"A RESERCH FORMULATION AND EVALUATION OF HERBAL CANDY BASED ON INDIAN MEDICINAL PLANTS FOR THE TREATMENT OF ORAL CANCER AND THEIR STABILITY STUDIES"

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Abstract— Background: More than 90% of malignant tumors diagnosed in the oral cavity are oral squamous cell carcinomas (OSCC) with the preferred site being the tongue. Classically, the disease has predominated in men, although recent studies suggest that trends are changing and the proportion of women with OSCC is increasing. In addition, the prevalence of oral cancer is also determined by certain risk factors such as alcohol and tobacco use. Currently, Tumor, Node, Metastasis (TNM) classification is used to define tumor stage and specific treatment is established based on this guideline. However, 5-year survival does not exceed 50% of cases. The aim of this study is to determine whether T1 T2 tumors located in the anterior two thirds of the tongue may have a histological risk pattern showing high recurrence. There are many treatment options for OSCC. But the easiest option of all is candy which can be beneficial for tongue cancer. Cactus (Opuntia ficus-indica) has been utilized in conventional people medication since of its part in treating a number of infections and conditions, counting diabetes, hypertension, hypercholesterolemic, rheumatic torment, gastric mucosa diseases and asthma, in numerous nations over the world. These days, the cactus, natural products and cladodes, is the focus of numerous thinks about since they contain bioactive (phytochemicals) compounds, well known for their health-related properties. It has been uncovering a positive relationship between a eat less wealthy in thorny pear cactus and a diminished hazard of diseases related with oxidative stretch, such as diabetes, cancer, cardiovascular and neurodegenerative diseases. The Opuntia ficus-indica shows differing pharmacological activities through its antioxidant movement: secures cells against oxidative harm, acts as radical foragers, decreases lipid peroxidation and increments GSH levels. So distant, there is no report around the adverse/toxic impacts on people. This survey gives clinical and exploratory confirmations about the most imperative phytochemical that contribute to its activity hypoglycemic, hypolipidemic, hipocholesterolemic and neuroprotective in arrange to allow the premise of their utilize in the avoidance and remedy of a few persistent illnesses. More studies on Opuntia ficus indica may offer assistance way better get it its pharmacological instrument of activity to give clear scientific prove to clarify its conventional employments, and to distinguish its helpful potential in other illnesses.

Index Terms— prickly pear cactus, oral squamous cell carcinomas, Harbal candy, anticancer, anti-inflammatory properties

Introduction

It has been utilized for more than 5,000 a long time and is one of the fundamental plants in Ayurvedic medication. In home grown medication, Exploratory considers in creature models have illustrated an inhibitory impact of Spirulina green growth on verbal carcinogenesis. The watery extricate of cinnamon contains a few bioactive compounds, such as cinnamaldehyde, cinnamic corrosive, and polyphenols, and applies anticancer and anti-inflammatory properties by modifying key apoptotic and angiogenic components. Tulsi, aloe vera have been utilized in the treatment of pre-cancerous injuries like leukoplakia, and pre-cancerous conditions like lichen planus and OSMF. Combination treatment continuously worked for OSMF and verbal lichen planus patients. There are a few ways to treat mouth (verbal) cancer, depending on the area and organize, counting: surgery to evacuate the cancer. radiation treatment, utilizing high-energy beams (such as x-rays) to annihilate cancer cells. chemotherapy with drugs that slaughter cancer cells. utilized to Ayurvedic herbs as neural tonics to improve insights and memory (move forward neurocognitive capacities). Sweet is quick and successful framework for pharmaceutical. spirulina, cinnamon, dark turmeric, tulsi, lemon and aloe vera all herbs utilized in Indian framework of medication for treating different wellbeing issues. Too gives tall level of dietary esteem. The comes about of physic-chemical assessment and soundness ponder were revealed.

