iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** V **Month of publication:** May 2024

DOI: https://doi.org/10.22214/ijraset.2024.62431

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue V May 2024- Available at www.ijraset.com

Development of Pomegranate Aloe Vera Juice: Pomalo

Sandesh Ainapure[1], Suraj Bawane[2], Vishal Patil[3], Harshika Raipure[4], Divya Korde[5], Prashant Watkar[6]
[1, 2, 3, 4]*Department of Food Technology, Ballarpur Institute of Technology, India)*
[5]*Assistant Professor, Department of Food Technology, Ballarpur institute of Technology, India*
[6]*Head of the Department, Department of Food Technology, Ballarpur Institute of Technology, India*

Abstract: ***Pomegranate juice is a good source of polyphenols and has good antioxidant potential, whereas, the studies on pomegranate juice have shown that it possesses antiatherogenic, antioxidant, antihypertensive, and anti-inflammatory properties. The literature also reported the major decrease in atherosclerotic lesion region in immune-deficient mice and intima media thickness in cardiac patients on medications, due to consumption of pomegranate juice. Whereas, in patients with type 2 diabetes, a reduction in lipid peroxidation was observed and in hypertensive patients, a systolic blood pressure and serum angiotensin converting enzyme activity was determined. Therefore, the study showed the potential cardioprotective advantages of pomegranate juice and suggests the inclusion of this juice in a diet for a healthy living. the composition of aloe vera and its role in development of functional foods. The colorless and watery gel-like consistency are the characteristics of aloe vera gel that makes it better option for blend beverages. The functional characteristics render aloe vera with broad range of application in the pharmaceutical, cosmetics and food sectors. The presence of antioxidants and hormones (auxins and gibberellins) in aloe vera, are responsible for preventing chronic diseases and wound healing properties by inducing the cell propagation, thus providing anti-inflammatory action, respectively. Saponins and salicylic acid present in it, provides antibacterial and antiseptic activity. The literature also reveals that emidine and aloin are the compounds present in aloe that act as antiviral, antibacterial and analgesic agent. Whereas, it also contains vitamins E, C and minerals such as, copper, selenium and zinc, along with enzyme brady kinase, fatty acids and sugar, essential and non-essential amino acids, 12 anthraquinones phenolic compounds. The most abundant monosaccharide and polysaccharides found in aloe vera are Mannose-6-phosphate, and glucomannans, respectively.***

I. INTRODUCTION

The major supplement included in diet of people from time being are the fruits, as fruits are considered significant in body functioning. Fruits are rich in essential elements, such as water, vitamins, minerals (Ca, Mg, Zn, Fe, K etc.), fibers and other organic components, which renders fruit, with nutritional quality and importance. The bioactive components and antioxidants are usually found in significant amounts in fruits, namely apple, berries, cherries, grapes, pomegranate, citrus fruits The fruit-based foods like juices are considered a main source of nutrition and hence consumed globally, in fresh, packaged, ready to serve forms. Moreover, the juice acquired from citrus fruits contain aromatic volatiles, such as alcohols, esters, aldehydes, ketones and non-volatile compounds such as, sugars and organic compounds.

The major component of fruit juice is water, followed by carbohydrate content (sucrose, fructose, glucose, and sorbitol), which is found in 0.44 kcal/mL to 0.64 kcal/mL. This can be compared to the human milk that contain 7 g percent of carbohydrate content. The functional foods are developed and standardized from fruits due to its beneficial nutraceutical attributes, along with rising research and studies that help understand functional and health promoting components of fruits. Fruits and fruit juices are excellent source of phytonutrients or phytochemicals, that help in preventing diseases, builds immunity and protects intra-cellular and extra-cellular oxidative damages caused due to free radicals.

The phytonutrients present in fruits and vegetables are responsible for lowering of the risk of Cardio Vascular Diseases (CVDs). The polyphenols such as, ellagitannins, isothiocyanates, flavonoids, resveratrol, organosulfur compounds and carotenoids are some of the phytochemicals found in fruits.

Moreover, several studies performed in both humans and animals, and epidemiological studies, confirmed the rise of immunity and reduction in cardiovascular, cerebrovascular diseases and cancer mortality, respectively associated to the consumption of fruits and vegetables or juices containing high phenolic content. The research on phenolic components possessing antioxidant properties has been done to discover its various dietary sources.

©IJRASET: All Rights are Reserved

II. MATERIALS AND METHODOLOGY

This chapter contains all the materials and methodology followed to prepare and test the product. The test method for testing raw materials and product are also discussed. New product development work was carried out at the Department of Food Technology, Ballarpur Institute of Technology, Bamni, Ballarpur.

