Technology Of In Vitro Propagation Of Mangosteen In The Climatic Conditions Of Uzbekistan

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Annotation: The mangosteen Garcinia mangosteen, the most revered fruit of the Guttiferae family, is one of the most respectable tropical fruits. This is a name that almost everyone in the world is familiar with. What about Uzbekistan, though? Have you tried this fruit before? Are you familiar with the term "mangosteen"? The mangosteen tree's fruit is utilized in medicine, and the tree itself has a distinctive landscape style. Over the last ten years, mangosteen has gained popularity in a number of foreign countries and islands. Natural adaption technology can be evaluated in each country based on its social and environmental context. This article provides insights and comments on the technology for growing and caring for mangosteen trees, which is new to the conditions of Uzbekistan.

Keywords: Mangosteen tree, conditions in Uzbekistan, reproduction technology, maintenance techniques, climate, ecology, adaptation.

Introduction.

Mangosteen is a perennial green tree with a pyramidal crown and dark brown bark that grows up to 25 meters tall. The leaves are oval-oblong, 9-25 cm long and 4.5-10 cm wide, dark green on top and yellow-green on the bottom. Pink is the color of the young leaves. Flowers with crimson dots on fleshy green leaves. The fruit is round with a diameter of 3.4-7.5 cm, a thick (up to 1 cm) burgundy-purple top with a sticky latex hue, and four white edible pulp with tightly bonded seeds underneath. There are eight sections in total. The plant bears fruit late in life, with the first fruits appearing on the branches between 9 and 20 years. Mangosteen is a Southeast Asian fruit. Widely cultivated in Thailand, Myanmar, Vietnam, Cambodia, Malaysia, India, Sri Lanka, Philippines, Antilles, Central America, Colombia, tropical Africa (Zanzibar, Liberia, Ghana and Gabon).

Economic value and application.

Mangosteen fruits are consumed fresh or canned in their white sections. Mangosteen juice, freshly squeezed, is very popular. The leaves and bark are decocted to treat dysentery, diarrhea, and fever [2].

However, there is no scientific proof to back up mangosteen's medicinal powers [3]. It is employed in the production of cosmetics due to the quantity of xanthones [4]. Mangosteen was mentioned in Russian literature. "And clouds of incense hang in the air, Golden mangosteen fruits blaze, Kandahar meadows glisten on the carpet, and proudly throw down the heavenly tent," Gogol wrote on Wednesday. "Give it a try," he says. I cut the fruit: under the red flesh there was a white, sweet and sour core, each consisting of several divisions with large grains. This mangosteen is chilled, fresh, delicate, and sweet, with a hint of acidity. Pallas "" Ivan Goncharov "Frigate" (1858) Description Mangosteen (or simply mangosteen, mangosteen) is a Southeast Asian fruit plant. It's a huge tree that can grow to be several tens of meters tall and is virtually always green. Mangosteen has a variety of health benefits that almost everyone on the planet is aware of. Mangosteen has a range of xanthones (natural antioxidants that contain potent chemical components) that are capable of eliminating cancer-causing cells, according to a study conducted by scientists in the United States. Antifungal and antibacterial effects are also found in xanthones.

Types of mangosteen and Origin.

Mangosteen is a tropical fruit that grows at temperatures not lower than 40 degrees and not higher than 100. At temperatures outside these limits, the plant dies.

Features.

Mangosteen is an excellent source of antioxidants found in fruits. Mangosteen is an effective medicine that aids in the prevention of illness development. Mangosteen juice has a preventive impact on the body, alleviating pain in a variety of organs and systems.

Mangosteen is used as a supplement to medication rather than as a replacement for it. It aids in the battle against diseases, hastening the healing process. Mangosteen is becoming increasingly popular as a result of its numerous health benefits. People who used the juice on a regular basis noticed considerable improvements in their health.

Because mangosteen, which is strong in antioxidants, is effective in the treatment of inflammation, both the fruit and the mangosteen are in high demand. Mangosteen's health benefits have long been acknowledged throughout the world. Mangosteen juice is advised for individuals with skin and infectious disorders since it offers the greatest health benefits. Scientists have discovered a trait linked with this plant: the ability of the xanthones in it to eliminate harmful bacteria even The fact that it was used before the commencement of the illness explains its effectiveness.