Oral Cancer

According to the ICMR (Indian Council of Medical Research), oral cancer is the most common cancer among men than women. Men are further than twice as likely as women to have these cancers. They affect White people slightly more constantly than Black people. Around 1 in 60 men and 1 in 141 women will acquire oral depression and oropharyngeal cancer in their continuances. It's estimated that India accounts for around 30 of all oral cancer cases worldwide. The frequency of oral cancer in India is attributed to various factors, including tobacco use(both smoking and chewing), alcohol consumption, poor oral hygiene, and a diet low in fruits and vegetables. These trouble factors are particularly current in certain regions of India, analogous as the northeastern countries and corridor of northern India. In terms of the frequency of oral cancer in India in words, In 2023 it's estimated that there are around 77,000 new cases of oral cancer each time in the country, with men being at advanced trouble than women. Unfortunately, oral cancer is constantly diagnosed late in India, performing in poorer issues and a lower survival rate. According to the American Cancer Society, over 54,000 new cases of oral cancer will be diagnosed in the United States in 2021, and about 10,850 people will die from it. Statistics reported 18.1 M new cancer cases and 9.6 M cancer deaths in 2018. These numbers reflect the limited curative effect of conventional anticancer treatments. Many studies demonstrate that increased adherence to the Mediterranean dietary pattern is associated with health benefits. Herbal and alternative medicine is highly popular among cancer

patients and it depends mainly on taking drinks and foods containing active ingredients. Food plays a vital role in cancer initiation and progression and some studies revealed a clear relationship between reduced cancer risk and dietary polyphenols. Many studies proved the effects of food in cancer treatment and prevention. In this sense, the present review highlights the different natural anticancer agents from plant origin and their mode of actions in carrying out this therapeutic action. This work appraises the selected plant species and active phytochemicals, their mechanism of action and pharmacological effects in various models. The detailed analysis revealed that plants owing to the presence of phytochemicals can be effective in fighting colon, lung, stomach, cervical, breast, oral, hepatic cancers and blood cancer cell lines. Roughly 300.373 unused cases of verbal squamous cell carcinoma (OSCC) are yearly detailed around the world (1), what makes verbal cancer the 6th most common cancer around the world (2,3). The term verbal cancer is alluded to as a subgroup of head and neck dangerous neoplasms influencing the lips, the front two-thirds of tongue, the salivary organs, the gingiva, the floor of the mouth, the verbal mucosal surface and the sense of taste (2), with the tongue being the most common area (3,4). The crest rate happens after the fifth decade of life, most commonly between the 6th and eight decade in men, and seldom in patients beneath 40 a long time of age (5,6). However, current considers uncover a rise in the rate in this last mentioned gather of youthful patients (7,8). The fundamental chance variables for the onset of verbal carcinoma are: tobacco and liquor utilization (both of which a synergistic impact), betel nut, certain dietetic propensities, hereditary components, sun introduction, destitute verbal cleanliness and human papillomavirus (HPV)infection (9,7,6,10,11-18).

History

Cancer is the major public health problems and one of the leading causes of death in the world. Encyclopedically, the number of cancer deaths is projected to increase from7.1 million in 2002 to11.5 million in 2030. The Middle periods and the Medical Practices of the intricate Conglomerate. There came a time when the Roman emperor Flavio Valerio Aurelio Costantino, or Constantine I the Great(274 – 337 BC), moved the capital of the Roman Empire from Rome to the ancient Greek megacity of Byzantium and called it Nova Roma or Constantinople(326 BC, present day Istanbul, Turkey). He allowed the spread of Christianity by promoting it and latterly in the 4th century announcement, the Christian religion came the sanctioned religion of the entire Roman conglomerate and it was therefore that drug, after the classical period, met Christian allowed . A group of brilliant croakers in Byzantium(the Christian Roman conglomerate), the natural successor of the Roman classical age conglomerate, made substantial benefactions to the history of otolaryngology and thus stomatology.

Oral Cancer at 19th Century

Most of our current knowledge on oral oncology, including individual styles and treatment operation, has been developed during the 19th and 20th centuries. Oral cancers which were most constantly treated were those located on the girding skin or those on the mucosal shells of the lingo, epoxies and the palate. The preface of general anaesthesia in 1846 was the crucial event which allowed adding cancer excisions with the development of numerous surgical accesses for oral cancer, including sectioning of the lip and beak by Bernhard von Langenbeck (1810 to 1887) and his coworker Theodor Billroth (1829 to 1894), a submandibular access for lingo excrescences in order to tie the lingual roadway, avoiding haemorrhages, tried on 120 cases by Theodor Kocher(1841 – 1917)

Oral Cancer at the ultramodern Age(20th Century)

The history of oral cancers ' medical and surgical development continues in the 20th century, with advances in neck deconstructions and reconstructive surgery, but also in applicablenon surgical options for complete oral cancer operation. The involvement of lymph bumps in cancer, recorded as early as 1790, was used in the history as an index for incurability. William Stuart Halsted(1852 – 1922), in the late 19th century, used the conception of lymphatic spread of primary tumour's cells and showed that radical resection with " en bloc " knot analysis could bring to a 6 reduction in rush rates.

