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FORMULATION AND EVALUATION OF DRAGON FRUIT JELLY

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Abstract:

The exotic fruit known as dragon fruit (Hylocereus spp.), Dragon fruit, sometimes referred to as strawberry pear or pitaya, is a type of vine cactus that is a member of the Cactaceae family. The genus Hylocereus has three species of dragon fruit, while the genus Splendiferous contains one species. dragon fruit varieties, such as Hylocereus megalanthus, Hylocereus polarizes, and Hylocereus undatus. More than 93% of the dragon fruit produced worldwide comes from three big nations: China, Indonesia, and Vietnam. With key states like Karnataka, Maharashtra, Gujarat, Telangana, Andhra Pradesh, and West Bengal encouraging commercial production, dragon fruit farming has grown dramatically in India in recent years. Tropical areas with ideal temperatures between 20°C and 30°C and evenly distributed yearly rainfall between 100 and 150 cm are ideal for dragon fruit growth. It favors mildly acidic soil. Standardizing process parameters to create powder-infused fruit jelly sweets was the goal of this investigation. The potential of both red and white dragon fruit varieties for health-conscious dietary applications is highlighted by the results of extensive analyses, which showed that they have low fat contents of 0.32% and 0.25%, respectively, and a high moisture content of about 88.8%. According to the study's thorough proximate analysis, the red dragon fruit variety has 2.03 grams of stool dietary fiber per 100 grams, which is somewhat more than its white counterpart and makes it a great option for diets high in fiber. By varying the proportions of sugar and jiggery, experimental jelly candy recipes were systematically altered in the product development plane. Dragon fruit was combined to create jelly candy.

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INTRODUCTION:

Introduction: The fruit of various cactus species, most notably those in the genus Hylocereus (sweet pitayas), is known as a pitaya or pitahaya. The tropical and subtropical forest regions of Latin America, including North, Central, and South America, are the primary origins of pitaya (Hylocereus spp.) (Crane and Balerdi 2005; Lauders and McMahon, 2006). Because of the bracts (scales) covering its skin, it is referred to as dragon fruit in Asia. Due to its huge, fragrant, night-blooming blossoms, the dragon fruit (Hylocereus spp.), a tiny fruit climbing cactus, has gained international attention as an ornamental plant. It has been widely consumed by the general public in its native countries from pre-Columbian times (Crane and Balerdi, 2005). According to Le-Bellec et al. (2006), it is a non-climacteric fruit with rosy-red exterior that is speckled with green scales. Its white flesh is home to numerous tiny black seeds. About a century ago, the French introduced it to Vietnam from its native regions, when it was produced solely as an ornamental crop for the king (Lauders and McMahon, 2006). The strawberry pear, night blooming cereus, belle of the night, conderella plant, and queen of the night are some of the colloquial names for dragon fruits. Jelly candy is a processed food item that is popular with people of all ages, including kids, because of its tasty flavor, appealing appearance, and ease of consumption at any time. As a result, it has emerged as a popular option for a healthy and useful snack that satisfies the nutritional needs of modern civilization. A solid snack consisting of sugar, water, flavorings, and gelling agents, gummy candy is often referred to as soft candy [1]. The majority of gummy sweets on the market are created by mixing chemically derived Apple snails (Pila ampullacea) are members of the ampullariidae family, which is a subclass of gastropods. Southeast Asia, which includes the Philippines, Singapore, Kalimantan, Sumatra, Java, and other areas, is home to them [14]. Common locations for these snails include ditches, rice fields, and imitation channels. lake ponds and freshwater wetlands, including large populations of mangrove swamps [15]. Because they destroy crops by feeding on rice plants, apple snails are regarded as pests. Among their distinctive features are a brown shell and, in mature animals, creamy white to reddish are required to solve this. Dragonfruit jelly property Rare Allergic Reactions Allergies can cause swelling, itching, or rashes in certain people. Though uncommon, it is feasible 2. Digestive Problems Could Be Caused by Overeating Bloating, gas, or diarrhea can result from consuming too much fiber. 3. Possible Interactions with Drugs may conflict with drugs that reduce blood sugar (watch if diabetic). 4. Discolorations The pink and red types can leave stains on surfaces or clothing.