Mangosteen has a significantly faster and more effective anti-inflammatory impact than manufactured anti-inflammatory medications, according to this study. The peel of the fruit has also been used to cure fever and skin disorders in traditional Chinese medicine. Fever was reduced and dysentery and diarrhea were treated with a decoction produced from mangosteen leaves and bark. Mangosteen is utilized to help the lymphatic system develop, which is crucial for immune system strength.

Although the exotic fruit - mangosteen, mangosteen, garcinia, mangut - grows in the hot tropics of

Southeast Asia, Central America, and Africa, it is not called mangosteen. It has a thick purple or brown skin with a white edible pulp in the shape of watery lumps that resemble garlic and appears like an apple. There are edible seeds that taste like spikes in some of the pieces. The lower half of the fruit is a naturally painted flower, with the number of leaves matching the number of lobules inside.

Mangosteen is unique in that it is slightly sour, and it can be found even in ripe fruits. Citrus, grapes, pineapple, strawberries, peaches, and apricots are all flavors that come to mind while thinking of the pulp. White pieces that are sweet and somewhat tangy, juicy, jelly-like, and aromatic melt in your mouth and satisfy your thirst properly. Tasting mangosteen can become a real culinary experience for those who have never experienced such exoticism.

Choosing a cooked mangosteen.

When choosing a mangosteen, look for brilliant green, not brown, leaves that crown the top of the fruit. The dark tint of the mangosteen leaves signals that it is overripe and has begun to decay, so it is best not to risk it. Because the mature mangosteen is elastic and slightly flattened when squeezed, the skin of the ruined fruit is quite hard, similar to that of a watermelon. Exotic fruit has one peculiarity: rotting does not change the appearance of the fruit in any way. The only method to tell if a fruit is good is to touch it and look at the leaves closely. Larger fruits are preferred over smaller ones since they have less pulp.

How is mangosteen consumed?

Before you can consume nutritious, tasty fruit, you must first cut it properly, which may be done in a variety of ways. The first is the most straightforward: take off the top leaves (if the fruit is quite ripe) and lightly press on the top of the fruit, which will crack and reveal the juicy pulp. The second way is more aesthetic: make a circle incision with a knife without touching the pulp and open the fruit. To avoid harming your hand, this manipulation should not be done with firm fruits. You can also use a knife to chop the top off the mangosteen and eat the pulp with a spoon.

Mangosteen is best eaten fresh and kept in the refrigerator for up to two weeks. Fruits with unbroken peel can be stored for up to a month at high humidity and + 3–6 ° C. The fruit's refreshing taste, paired with its therapeutic characteristics, makes it particularly important; flavonoids, which are found in great numbers in dark chocolate and ground coffee, are natural antidepressants.

Mangosteen has been cooked as well!

Delicious tropical fruit juices, exotic salads, fruit cocktails, mousses, sweet pie fillings, soufflés, and delectable meat and fish sauces are all made with it. Mangosteen gives foods a burst of freshness, elegance, and citrus flavor. Simply cut the fruit pulp into little pieces and toss them into yogurt, salad, or ice cream for a sure success.

Young mangosteen is canned and dried in several countries, however heat treatment decreases the fruit's perfume and flavor. Mangosteen jam is a popular Asian treat made by cooking the white pulp with brown sugar and cinnamon for a short period. The soft shell is used to make wonderful jelly, and the seeds are roasted and eaten as food.

The first discovery in the field of clonal micropropagation of plants was produced by French scientist Georges Morel in the 1950s. He received a plant that can regenerate orchids. The technology of in vitro culture of plant apical meristems was created during the time. The researchers evaluated the effect of nutritional composition on the regeneration process and the development of these plants using primary plants as a source of primary seedlings: cloves, chrysanthemums, sunflowers, peas, corn, sage, and lettuce. Morel observed the production of spherical spheres-protocorms in his tests by growing symbidium (an orchid family member) under particular conditions and generating a three-conical and two-three-leaf base. Isolated protocorms may be cultivated in freshly produced nutritional medium until leaf development and root formation occurred. As a result, it has been found that the process can continue as long as desired, producing large quantities of high-quality, genetically identical, virus-free planting material.