EPIDERMILOGY

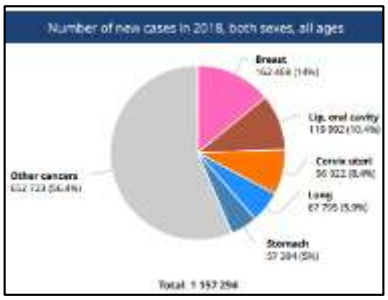

Fig. 1 : Number of new cases in 2018, both sexes, all ages

Oral cancer is the sixth most common cancer in the world accounting for 2 – 4 % of all the cancers and constitutes a major public health burden [Petersen. 2005]. The incidence of oral cancer is significantly high globally with an estimated 650,000 new cases and 350,000 cancer deaths each year [Parkin et al. 2005]. Oral cancer accounts for 50 - 70 % of total cancer mortality and has the highest incidence in Asia [Khandekar et al. 2006]. It is the most common cancer in South East Asia (India, Bangladesh, Pakistan, and Sri Lanka) where it accounts for one-third of all cancers [Singh et al. 2014; Khan et al. 2017]. According to WHO, the age standardized Incidence rate of oral cancer in India is 12.6 per 1,00,000 population [Petersen. 2005]. OSCC occurs in almost all the regions of the oral cavity (Figure 1.1). In India, the commonly affected site is the buccal mucosa followed by the alveolar surface, hard palate, anterior 2/3rd of tongue and floor of mouth [Montero et al. 2015]. Majority of the OSCC patients present with locally advanced disease. Despite improvements in surgical and therapeutic approaches, less than 60 % of the patients survive for more than 5 years [Rosebush et al. 2011].

V. HERBAL CANDY

Candy is a semisolid pharmaceutical preparation .candy is delicate, delicious, treat that we all love. Herbal products have lesser side effects than synthetic one. It is a popular product consumed by children, young and elderly alike. The major ingredient is sugar make it instant source of energy, mostly blended with variety of flavours and multi-medicinal herbs.

Principle Ingredients of Candies

1. Sweeteners: These are added to candies to make it good in taste. Various sweeteners include glucose, fructose, honey etc. Honey has a non-crystallization property, and can therefore be used in candies to maintain a soft, smooth consistency.
2. Acids: Acids such as lemon juice or cream of tartar added because it causes conversion of sucrose into its two simpler components, fructose and glucose.
3. Fats: Fatty ingredients such as butter help in interfering with crystallization again, by getting in the way of the sucrose molecules that are trying to lock together into crystals. A large amount of butter is added to maintain smooth texture and easy breakability of a candy.
4. Gelatin: If you add a gelatin, starch, pectin or gum to the boiling mixture, the sugar will become gel and products look like jelly beans.
5. Flavors: Various flavors are used such as melted chocolates, vanilla, mint etc. Commonly candy oils can be used and are preferred flavors as they are oil based, it makes them strong and less likely to evaporate when subjected to heat or added to a hot mixture.
6. Colors: For sugar based candy, food coloring is best to use. It is a liquid, which comes in little bottles available at any supermarket or from a cake decorating store. It is particularly suitable for mixtures which do not combine readily with liquid, such as chocolate or to be used in baking recipes.
7. Salt and vegetable oil: These are added to improve the taste of candy.

Importance of Herbal Candies

An herb is a plant or part of a plant valued for its medicinal, aromatic or savourly qualities. Nature produces several food items for every season. Their use in that particular season proves to be highly beneficial for the mankind which is packed with enormous medicinal advantages. Herbal drugs play a major role in systems of health in India; almost 70% of modern medicines in India are derived from natural products. In last few years there is an increment occur in the use of herbal medicines. The herbs used in herbal candy are selected on the basis of their role in the treatment of altitude health problems with lesser side effects, also the selection based on their availability and their preferences. The herbal products are much better than the allopathic medicines. Herbal products have lesser side effects and more therapeutic effects.