Plate 1. Fruits of dragon fruit (*spp. Hylocereus undatus*)

Plate 2 . Fruits of *Hylocereus undatus* with different coloured pulp

Benefits of Dragon Fruit:

- Packed with of nutrients High in fiber and low in calories,
- Excellent source of iron, magnesium, vitamin C, and antioxidants such as flavonoids, carotenoids, and battalions.
- Strengthens the Immune System Antioxidants and vitamin C support a stronger immune system.
- Facilitates Digestion Constipation is avoided and a healthy digestive system is supported by a high fiber content.
- Promotes Heart Health contains omega-3 and omega-9, two beneficial fats derived from seeds. Aids in lowering bad cholesterol and raising good cholesterol (LDL) and HDL.
- Blood Sugar Control
- Rare Allergic Reactions Allergies can cause swelling, itching, or rashes in certain people.
- Digestive Problems Could Be Caused by Overeating Bloating, gas, or diarrhea can result from consuming too much fiber.
- Possible Interactions with Drugs may conflict with drugs that reduce blood sugar (watch if diabetic).
- Discolorations The pink and red types can leave stains on surfaces or clothing.
- Limited Shelf Life Once ripe, if not refrigerated, spoils quickly.

Applications in Cooking:

- Brand-New Bating Cut and remove the meat to consume it raw. Enjoy as a light snack or chilled.
- Fruits and Drinks Mix with additional fruits, such as berries, bananas, or mangos.
- For a striking hue, use red or pink dragon fruit.
- The salad gives green or fruit salads a hint of sweetness and color
- Uses of Cosmetics and Skincare (Secondary or DIY) utilized to provide antioxidant effects in DIY face masks included in hydrating and anti-aging lotions and creams.
- Uses in Agriculture and Other Fields Seeds: Although uncommon, seeds can be crushed to extract oil.

Adverse Reactions:

Dragon fruit is well-known for both its eye-catching appearance and possible health advantages. Dragon fruit is therefore thought to be safe for the greatest number of people when consumed in moderation

That Impact Dragon Fruit Jelly:

- Fruit Ripeness and Quality Ripeness:
- Underride fruits alter flavor and sweetness, while overripe fruits can cause fermentation and a mushy texture.
- Variety:
- Compared to white-fleshed varieties, red-fleshed dragon fruit has a richer flavor and a brighter color.

Review of Literature

A delicacy known as gummy candy is created by combining fruit extract or juice with gelling chemicals, giving it an elastic texture. The market now offers gummy sweets in a vast array of flavors and shapes (10) Gummy candies typically have a soft feel that makes cutting them simple. You're sturdy enough to hold their form. They have a smooth and soft texture and are a popular confection because they are not sticky, slippery, or brittle (11) The bioactive substances included in dragon fruit, such as antioxidants (ascorbic acid, beta-carotene, and anthocyanin's), are good for the health. Dragon fruit also contains a variety of minerals. Dragon fruit also includes a variety of nutrients, including iron and calcium. Vitamins B1, B2, B3, and C are among the vitamins included in dragon fruit [12]. Dragon fruit has many health benefits, such as antioxidants to prevent damage from free radicals that can cause cancer and other health problems, blood sugar control, particularly for people with type 2 diabetes, blood pressure reduction, improved digestion, weight loss, body demnification, and eye health support [13]. Apple snails (Pila ampullaceal) are members of the ampullariidae family, which is a subclass of gastropods. Southeast Asian countries such as the Philippines, Singapore, Kalimantan, Sumatra, Java, and others are home to them. Apple snails (Pila ampullacea) are members of the ampullariidae family, which is a subclass of gastropods. Southeast Asia, which includes the Philippines, Singapore, Kalimantan, Sumatra, Java, and other areas, is home to them [14]. Common locations for these snails include ditches, rice fields, and imigation channels. lake ponds and freshwater wetlands, including large populations of mangrove swamps [15]. Because they destroy crops by feeding on rice plants, apple snails are regarded as pests. Among their distinctive features are a brown shell and, in mature animals, creamy white to reddish flesh [16].

