INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 6.078
(Volume 6, Issue 5)
Available online at: www.ijariit.com

Development and biochemical analysis of Amla-Betel leaf extract impregnated jelly

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ABSTRACT

The objective of this research work is about developing a herbal jelly by incorporating Amla and betel leaf extract. Amla is a green colour translucent fruit which is loaded with more nutritional benefits. Amla is an excellent source of vitamin c and this vitamin c helps in building our immunity. Next is the betel leaf extract which is also enriched with more health benefits. These betel leaves are full of vitamin c,niacin and riboflavin and it has an Excellent healing properties. These betel leaf treat colds and also aids in digestion. So our idea is to develop a jelly by combining all these products. Our jelly is completely free of artificial colouring and flavouring agents. After preparation,the jelly was filled in sterilized bottles and stored under both ambient and refrigeration temperature for about 60 days and the biochemical parameters such as moisture content, TSS, pH, Titratable acidity were analysed. Under ambient temperature, moisture content decreased from 26.80% to 24.90 %and pH increased from 3.6 to 4.3 and Tss increased from 65 degree brix to 72 degree brix and Titratable acidity increased from 0.48 % to 0.67%.Under refrigeration temperature, the moisture content decreased from 26.80% to 25.83%, ph increased from 3.6 to 4.2,Tss increased from 65degree brix to 69degree brix and titratable acidity increased 0.48% to 0.54%. Sensory evaluation was also performed and the developed jelly obtained an excellent sensory score.

Keywords: *Herbal, Translucent, Immunity, Niacin, Riboflavin*

1. INTRODUCTION

Jelly is a semi-transparent, semi- solid confectionary made by cooking fruits(pulp, pieces and/or juice)with sugars, gelling agents (usually pectin) and edible(usually organic)acids and concentrating the mixture until a characteristic and suitable consistency is obtained .This is one of the oldest process to preserve fruit for consumption in the off-season(Arjun Ringwal.,2019).The objective of the study is to develop Jelly using Amla juice and betel leaf extract.Piper Betel Leaves (*Piper betel linn)* also referred to as green gold are widely consumed as a condiment in Africa and Asia(RutugandhaParanjpe et al.,2013).The deep green heart shaped leaves of betel vine are popularly known as Paan in India.There are about 100 varieties of betel vine in the world, of which about 40 are found in India and 30 in west Bengal.It belongs to the family Piperaceae.Betel leaf is traditionally known to be useful for the treatment of various diseases like bad breath,boils and abscesses,headache,ringworm,swelling of gum,abrasion,cuts and injuries(Guha.p.,2006).The betel leaf produces aromatic volatile oil contains aphenol called chavicol, which has a powerful antiseptic properties(Sripradha.,2014).Amlafruit also known as Indian gooseberry (*EmblicaofficinalisGaertn*), is acclaimed for its unique nutritional and rejuvenating properties. The fruit also forms an important constituents of nearly 300 Ayurvedic preparations of which the most popular formulations are Chyvanprash and Triphala.TheAmla fruit is loaded with more nutritional and health benefits. The green fruits are made into pickles and preserves to stimulate Appetite. The fruits are used in the treatment of diabetes.It is used medicinally for the treatment of diarrhoea. The fresh fruit is diuretic andit reduces the irritability of bladder and in retention of urine. The decotion of the leaves is used as a chemical-free bactericidal mouthwash. The juice of the fresh fruit when mixed with ghee is considered a good restorative tonic(Srivasuki K.P.,2012).

2. MATERIALS AND METHODS

2.1 Material procurement

Fresh Betel leaves, pectin, citric acid, amla fruit were purchased from the local market of Coimbatore, Tamilnadu.

2.2 Preparation of Raw material

Purchased betel leaves and amla fruit were first washed thoroughly and it was cut into small pieces and it was grinded by using electric blender and the juice was strained.

2.3 Preparation of Jelly

The strained juice was then boiled with 1.8 times of water.5%pectin,50%sugar and 1% citric acid was added to the extract while boiling. Heating was continued until it reached the desired consistency.

2.4 Cooling and Filling

The Finished Hot jelly is cooled to room temperature and it is filled in sterilized glass bottles and it was stored under both ambient and refrigeration temperature for about 60 days.

3. BIOCHEMICAL ANALYSIS

3.1 Determination of moisture content

Moisture content of the jelly was performed using the procedure described in AOAC (2005)

3.2 Determination of pH

The pH was determined by using digital pH meter.5 ml of sample was measured and the glass electrode of the pH meter was inserted into the sample and the reading was taken.

3.3 Determination of total soluble solids

Total soluble solids were measured using a hand held refractometer.Put a small quantity of the test solution (2- 3 drops are sufficient) on the fixed prism of the refractometer and immediately adjust the movable prism. Suitably illuminate the field of view. Bring the line dividing the light and dark parts of the surface in the field of view to the crossing of the threads and read the value of refractive index

3.4 Determination of Titratable acidity

Titratable acidity was determined by titration with 0.1 M Sodium hydroxide until the sample reaches pH 8.1 and expressed as g\100g of citric acid (Gurak,P.D et al 2017).