Advantages of Herbs

1. Safety
2. Efficacy
3. Lesser side effects
4. Compatibility with the human body
5. Cultural acceptability

Disadvantages of Herbs

1. Herbal drugs have slower effects as compare to Allopathic dosage form. Also it requires long term therapy.
2. They are difficult to hide taste and odor.
3. Most of the herbal drugs are not easily available.
4. Manufacturing process are time consuming and complicated.
5. No pharmacopoeia defines any specific procedure or ingredients to be used in any of herbal cosmetics.

Ideal properties :

1. It should have safe dosage regimen.
2. All ingredient should have compatibility to each other.
3. It should have proper stability profile.
4. It should be uniform in weight and drug content.

OPUNTIA (PRICKLY PEAR CACTUS)

Prickly pear, also called nopal, any of several species of flat- stemmed spiny cacti of the rubric Opuntia(family Cactaceae) and their comestible fruits. Prickly pear cacti are native to the Western Semicircle. Several are cultivated, especially the Indian fig(O. ficus- indica), which is an important food for numerous peoples in tropical and tropical countries. The Indian fig is bushy to treelike, growing to a height of5.5 metres(18 bases). It bears large unheroic flowers,7.5 to 10 cm(3 to 4 elevation) across, followed by white, unheroic, or sanguine grandiloquent fruits. It's extensively grown in warmer areas for the fruit and comestible paddles and as a probe crop. The hard seeds are used to produce an oil painting. Because of their high water content, the stems, especially of spineless kinds, are used as exigency stock feed during failure. 3.1. Health Benefits of Cactus Cactus plants have a number of nutrients that may be good for different aspects of your health 4. Cholesterol Both the cactus pad and the cactus fruit are high in fiber, which can lower cholesterol levels in the blood. 5. Blood sugar High blood sugar in the body can be a symptom of several illnesses, such as diabetes, stroke, or heart disease. Some research shows that people who ate cactus pads on a regular basis had lower blood sugar than those that didn't. More research is needed todetermine the reasons for this. 6. Immune system Cactus fruits are an excellent source of vitamin C, which is one of the best immune boosters. Regular doses of vitamin C increase the production of white blood cells, which can help your body fight off viruses. 7. Digestion The betalain and potassium content in cactus are good for digestion. Potassium helps your body absorb nutrients, while betalains are anti-inflammatory and help to protect your digestive tract.

Figures and Tables

MATERIALS AND METHODS:

Ingredients	Biological name	Family
Cinnamon	**Cinnamomum verum J. Presl**	Lauraceae
Black turmeric	**Curcuma caesia Roxb.**	Zingiberaceae
Tulsi	**Ocimum tenuiflorum**	Lamiaceae
Lemon	**Citrus**	Rutaceae
Aloe Vera	**Ocimum tenuiflorum**	Liliaceae
Spirulina	**Spirulina platensis or S. maxima**	Oscillatoriaceae
prickly pear cactus	**Opuntia**	Cactaceae

Table 1: Source of Data

List of Materials with Probable Manufacturer details

Sr. No.	Ingredients	Quantity taken (1 tbsp. = 14.7 ml) (1 tsp. = 4.2 g)
1	Cinnamon	1 tsp
2	Black turmeric	1 tsp
3	Tulsi	1tsp
4	Lemon	q.s
5	Aloe Vera	1 tsp
6	Spirulina	1 tsp
7	Prickly pear (cactus)	1/2 tsp
8	Water	2 tsp

Table 2: Manufacturer details

Plant Materials

Shankhpushpi, brahmi, nagarmotha, chirata Herbs were collected from different localities of Oman such as Al Buraimi, Salalah, Musandam and Nizwa. Herbs were identified according to the International Ethno-medical Data in the College of Agricultural and Marine Sciences, Sultan Qaboos University (SQU). Selected leaves/seeds were washed thoroughly with water, and then air dried under shade and grounded using a pestle and mortar.