By growing the apical meristem of transient plants in a proper nutritional media to create a regenerant plant, the first success in clonal micropropagation of plants was obtained.

Micropropagation, on the other hand, has a wide range of applications that is expanding all the time. This is primarily owing to the in vitro propagation of trees, particularly conifers, and the use of in vitro procedures to conserve rare and endangered medicinal plant species. At the moment, there is a notable shift in this direction. Gautre, a French scientist, was the first to publish research on the roughness of woody plants in the 1920s. He described the ability of some species of pine and pine to form cambium tissue in vitro. Articles published in the 1940s describe the ability of different tissues of slate to form adventitious buds. However, the authors were unable to ensure the subsequent growth and formation of the seedlings. It was not until the mid-1960s that the first regenerant plant of the buckthorn plant was picked up by Mates and planted in the ground. The cultivation of deciduous tissues has long been a study topic. This is related to the difficulties of isolating juvenile issues from the plant, as well as the difficulty of culturing mature plant tissues [2].

Woody plants, particularly conifers, are known to grow slowly and be difficult to establish. They include a lot of secondary metabolite chemicals (phenols, terpenes, and other things) that are oxidized by various phenolases in isolated tissues. Oxidized phenol compounds, on the other hand, are frequently associated with the mortality of main implants through inhibition of cell division and growth, or with a reduction in the ability of woody plants to create adventitious buds. Despite the challenges, scientists frequently use woody plant tissues and organs as a source of scientific inquiry. Currently, over 200 tree species from 40 families are produced in vitro (chestnut, oak, birch, maple, birch, poplar and birch hybrids, pine, spruce) [1].

Working with isolated tissue cultures necessitates strict commitment to sterility. The nutrient medium's diverse composition also makes it an ideal environment for microorganism development. Microorganisms can easily destroy plant portions (transplants) cultivated in a nutritional media. As a result, sterilization of both the implant and the culture medium is requiredBecause temperature microorganisms can enter the solution through the damp stopper of the container when it drops, or when moisture occurs, all work with the separated tissue (culture, transfer to a new nutrient medium) is done in sterile rooms (in laminar boxes) with sterile instruments.

Sterility should be maintained even during the growth of the separated tissue, because temperature microorganisms can enter the solution through the damp stopper of the container when it drops, or when moisture occurs. Seedlings and seeds are sterilized for 5-20 minutes in a sterilizing solution before being washed numerous times in sterile water. The length of time it takes to sterilize an implant is determined by the nature of the implant and the activity of the sterilizing solution. The seeds and vegetative parts are sterilized for 10-20 minutes and 5-10 minutes, respectively. Plant cultures obtained by culture are first rubbed in soapy water and rinsed in distilled water, then soaked in 70% ethanol for a few seconds, and the seeds are soaked in alcohol for 1-2 minutes. Alcohol not only sterilizes tissues, but it also boosts the main sterilizing solution's sterilization efficacy. The tissues are then washed in sterile water after being exposed to alcohol.

External sterilization only prevents diseases from spreading. Antibiotics should be used to treat an internal infection in the implant. Internal infections are abundant in tropical and subtropical plant tissues. 1-14 days after planting, fungal or bacterial cultures can be found. Cultures that are contaminated with germs should not be allowed to spread into the room since they will pollute the air.

