eleven months. Vanilla fruits grow at a rate of 2 cm per week. In addition to being cultivated as a mono crop, Vanilla can also be grown in rotation.

4. Pest and Disease Management

Vanilla is susceptible to numerous fungal and viral diseases. Rots of the root, stem, leaf, bean and shoot apex are caused by Fusarium, Colletotrichum Sclerotium and Phytophthora species. Most diseases thrive under inappropriate growing conditions such as excessive watering, inadequate drainage, heavy mulch, over-pollination and excessive shade. Fungal diseases can be managed by spraying with Bordeaux mixture (1%), carbendazim (0.2%) and copper oxychloride (0.2%).

5. Harvesting

Vanilla beans grow rapidly, reaching their full size six weeks after pollination and manuring. However, they take 8 to 11 months to mature. Harvesting is ideal between 6 and 9 months after flowering when the pods turn dark green with a yellowing tip. Harvesting is recommended when the distal end of the beans turns yellow in color. On average, it takes 80 to 90 mature beans to make 1 kg of Vanilla.

The production process involves several stages:

a) Curing: Submerging Vanilla beans in warm water at 63-65 °C for 3 to 4 minutes.

b) Sweating: Exposing the beans to sunlight for 2 hours by spreading them on an elevated platform daily for 5 to 6 days (Frenkel *et al.*, 2004) [5].

c) Drying: Placing the beans on racks in a well-ventilated room for up to at least 1 month.

d) Conditioning: Bundling and storing the dried Vanilla beans in butter paper within wooden boxes for approximately 3 months.

6. Marketing

The market price for fresh Vanilla beans is approximately Rs 3500 per kilogram, while green vanilla pods are expected to command Rs 500 per kilogram. Vanilla is a crucial ingredient, notably for flavouring ice creams and soft drinks. The USA consumes nearly 300 tons of Vanilla beans annually for cola-type drinks. Pharmaceutical companies and soft drink giants like Coke and Pepsi are major buyers. Interestingly, the natural vanilla essence market is mainly in the West, with little presence in India. India, a relatively new player, produced 30 tons of vanilla last year, primarily focusing on green vanilla beans, fetching farmers about Rs 150/kg for their produce. However, once processed, these beans fetch a significantly higher price of around Rs 1500/kg. Despite potential higher profits through processing, vanilla processing technology in India remains basic, leading many farmers to supply green beans.

Global vanilla production totals around 3000 tons annually, with Madagascar supplying 50% of the world's supply. Other major contributors include Indonesia, Comoro and Reunion. Indonesia produces nearly 500 tons annually. Presently, vanilla imports are dominated by the USA, France and Germany (Sinha *et al.*, 2008) [21]. In Europe, especially Germany and France, importers distribute high-quality beans across various markets. Cooperative agreements involving Bourbon vanilla cultivating countries like Madagascar, Comoro and Reunion facilitate marketing towards importers in France and Germany.

Looking ahead, with vanilla cultivation remaining attractive due to low production costs, India's role in the international vanilla market is anticipated to grow.

USES AND SIGNIFICANCE OF VANILLA EXTRACT

Vanilla Extract: A Valuable Commodity with Diverse Applications

Vanilla, derived from a specific type of orchid plant, is renowned for its multifaceted uses and significance. Orchids, with their diverse array of beautiful flowers and captivating color combinations, are a source of aesthetic pleasure (Lavine *et al.*, 2012) [13]. The orchid plant, boasting exquisite flowers of remarkable beauty and exceptional longevity, has also found favor among ladies for adorning their hair. Orchids, well-suited for gardens, can be cultivated in various ways, including ground orchids, pots, baskets and split hollows of bamboo pieces. The fruit of the orchid, commonly referred to as the vanilla bean, is a key component utilized to create flavouring, medicine and enhance a plethora of food items within the food industry, including dairy products, beverages, baked goods and confections (Veni *et al.*, 2013) [24]. Additionally, vanilla extract is used as a food enhancer, rounding out the flavour profiles of many culinary creations (Vikram*et al.*, 2014)[26].

The Health Benefits of Vanilla:

1. Abundant in Antioxidants

Vanilla stands as a spice rich in antioxidants, effectively shielding the body's cells against free radicals and toxins (Makni *et al.*,2011) [15]. Free radicals, a byproduct of natural body

processes and exposure to radiation, pose a threat by promoting cell and tissue breakdown. Antioxidants present in vanilla are invaluable for repairing the body at the molecular level, reducing the risk of various diseases, including diabetes and cancer and supporting youthful skin. Moreover, vanilla aids in healing skin eruptions such as pimples and acne.