Instrument Used:

Sr. No	Equipments	Manufacturer
1.	Electronic weighing balance	Shimadzu, Japan
2.	Candy Thermometer	Remi Scientific Instruments, Mumbai
3.	A Sturdy Pot	Remi Scientific Instruments, Mumbai
4.	Dipping Tools	Remi Scientific Instruments, Mumbai
5.	Dissolution Apparatus	Labindia Ltd., Mumbai, India
6.	pH meter	Labindia Ltd., Mumbai, India
7.	Melting point apparatus	PERFIT, India
8.	Refrigerator	Whirlpool, India

Table 3: Instrument List

Methodology

i) Serial dilution method

mix the bacterial suspension by rolling the test tubes between the palms of hands to ensure even dispersion of cells in the cultures. By using sterile pipette, aseptically transfer 1ml from the bacterial suspension to first flask containing 99ml saline solution. Discard the pipette in the beaker of disinfectant. The bacterial suspension has been diluted 100 times (10^{-2}). Mix the contents of the first flask and transfer 1ml suspension to the second flask (containing 99ml saline) with a sterile pipette. This original culture is diluted (10-4). Mix the contents of the second flask and transfer 1ml suspension to third flask containing 99ml sterile solution with a sterile pipette. Finally, in the third flask bacterial suspension is diluted to 10-6. Add approximately 15 to 20ml nutrient agar medium into three large size test tubes, sterilize by autoclave at 1210C for 15 minutes and cooled at 45oC. Mix all the dilutions and transfer 1ml from each dilution to large size test tubes. Mix the bacterial suspension by rolling the test tubes between the palms of hands to ensure even dispersion of culture in the medium. Immediately pour the media of three test tubes into 3 sterile petri plates to solidify. Incubate these plates in an inverted position for 24 to 48 hours at 37oC.

ii) Cup plate method

Each petri dish was filled to a depth of 4-5 mm with a nutrient agar medium that was previously inoculated with suitable inoculums of suitable test organism, and then allowed to solidify. The petri dish were specially selected with flat bottom and were placed on level surface so as to ensure that the layer of medium is in uniform thickness. The petri dishes were sterilized at 160-170°C in hot air oven for 30 mins before use. Small sterile borer of uniform size was placed approximately at 10 cm height, having an internal diameter of approximately 6-8 mm and made of aluminium (or) stainless steel. Each plate was divided in to five equal portions along the diameter. To each portion one cylindrical cavity was made in medium with the help of sterile borer. Five cavities for test compounds were made. The petri dishes were incubated at 37°C for 18 hours. Diameter of the zone of inhibition (ZOI) was measured and the average diameter for each sample was calculated.

Phytochemicals analysis of plant extract

<table>
<tr><th>Test for Carbohydrates</th><th>Test for Alkaloids</th><th>Test for Tannins</th><th>Test for Proteins</th></tr>
<tr><td rowspan="2">Molisch's Test:
2-3 drops of Molisch's reagent added to small amount of analyte in test tube and mixed well. Few drops of concentrated sulphuric acid added drop-wise along walls of test tube to facilitate the formation of purple to reddish brown color.</td><td>Mayer's Test:
2-3ml filtrate, add few drops Mayer's reagent gives white ppts.</td><td rowspan="2">FeCl3 Test:
To 2-3ml of aqueous or alcoholic extract, add few drops of 5% FeCl3 solution. It will give black color precipitate.</td><td rowspan="2">Biuret's Test:
2Ml filtrate + 1 drop of 2% copper sulphate sol, add 1mL of 95% ethanol, KOH pellets. It gives a pink colored solution.</td></tr>
<tr><td>Hager's Test:
2-3ml filtrate with few drops Hager's reagent gives Yellow ppts.</td></tr>
<tr><td>Fehling's Test: Add sample to test tube and add Fehling's solution in tube. The tube must kept in water bath and make observation and record if there is any development of brick red precipitate.</td><td>Wagner's Test:
2-3ml filtrate with few drops of Wagner's reagent gives reddish brown ppts.</td><td rowspan="2">Lead acetate Test: To 2-3ml of aqueous or alcoholic extract, add few drops of lead acetate solution. It gives white precipitate.</td><td>Millon's Test:
2mL filtrate, few drops of Millon's reagent, gives a white precipitate.</td></tr>
<tr><td>Benedict Test:
Add sample in test tube and add Benedict's solution to the test tube and heat it in water bath and observe the development of brick red color.</td><td>d) Dragendroff's Test:
2-3 ml filtrate with few drops of Dragendroff's reagent gives red brick color.</td><td>Ninhydrin's Test: 2mL filtrate, add 2 drops of Ninhydrin solution (10mg ninhydrin + 200mL acetone), it gives a purple colored solution.</td></tr>
</table>