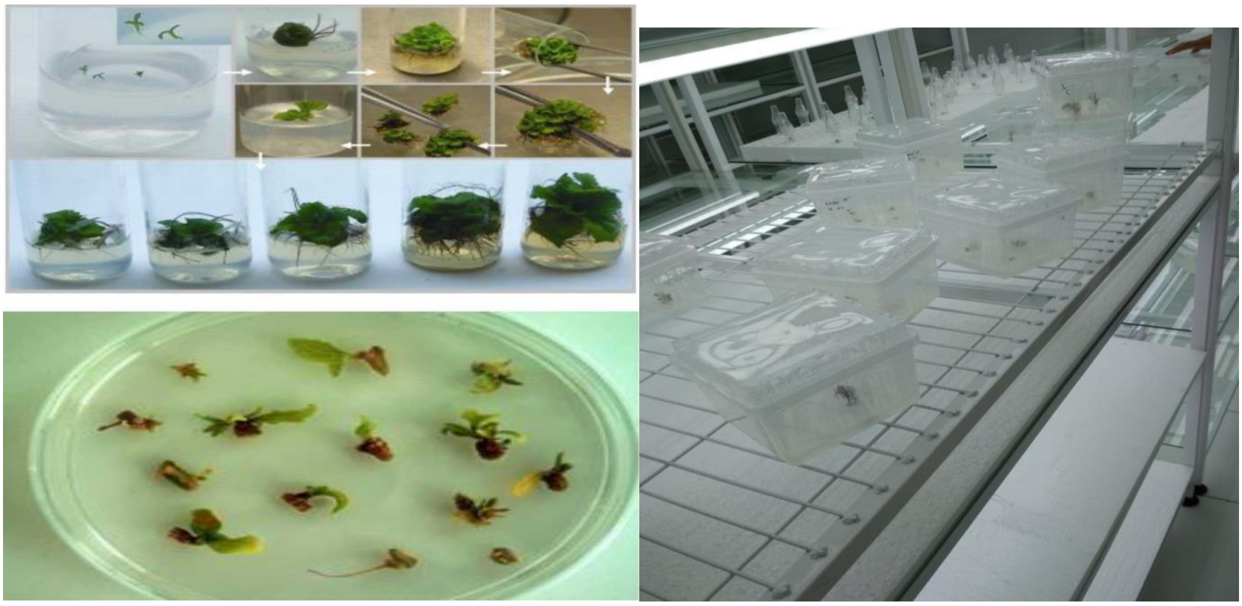
Food media are sterilized in an autoclave at 1200C for 20 minutes at a pressure of 0.75-1 am. If the nutrient medium contains substances that decompose at high temperatures, then these substances are cleaned through special bacterial filters, and then placed in the main nutrient medium, which is autoclaved and cooled to 400C. Pre-wrapped containers in parchment paper or plain paper should be sterilized in ovens at 1600C for 2 hours.

Environments rich in nutrients. In the nutrient media for the culture of isolated cells and tissues, all macronutrients (nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron) and trace elements (boron, manganese, zinc, copper, molybdenum, etc.) necessary for the plant, as well as vitamins, carbohydrates, phytohormones or their analogues. Some nutrients also contain casein hydrolyzate and amino acids. To supply the cell's iron requirement, EDTA (ethylenediaminetetraacetic acid) or its sodium salt is supplied to the nutritional medium.

Coconut endosperm (coconut milk) and chestnut liquid endosperm (chestnut milk) are sometimes added to the nutritional medium to obtain callus tissue. Carbohydrate-isolated cells and tissues are required components of the culture medium. Because they don't have any nutritional qualities that are autotrophic. Sucrose or glucose with a concentration of 2-3% is employed as a carbohydrate source.

To speed up cell shrinkage and division, phytohormones are required. As a result, auxins (which trigger cell differentiation) and cytokines must be present in the nutritional medium in order to obtain callus tissue (which cause cell division). In the formation of stem morphogenesis, the amount of auxin in the nutrient medium is reduced or not added at all [3].

Tumor tissue or adapted tissue grows in a hormone-free environment. They have the ability to produce hormones on their own.



In nutritional media, 2,4-dichlorophenoacetic acid (2,4-D), indolyl 3-acetic acid (ISK), and naphthyl acetic acid (NCS) are utilized as auxin sources. Because its activity is 30 times higher than that of ISK, 2.4 – D is mostly employed to obtain porous, (pure) well-growing callus issue.