3.5 Sensory evaluation

Sensory evaluation of the jelly was perfomed using 9-hedonic scale and it was carried out by 5 untrained members.The scale ranged from extremely like to dislike extremely.The parameters evaluated were colour,flavor,texture,mouthfeel and overall acceptability.

4. RESULT AND DISCUSSION

4.1 Biochemical changes in jelly

The biochemical analysis data for amla betal leaf extract jellies were given in table 1a and 1 b and the sensory evaluation results were given in the table 2a and 2b. The jellies were stored at both ambient temperature and refrigerator temperature and parameters like moisture content, pH, total soluble solids, Titratable acidity were analysed for both samples and both was compared

Table 1a : Biochemical parameters of jelly under ambient temperature

Storage period	Moisture content(%)	pH	TSS(°Brix)	Titratable acidity(%)
0	26.80	3.6	65	0.48
20	26.05	3.9	66	0.52
40	25.60	4.1	68	0.57
60	24.90	4.3	72	0.67

Table 1b : Biochemical parameters of jelly under Refrigeration temperature

Storage period	Moisture Content(%)	pH	TSS(°Brix)	Titratable acidity(%)
0	26.80	3.6	65	0.48
20	26.68	3.7	66	0.50
40	25.90	3.9	67	0.54
60	25.83	4.2	69	0.54

4.1.1 Moisture content: The data clearly shows that moisture content of both ambient and refrigerator stored jellies reduces. The jelly stored at ambient temperature decreased from 26.80 % to 24.90%.The jelly stored at refrigerator condition shows slightest change in it from 26.80% to 25.83%. This shows that jelly stored at refrigerator conditions has good quality.

4.1.2 pH: The analysed data shows pH varies at both ambient and refrigerator conditions. The pH of ambient stored jelly is decreased.The pH of refrigerator stored jelly is also decreased but slightly.

4.1.3 Total soluble solids: The analyses shows that total soluble solids increases in both ambient and refrigerator condition. The jelly stored at ambient condition increases from 65 degree brix to 72 degree brix. The jelly stored at refrigerator condition increases from 65degree brix to 69 degree brix.This clearly shows the total soluble solids increase in both condition on storing period. The significant increase in TSS could be due to the degradation of polysaccharides during storage into soluble compounds

4.1.4 Titratable acidity: The data shows there is increase in titratable acidity in both ambient and refrigerator stored jelly. The jelly stored at ambient condition increases from 0.48% to 0.67%. The jelly stored at refrigerator condition increases from 0.48 %to 0.54%.

4.2 Sensory evaluation

Table 2.a: Sensory evaluation of jelly stored under room temperature

Storage period	Colour and appearance	Texture	Flavor	Overall Acceptability
0	8.95	8	8.4	8.5
20	8.5	7.6	7.9	8
40	7.8	7.2	7.5	7.5
60	7.5	6.9	7.1	7

Table 2.b: Sensory evaluation of jelly stored under refrigeration temperature

Storage period	Colour and appearance	Texture	Flavor	Overall Acceptability
0	8.95	8	8.4	8.5
20	8.95	7.8	8.2	8
40	8.50	7.5	8	8
60	8.34	7.4	7.8	7.5

4.2.1 Colour and appearance: The results of the sensory evaluation indicates that the colour and appearance of the jelly stored under ambient temperature received a score of about 7.5 at the 60th day of storage and the jelly stored under refrigeration temperature received a score of about 8.34 at 60th day of storage.So from the results it is clear that the jelly stored under refrigeration temperature was liked by the panel members than the jelly stored under ambient temperature.

4.2.2 Texture: The data helps us to predict the texture of the products. The score for the texture of the jelly decreases from 8 to 6.9 at ambient temperature and the score of jelly stored under refrigeration temperature decreases from 8 to 7.4.So this clears that the refrigerated samples were liked by panel members

4.2.3 Flavor: The analysis shows that score for flavor reduced during storage. The score for flavor of jelly that is stored at ambient condition reduces from 8.4 to 7.1 and the score for flavor of jelly reduced from 8.4 to 7.8 that are stored at refrigerator condition. This clearly shows that the jelly that is stored at refrigerator is at good condition.

4.2.4 Overall acceptability: The data clearly explains the overall acceptability score is decreased over storage period from 8.5 to 7 at ambient temperature and from 8.5 to 7.5 at refrigerated temperature. The temperature plays a vital role during storage. The refrigerated stored jelly shows higher acceptability than ambient stored jelly. After two months of storage the jelly are not acceptable due to undesirable biochemical changes. This undesirable changes leads to discoloration and produces off flavor (Journal of Pharmacognosy and Phytochemistry 2018; 7(4): 2648-2655).

5. CONCLUSION

People nowadays are becoming more health conscious so our aim is to develop a product loaded with more and more health benefits which is completely free of artificial coloring and flavoring agents .The jelly we developed is completely free of artificial sweeteners,colouring and flavouring agents and it has a shelf life of about 60 days. The ingredients we used like amla juice and betel leaf extract are loaded with more vitamin c compounds so it will boost the immunity and this study also confirms that even underutilized product can be converted into a value added product in less cost .

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