Material method:

Harvesting for Dragon Fruit Dragon fruit plants usually start to produce their best fruit 12 to 15 months after they are first planted. It is necessary to keep an

eye on the fruit pericarp's color change from green to red in order to attain the most desirable fruit . Additional chemicals and raw materials The local market provided the additional raw materials needed for product manufacture, including pectin or gelatin, citric acid and sugar, cardamom or ginger, (kms,) potassium metasuphite, sodium benzoate, glycerol (as a humectant), and (as a preservative)

Equipment and Supplies:
A blender, a cutting board, a watch glass, a 1 L beaker, an analytical balance, a porcelain cup, a saucepan, a burner, a wooden spoon, a 50 mL beaker, aluminum foil, a spatula, a stirring rod, a drop pipette, a mixer, and a pH indicator meter, an object glass, 50-gram weights, a Brookfield viscometer, and UV-Vis spectrophotometry.

Dragon fruit jelly's chemical makeup:
Compared to other citrus fruits, dragon fruit was discovered to have an extremely low vitamin-C concentration. Since the majority of the vitamin C in the pulp was lost during prolonged high-temperature cooking, it was further decreased in jellies made from dragon fruit juice. The moisture content, vitamin C, acidity, TSS, pH, and sugar of the dragon fruit jelly were examined. The pectin level of the three jelly products (A, B, and C) varied, ranging from 0.5% to 1.0% and 1.5%, respectively. Dragon fruit jellies' nutritional makeup

Materials for Packaging: The local market Washim provided the appropriate Packaging materials, including a glass container, lid, and paraffin wax, for the product's confinement and safe storage.

Making an Extract from Red Dragon Fruit:
Using a knife, cut the red dragon fruit's flesh into four equal pieces and remove the skin. The meat was then sliced into little bits. An analytical balance was used to weigh the meat after it had been placed in a beaker glass. After that, a juicer was used for five minutes to mash the pieces of red dragon fruit flesh. The juice from the dragon fruit was then transferred into a sizable porcelain cup. After that, water was added to the heating pot until it.

Method and formulation for preparation of dragon fruit jelly
Flow diagram for making dragon fruit jelly candies Choosing Ripe Dragon Fruit + Cleaning Cutting into pieces after peeling Water addition (1:1 slices: water) + Boiling (for 20 to 30 minutes) Applying muslin towel to strain the extract bringing the extract to a boil while stirring constantly Adding sugar Pectin and gelatin are added when the TSS reaches 55 °Brix. Citric acid is used when TSS reaches 58 "Brix. Get rid of the filth Mold Filling Storage, packaging, and chilling (30 °C) Fig. 1: Making Jelly Candy

Plate 3 : Drago fruit jelly

Figure 1: Process flow chart for dragon fruit jelly

Storage of dragon fruit jelly:
Keeping For ninety days, the jelly was kept at room temperature after being poured and packed into 250ml tight glass containers. Only every 30 days were the bottles opened for the chemical and sensory analyses. at 0.30, 60, and 90-day storage intervals. Dragon fruit preserves were evaluated chemically and organoleptically