2. Soothes Coughing

Vanilla extract is a common ingredient in cough medicines due to its mild anesthetic properties, providing relief for sore throats.

3. Alleviates Toothache

Containing capsaicin, vanilla offers relief from toothaches and assists the central nervous system. It also safeguards teeth from infections that could lead to dental issues.

4. Heart Health Promotion

Vanillin, a component of vanilla, has been shown to lower bad cholesterol, a key factor in heart diseases. A study published in the Indian Journal of Experimental Biology demonstrated a significant reduction in cholesterol levels in rats after receiving controlled doses of vanilla for 45 days. Though more research on humans is needed, the cholesterol-lowering potential of vanilla is promising.

5. Anti-inflammatory Agent

Vanilla's robust anti-inflammatory properties, attributed to its antioxidant content, effectively soothe inflammation (Shyamala *et al.,* 2007) [20]. Additionally, vanilla extract is a good source of essential B andB6 vitamins, including niacin, riboflavin crucial for regulating metabolic functions and alleviating pain, particularly in conditions like arthritis (Niazi *et al.*,2014) [17].

6. Blood Pressure Regulation

The potassium in vanilla aids in controlling heart rate and maintaining normal blood pressure, crucial in managing escalating stress levels. Vanilla's pleasant aroma can also have a positive impact on mood, potentially acting as a potent anti-depressant.

7. Vanilla Oil: A Therapeutic Essential

Vanilla oil, possessing eugenol properties, helps reduce high temperatures and offers relief. Its antioxidant properties fortify the body's defense against various diseases. Applying this essential oil on burns and cuts can provide rapid relief.

8. Digestive Health Promotion

Vanilla promotes healthy digestion; consuming natural vanilla tea is a popular herbal remedy known to soothe gut inflammation and aid in various digestion issues like cramping, stomach-ache and diarrhea.

9. Medicinal Applications of Vanilla

Vanilla has been cherished for both its culinary and medicinal uses. Its esteemed reputation in the culinary realm has been built over a long history of enhancing the flavours of sweet, indulgent treats like sugar cookies, ice cream, pastries and buttercreams. While vanilla's culinary significance is well-established, its lesser-known roles as an aphrodisiac and a botanical remedy date back to its discovery in Mesoamerica by ancient cultures that cultivated and revered the sweet orchid (Ndjonka *et al.,* 2013) [16]. European nations also historically prized vanilla for its flavour, its reputation as a love elixir and its medicinal properties. Although traditional medicinal applications of vanilla have waned, its culinary traditions remain largely unchanged. Modern advancements in scientific research have illuminated the medical advantages of vanillin, the active component of vanilla.

10. Vanillic Acid's Toxic Effects on Antigens

The toxic effects of vanillic acid on antigens at the chromosome and DNA levels were examined using the alkaline comet assay and cytokinesis block micronucleus test. It demonstrated a protective effect against DNA damage induced by mitomycin C.

11. Aphrodisiac Properties

A study evaluating the aphrodisiac activity primarily in rats revealed that vanillin possesses aphrodisiac properties at a dosage of 200 mg/kg in male rats.

12. Anti-Sickle Cell Properties

The anti-sickling effect of vanillin has been investigated in vitro in mice and clinical trials. Under hypoxic conditions, there was an increase in hypoxia resistance and a reduction in the proportion of sickle cells. The findings affirmed that vanillin exhibited the most potent anti-sickling effects in mice and other clinical trials (Bomgardner, 2016) [3].

13. Healing Properties

Pure vanilla's healing potential is notably reliable, acting as a crucial shield against ailments, potentially altering the outcome from a complete party defeat to a triumphant counter-attack. Although raspberries and Swift chocolates offer more potent and rapid healing, vanilla's efficacy as a healer is consistent and beneficial.

FLAVOUR AND AROMA OF VANILLA

Vanilla is an exceptional flavour enhancer, commonly utilized in a wide array of foods and beverages. In the realm of food production, it is primarily used to add flavour to syrups for medicinal purposes. Additionally, vanilla finds significant utility in perfumery due to its pleasant fragrance.

The process of extracting vanilla involves soaking vanilla beans in a blend of ethyl alcohol and water. Flavourings are produced from various essential oils, including lemon and almond, derived from vanilla, fresh fruits through expression, combinations of essential oils and synthetic organic compounds, or entirely synthetic chemicals with propylene glycol, glycerol and alcohol (Kumar *et al.,* 2012) [11].