			Xanthoprotic test: Sample extract, few drops of conc. nitric acid, it gives a yellow colored solution.

Table 4: Phytochemical analysis of plant extract

RESULTS AND DISCUSSION

1. Collection of leaves and soaked in water

Fig 2: Dried leaves & soaked in water

Pulp of leaves

Fig 3: Pulp of leaves

Extract Of Leaves

Fig 4: Extract of leaves

4. Result of Agar plate formation

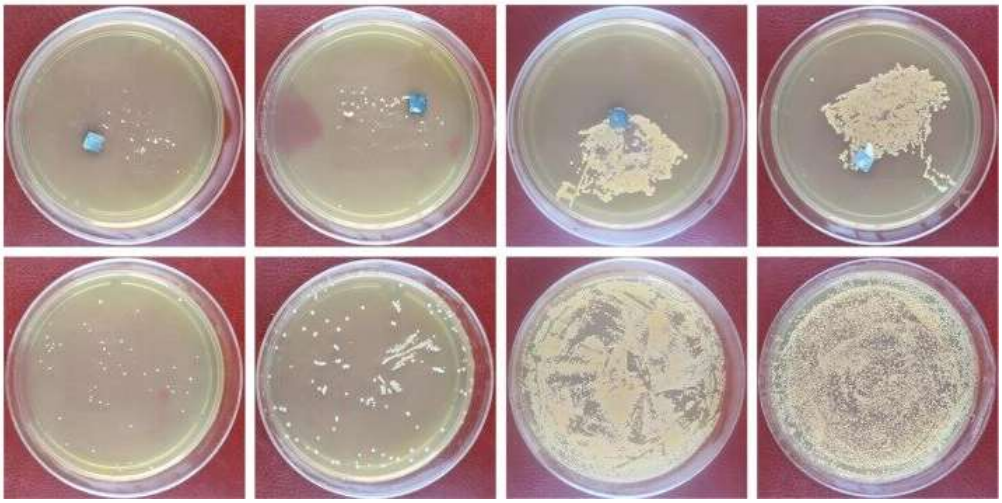

Fig.5: Figure showing the agar plates

5. Antibacterial activity of candy
1. By Cup Plate method

Fig 6: Antibacterial activity by cup plate method

2. By Serial Dilution or total plate count method
Serial dilutions:

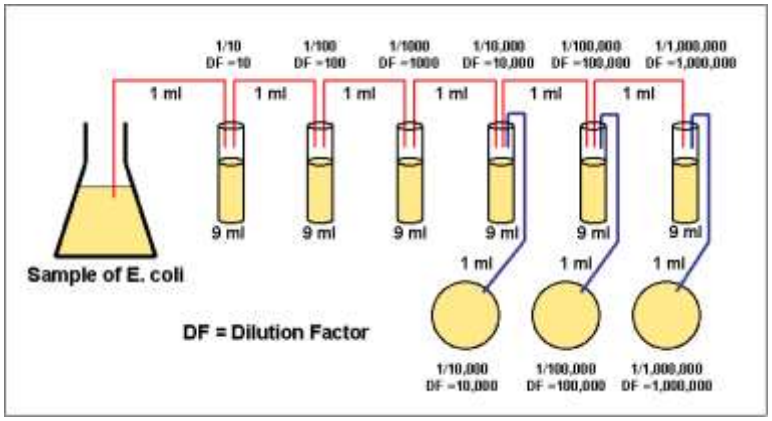

Fig 7:Antibacterial activity by Serial dilutions

Result

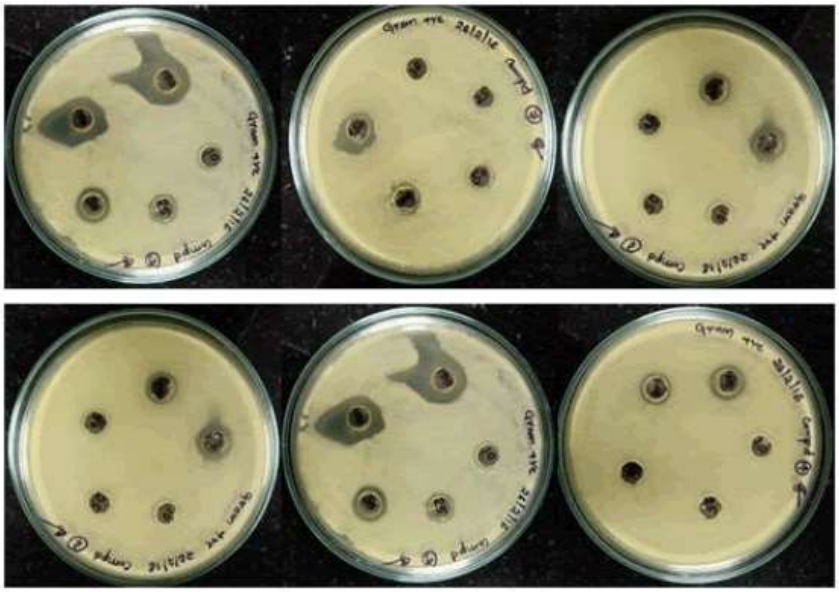

Fig 8: Positive result of antibacterial activity

Evaluation of candy

Physicochemical parameters	**Observations**
Colour	Dark brown
Odour	Aromatic
Taste	**Sweet**
pH	4.5
Ash value	2.16 g
Shelf-life study (4 weeks)	Stable

Table 5: Evaluation of candy

CONCLUSION:

Creating a herbal candy using Prickly Pear cactus holds for a unique confectionary product with potential health benefits offers a spicy flavour and anti-inflammatory properties. Prickly pear help to Diabetes Mellitus. Now-a-days there is lots of "Disease and Disorder" approaching related to nervous system. It has been utilized for more than 5,000 a long time and is one of the fundamental plants in Ayurvedic medication. In home grown medication, Exploratory considers in creature models have illustrated an inhibitory impact of Spirulina green growth on verbal carcinogenesis. The watery extricate of cinnamon contains a few bioactive compounds, such as cinnamaldehyde, cinnamic corrosive, and polyphenols, and applies anticancer and anti-inflammatory properties by modifying key apoptotic and angiogenic components. Tulsi, aloe