Organoleptic parameter:
1.**Aroma**:
the unique dragon fruit scent, which seems to mask the fishy-smelling apple snail collagen's scent. Because there is a small amount of concentrated hydrocolloid material present, the panelists' sense of smell is still able to detect the dragon fruit's
2.**Texture**:
the highest texture score. This is because the addition of collagen and carrageenan affects the gummy candy's texture. The characteristics of collagen-namely, its ability to form gels, thicken, and bind water-are related to its behavior. Therefore, using collagen as a thickening agent can improve the gumuny candy's gel strength.
3.**Appearance**:
jelly that is clear, shiny and well set, vie can be translucent white or magenta or deep p uniform allocation of se consist form and a smooth surface
4.**Mouthfeel**:
In the mouth, smooth, and soft. They shouldn't be too hard or rubbing. Se might add a little.
5.**Color**: Bright pink, red, or purple hue (depending on the type of dragon fruit used-white, red, or yellow).
Clarity: Usually clear to slightly translucent.
Uniformity: Consistent color and texture throughout

.**Analysis of chemicals components** of fresh ripe dragon fruit and dragon fruit jelly, and RTS were identified, including TSS, pH, moisture content, lipid content, protein content, ash, and carbohydrate content.

1.T.S.S. (total soluble solids): Using a mortar and pestle, the Dragon fruit pulp or product was equally mashed. Total soluble solids (Bx) was measured after a drop of mashed pulp was put on the prism of a hand refractometer (ERMA brand).
2.**pH**:After standardizing it using pH 4.0 and pH 9.2 buffers, the pH was measured using a digital pH meter (ELICO LI 612).
3.**Gammy sweets has a moisture content r**anging from 12.43% to 16.24%. The percentage of dragon fruit juice and apple snail collagen and the amount of carrageenan influencing the gummy candy's moisture content interact significantly, according to variance analysis ($P<0.05$). The maximum moisture content (16.24%) was obtained from the treatment that included a ratio of dragon fruit juice to apple snail collagen (80:20) and 3%

Estimation of moisture content:
5 g of sample subjected to oven drying at 105°C for 4-5 hours. It was again weighed after cooling and repeated until a constant weight was obtained. The resultant loss in weight was calculated as moisture content (AOAC, 2000).
% Moisture = loss in weight of sample after dryingx100 Weight of sample taken

Estimation of ash content:
5g sample was weighed into crucible, which was heated at low flame till all the material was completely charred and cooled. Then it was kept in muffle furnace for about for 5-6 hours at 550°C. It was again cooled in desiccators and weighed and repeated until two consecutive weights were constant. The per cent ash was calculated by taking the difference between the initial and final weight. (AOAC, 2000).
weight of ash % Ash = Weight of sample taken X100

Estimation of crude fat:
5g ground sample was weighed accurately in thimble and extracted with petroleum ether in in an intermittent Soxhlet extractor (Soxhlet Extractor Darmstadt, Germany) and extracted the sample for 4 h. The residue in round bottom flask after solvent removal represents the fat content of the sample. The residue was weight and checks the Reflective Index (RI) using reflectometer (Merck KGaA, 64271 Darmstadt, Germany). The resultant ether extract was evaporated and lipid content was calculated (AOAC, 2000).

Estimation of crude protein:
Protein was determined by Micro-Kjeldahl method using 0.2g of ground sample by digesting the same with concentrated Sulphur acid (H_2SO_4) containing catalyst mixture for 3-4 hours at 100°C. Then it was distilled with 40 per cent NaOH solution and liberated ammonia was trapped in 4 per cent boric acid and then it was titrated with 0.1N HCL using mixed indicator (Methyl red: Brooches green:: 1:5). The per cent nitrogen

SUMMERY AND CONCLUSION:
Here is a summary of the findings from the current study, "Studies of dragon fruit (Hylocereus spp.) and its utilization in value added products." Sincere attempts were made to make dragon fruit jelly, and RTS beverages in order to capitalize on the use of dragon fruit. Through the sale of dragon fruit jelly, and