Vanilla plays a crucial role in various domains:

- It effectively eliminates unpleasant odors, serving as a natural air freshener throughout the entire household.
- Vanilla can be used to create personalized DIY vanilla-scented room sprays.
- When added to hot beverages, vanilla enhances their fragrance. Savory dishes are renowned for their distinct vanilla flavour.
- Yogurts become more delightful with the addition of vanilla.
- Employed in the preparation of Smithies.
- Elevates the flavours of pancakes, waffles and French toast.
- Vanilla perfumes can deodorize microwaves.

INCOME GENERATION FROM VANILLA:

- Vanilla Farming and Harvesting: Vanilla cultivation is a primary source of income. Farmers grow vanilla orchids and harvest vanilla beans. The beans are then cured and processed for commercial use. The income is generated from selling the vanilla beans to processors, manufacturers, or exporters.
- Vanilla Processing and Packaging: After harvesting, vanilla beans need to be processed, cured and prepared for market. This involves specific curing processes to develop the flavor and aroma. Income is generated through processing fees and sales of processed vanilla to manufacturers and retailers.
- Vanilla Extract and Flavoring Production: Vanilla extract and flavorings are derived from vanilla beans and are used in food and beverage manufacturing. Income is generated from the sale of vanilla extract and flavorings to food processing companies, bakeries, ice cream makers and other related businesses (Gallage and Moller, 2015) [6].
- Retail and Wholesale Sales: Retail and wholesale sales of vanilla products, including whole vanilla beans, vanilla extract, vanilla powder and vanilla-flavored products, generate income for retailers, wholesalers and distributors.

- Value-Added Products: Creating value-added products like vanilla-infused oils, vanilla sugar, vanilla paste, or vanilla-scented candles can generate additional income and diversify the product range (Cadena *et al.*, 2012) [4].
- Exporting: Vanilla is often exported to different countries where it is in high demand. Exporting vanilla beans or processed vanilla products can be a significant source of income for producers and exporters.
- Vanilla Tourism: Some regions known for vanilla production may also attract tourists interested in learning about the cultivation and processing of vanilla. Income can be generated through guided tours, educational workshops and sales of vanilla-related products to tourists.
- Research and Development: Engaging in research and development related to improving vanilla cultivation techniques, disease resistance and flavor enhancement can lead to income from grants, contracts and technology transfer.
- Partnerships and Contracts: Forming partnerships with food manufacturers, restaurants, or bakeries to supply them with vanilla products on a regular basis can secure long-term contracts and stable income streams.

Challenges and Adverse Effects of Vanilla Production

i) Challenges in Vanilla Production

The global production of natural vanilla is meager and has been dwindling in recent years. Genuine vanilla orchids contribute to less than 1% of vanilla flavour. With increasing demand, the trade in this coveted flavour is imbalanced, leading to a significant rise in vanilla prices (Bomgardner, 2016) [3].

ii) Difficulty in Cultivation

Vanilla cultivation demands extensive manual labor. The vanilla plants do not start producing vanilla beans until three years after planting. When they finally bloom, the flowers are open for just one day and must be meticulously hand-pollinated within 12 hours of blooming.

iii) Toxicity to Humans

Vanilla extract contains ethanol, the same type of alcohol found in beverages like beer, wine and liquor, as well as various flavouring extracts, colognes, mouthwashes and aftershaves. While the amount of extract used in recipes is not harmful, ingestion of a significant amount, especially by a child, can lead to alcohol poisoning.

iv) Downsides of Vanilla Extract

Pure vanilla extract has an indefinite shelf life and does not spoil. However, it's worth noting that the extract has an alcohol base and over time, the alcohol content may slowly evaporate, slightly intensifying the extract's flavour.

v) Potential Risks of Vanilla Extract Consumption

Consuming vanilla extract in moderate quantities is not harmful. However, excessive consumption can cause discomfort, drunkenness, headaches and disrupted sleep due to substantial exposure or ingestion in large amounts.

Conclusion

While the initial and limited use of vanilla for imparting human health benefits is drawn from medical literature, emerging research indicates that specific components of vanilla may potentially improve symptoms of various chronic conditions. Limited clinical studies suggest that exposure to vanillin's aroma might have a calming effect on distressed infants and reduce sleep apnea in both infants and adults. However, for leveraging these potential benefits of vanillin exposure in humans, it's essential to clarify practical implementation aspects and

conduct further research to understand the intricate emotional and physiological responses involved.

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