vera have been utilized in the treatment of pre-cancerous injuries like leukoplakia, and pre-cancerous conditions like lichen planus and OSMF. Combination treatment continuously worked for OSMF and verbal lichen planus patients. There are a few ways to treat mouth (verbal) cancer, depending on the area and organize, counting: surgery to evacuate the cancer. radiation treatment, utilizing high-energy beams (such as x-rays) to annihilate cancer cells. chemotherapy with drugs that slaughter cancer cells. utilized to Ayurvedic herbs as neural tonics to improve insights and memory (move forward neurocognitive capacities). Sweet is quick and successful framework for pharmaceutical. spirulina, cinnamon, dark turmeric, tulsi, lemon and aloe vera all herbs utilized in Indian framework of medication for treating different wellbeing issues. Too gives tall level of dietary esteem. The comes about of physic-chemical assessment and soundness ponder were revealed. According to that point of view we formulate & evaluate the polyherbal candy in which main API was Prickly Pear and other ingredient as Cinnamon, Black Turmeric, Tulsi, Lemon, Aloe Vera, and Spirilina. Combining these could offer a unique herbal candy with potential advantages But the recipe and formulation need to be refined for successful development. This will contribute to a better understanding of its immunomodulatory properties and its potential as a valuable addition to healthcare practices. It also highlights the broader potential of botanicals in the development of novel therapeutics with enhanced efficacy and reduced side effects. This polyherbal candy formulation beneficial in Diabetes Mellitus and depression. Act as an appetizer for children give nutritional benefit and keep them healthy. Easy and acceptable medication.

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