RTS beverages, the research aims to reduce post-harvest losses of dragon fruit, develop a cost-effective method of processing dragon fruit with high nutritional contents for human consumption, and foster economic prospects. The product was developed using the dragon fruit variety Hylocereus undatus. Semi-trained panel members were used to evaluate the effects of various therapies, either alone or in combination, during the product's development. For making dragon fruit goods (jellies, jams, and RTS drinks). Citric acid (0.7%, 0.8%, and 0.9%), pectin (0.5%, 1%, and 1.5%), and sugar (45%, 55%, and 65%) were measured in various ratios. Based on the findings of the sensory evaluation, it was determined that the acceptability of various individual treatments used in the production of dragon fruit products varied. The semi-trained panelists found that the 1.5% pectin solution and the 0.9% citric acid solution were the most acceptable among the treatments, which included a 55% sugar content, for making dragon fruit jam and jelly. The ideal concentrations for making RTS beverages were 14% pulp, 12% sugar, and 0.9% citric acid solution.It was investigated how these treatments affected the instrumental color parameters (L*, a*, and b*). For dragon fruit jelly, the sample handled with a 45 percent sugar and 1.5% pectin solution produced the best results. For dragon fruit , the L", a and b values were 40.64±0.64, 14.42+1.23, and 15.86±1.09, respectively, while for dragon fruit jelly, they were 39.46±0.56, 12.98±1.09, and 16.27±1,87. We may infer from the results that the samples were darker (lower L values) as a result of thermal treatment, most likely because of non-enzymatic browning brought on by Maillard processes and sugar caramelizing. Analysis of the samples' texture profiles was done. We may infer from the TPA that as the sucrose content grew above 60%The semi-solid food (SSF) dragon fruit jelly has an average moisture content of 29.10 percent and 28.96 percent, respectively. Dragon fruit is high in minerals, particularly calcium, ascorbic acid, fiber, and carbs, according to a chemical study of processed dragon fruit products. It is therefore a food with medicinal benefits. It was discovered that the fiber content of dragon fruit jelly and jam was 0.39 percent and 0.38 percent, respectively. The amounts of vitamin C were 2.61 and 2.77 mg, respectively. The chemical analysis of the dragon fruit RTS beverage revealed that, following conversion to RTS beverage, there was a similar rise in both total and reducing sugars. It had a 12.50 percent total sugar content. The corresponding contents were 4.26 and 8.06 percent. RTS had 9.12 mg of ascorbic acid per 100g. The dragon fruit RTS's T.S.S. pH and treatable acidity were determined to be 15.20°Brix, 3.98, and 0.44 percent, respectively . he product quality remained rather consistent over the course of three months, demonstrating that osmotic dehydration extends the shelf life of processed dragon fruit goods beyond three months. Which are properly kept for over three months and shield against microorganisms. But because acid hydrolyzes polysaccharides, particularly gums and pectin, there is a slow rise in T.S.S. in dragon fruit processed products.

CONCLUSION:

From the description above, it is clear that the Hylocereus undatus variety can be used to produce high-quality dragon fruit items once it has fully ripened. The color and other organoleptic properties of dragon fruit jam and jelly were enhanced by treating the pulp and juice with a solution that contained 1.5% pectin, 55% sugar, and 0.9% citric acid. The optimal ratio for the dragon fruit RTS beverage was determined to be 14% pulp, 12% sugar, and 0.9%. The prepared product was determined to be satisfactory from an organoleptic standpoint. In several formulations, the nutritional profile of Dragon fruit jelly sweets was enhanced by substituting jiggery powder for sugar. The mineral content and approximate makeup of every Dragon fruit jelly treat This article provides an overview of the exotic fruit that is Dragon fruit is one of the most popular and nutrint-dense fruits consumed worldwide. Each of the 18 species of dragon fruit found in Hylocereus species has a unique nutritional value. Due to its abundance of minerals and nutrients, dragon fruit offers phytochemicals with anti-aging, anti-cancer, antioxidant, and anti-microbial properties, among many others. As a result, its use has grown in importance both nutritionally and economically in recent years. Its nutrition contains nutraceutical factors that strengthen the human defenses and help avoid nutrition-related diseases. Nutraceuticals have a number of qualities, including anti-oxidant, anti-diabetic, antibacterial, anti-cancer, and anti-obesity capabilities.

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