Table 1: Material Required for New Product Development

Material Required	Collection of Raw Material
Pomegranate	Local market in hadaspur, pune
Aloe vera leaves	Local market in hadaspur, pune
Stevia leaf powder	Medical store
LABINDIA UV 3000 Spectrophotometer.	Processing Lab
Portable Refractometer	Processing Lab
Contech Digital Weighing Balance	Processing Lab
Incubator	Processing Lab
Autoclave	Processing Lab
NEYA 16R Centrifuge.	Processing Lab
Laminar Air Flow	Processing Lab

A. Packaging Material

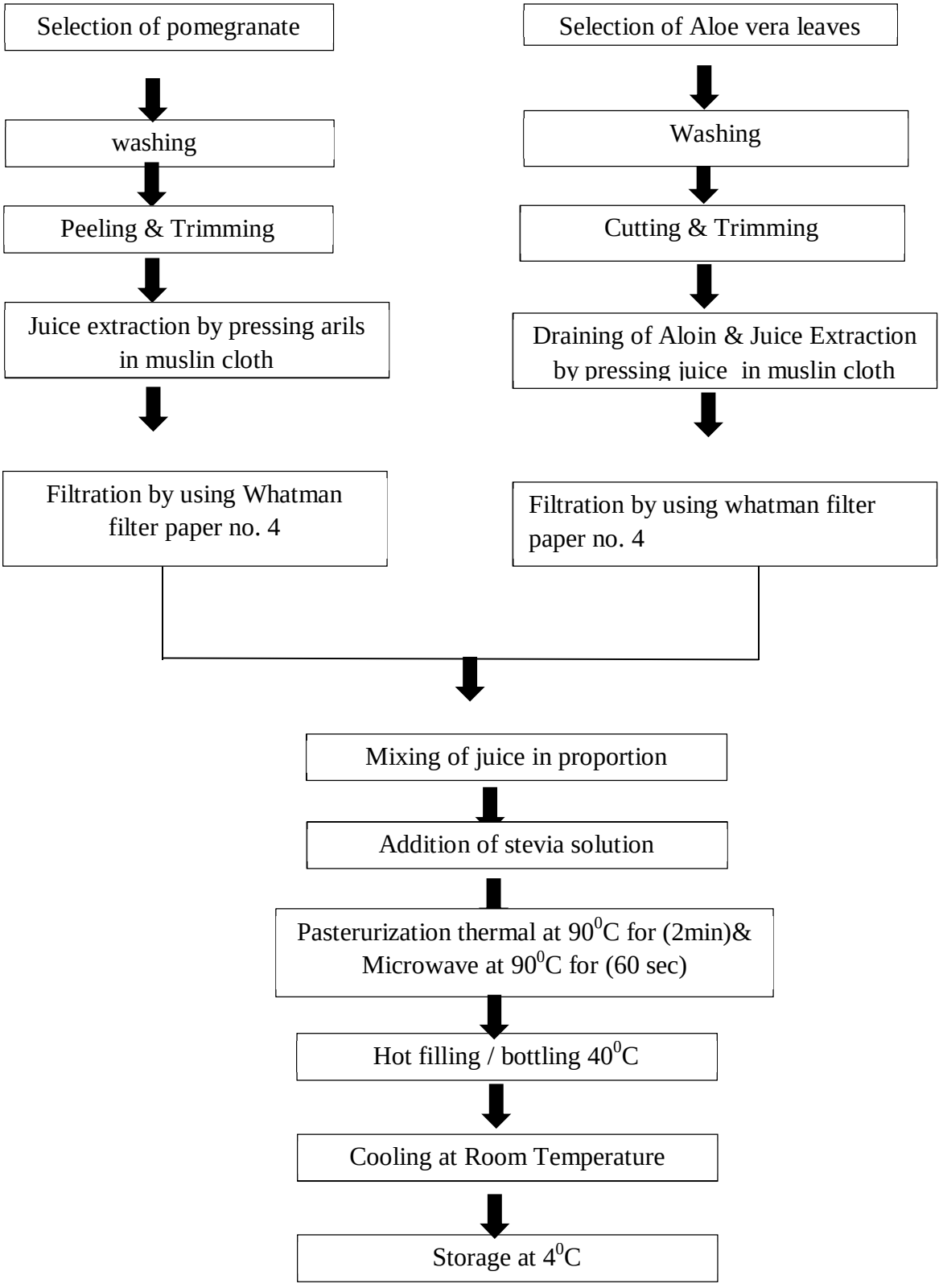
Transparent bottles and PET (polyethylene terephthalate) packaging are popular choices for juice due to their lightweight, durable, and recyclable properties. These materials provide excellent product visibility, allowing consumers to see the juice's color and clarity, which can enhance its appeal. PET packaging also offers a strong barrier against oxygen and carbon dioxide, helping to preserve the juice's freshness and flavor. Additionally, the versatility in design and cost-effectiveness of PET makes it a preferred option for both manufacturers and consumers in the beverage industry.