In artificial nutritional media, cytokines are derived from kinetin, 6-benzylaminopurine (BAP), and zeatin. In the growth of isolated tissues and organ creation, BAP-6 and zeatin are more effective than kinetin. Some nutrients contain adenine. Several nutrient mediums have been identified as having different compositions. In vitro development of isolated cells and tissues, on the other hand, is primarily based on the nutritional media developed by T. Murasiga and F. Skuga in 1962. The nutritional content is balanced in this environment, which differs from others in the ratio of ammonium to nitrate nitrogen.Solid media is made from seaweed polysaccharide.

Salts of macro-micro elements, as well as concentrated (increased) vitamins and phytohormone solutions, can be made, eaten in small amounts, and diluted. The refrigerator is where concentrated beginning solutions are kept.

Cultivation conditions. Isolated cells and tissues must be cultured before they may be cultured.

Because their cells lack chloroplasts and are heterotrophic, most callus tissues do not require light. With the exception of mandrakes, some green callus tissue. In some circumstances, even if callus tissue is not capable of autotrophic nourishment, which is required for effective morphogenesis, it is developed under continuous light conditions.In 1000-4000 l of light, tissues that have begun to develop are cultivated.

In light, isolated meristems are cultivated and micropropagated. Depending on the culture, room lighting should range from 3,000 to 10,000 lumens.

It is necessary to consider the photo cycle required for this cultivated object. The humidity level in the growing environment should be between 60 and 70 percent. Dry air can cause the nutrient medium to dry out and the concentration to degrade if the opening of the test tube or flask is covered with a cotton swab. To improve the humidity in the space, water can be added to the containers. Most cultivated tissues prefer a temperature of 25-260°C, while tropical plant tissues prefer a temperature of 29-300°C. When doing morphogenesis induction, the temperature is reduced to 18-200C. Light, temperature, and humidity may all be controlled with climate cameras.

CONCLUSION.

The current study uses mangosteen fruit in vitro reproduction technology. The application of two approaches under these circumstances has been scientifically explored. That is, the callosum is propagated from the flower's developing tissue, and the seeds are produced in vitro and divided into callos within 6 months after fertilizing the flower. According to study and estimates in reproduction technology, both of these ways are cost effective. Only the findings of research can reveal which option is the most acceptable.

LIST OF REFERENCES:

1. Morton JF (1987). "Mangosteen". Fruits of warm climates. Purdue University. pp. 301–304. Retrieved 4 December 2012.

2. Crown I (2014). "Science: Mangosteen information". Mangosteen.com. The mangosteen website

3. The King and Queen of Fruits: the Durian and Mangosteen - Flora and Fauna - 103 Meridian East, Singapore".

4. Mangosteen Tree Care - Tips On Growing Mangosteen Fruit Trees. https://www.gardeningknowhow.com/edible/fruits/mangosteen/mangosteen-fruit-trees.htm

5. Garcinia mangostanaMangosteen, Manggis PFAF Plant Database. https://pfaf.org/user/Plant.aspx?LatinName=Garcinia+mangostana

6. How to Grow Mangosteen From Seed. https://homeguides.sfgate.com/grow-mangosteen-seed-49426.html

7. Biological Activities and Bioavailability of Mangosteen Xanthones: A Critical Review of the Current Evidence. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3775248/

8. Growing Mangosteen: How to Plant, Raise and Harvest the Queen of Tropical Fruit. https://morningchores.com/growing-mangosteen/

9. How to Grow Mangosteen Tree | Mangosteen Planting Guide https://balconygardenweb.com/how-to-grow-mangosteen-tree-planting-guide/

10. Mangosteen in SouthernCalifornia. ttps://www.houzz.com/discussions/4118016/mangosteen-in-southern-california

11. Artikova R., Murodova S.S. Agricultural biotechnology.Training manual. Tashkent, Publishing House" Science and technology", 2010 - Twenty-two b's.

12. Zuparov M.A. and others. Agricultural Biotechnology (a study guide for laboratory training). Toshdau publishing house, 2016. - 98 b.

13. Davrav Q.D. and et al. Agricultural biotechnology. Methodical guide. Tashkent, 2000y. - 156 b.

14. Davrav Q.D. Biotechnology: scientific, practical and methodological bases. T.: 2008. -214 b.