Fig. PET plastic bottle Packaging

©IJRASET: All Rights are Reserved

III. METHODOLOGY



IV. PROXIMATE ANALYSIS

A. *Determination of TSS, Acidity and PH of pomegranate aloe vera juice samples*

Total Soluble Solids (TSS) were measured using an (Atago RX-1000) digital refractometer for all three juice samples, pomegranate, aloe vera, and blended juice, and the findings were expressed in Brix. (AOAC 2005). The acidity of juice samples was also analyzed using 0.1N NaOH using a few drops of 1% phenolphthalein indicator (AOAC 2000). An electronic pH meter (model Lab India) was used to determine the pH (Jan et al., 2016). All of the readings were taken in triplicate, and the average of the three was calculated, along with the standard deviation.

%TA= 1 Liter x Normality of alkali x volume made up x Equipment weight of acid x 100

Volume of samples taken forestimation x Wt. of volume of sample taken x 100

B. *Determination of Antioxidant Activity (DPPH) of Pomegranate Aloe vera Mix Juice Samples.*

The 1,1-diphenyl-1-picrylhydrazyl (DPPH) test quantifies the capacity of antioxidants to scavenge the stable DPPH radical. The juice sample's free radical scavenging activity was mostly determined as stated by Siddhuraju et al., with a few minor adjustments (2002). A (100 L) of the juice sample was rapidly combined with 3.9 mL DPPH in 95 percent methanol and agitated. After a 30-minute incubation period, the absorbance of the sample was measured at 520 nm using a UV-Visible spectrophotometer (LAB INDIA, Mumbai). The % inhibition of DPPH was calculated using the method below.:

$$\%\text{inhibition} = \frac{AO - A}{AO} \times 100$$

Where A0 is the sample's initial absorbance and A is the sample's final absorbance. This absorbance was measured at 520 nm, with (95%) methanol serving as the blank.

V. MICROBIAL ANALYSIS OF POMEGRANATE ALOE VERA MIX JUICE SAMPLES

A. *Determination of Total Plate Count (TPC)*

The nutrient agar media was used to calculate the bacterial count. To measure the microbiological load during pasteurization and during storage, in addition to every 7 days, samples of 80:20 pomegranate and aloe vera juice were employed. A greater dilution was employed to count the number of bacteria in mixed juice samples after the sample of prepared juice was diluted to 10-4 in sterile saline solution. On sterile plates of nutrient agar, triplicates of 0.1 ml of a highly diluted sample were inoculation. following incubation (37 oC at 24 hrs.). After incubation, colonies were counted using a colony counter, and the average number of colonies was recorded. The number of colonies CFU/ml of the original sample were then calculated using the (Digital Colony Counter-362) colony counter. used to count colonies, the average number of colonies was noted, and the number of colonies.

CFU/ml of the original sample were computed using the method below (Aneja K. R., 2007).

$Totalbacterialcount\ (cfu/ml) = numberofcolonies \times dilutionfactor.$

VI. RESULT AND DISCUSSION

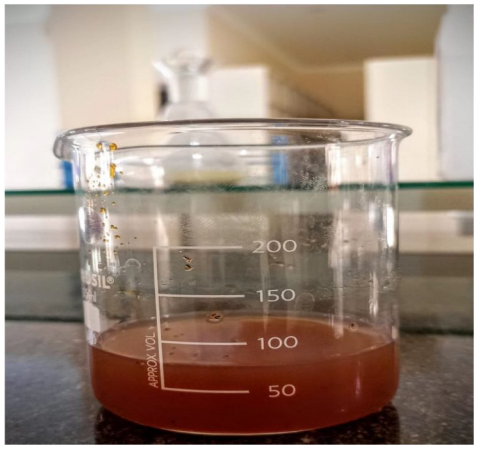


Fig. Aloe vera and pomegranate juice “pomalo”

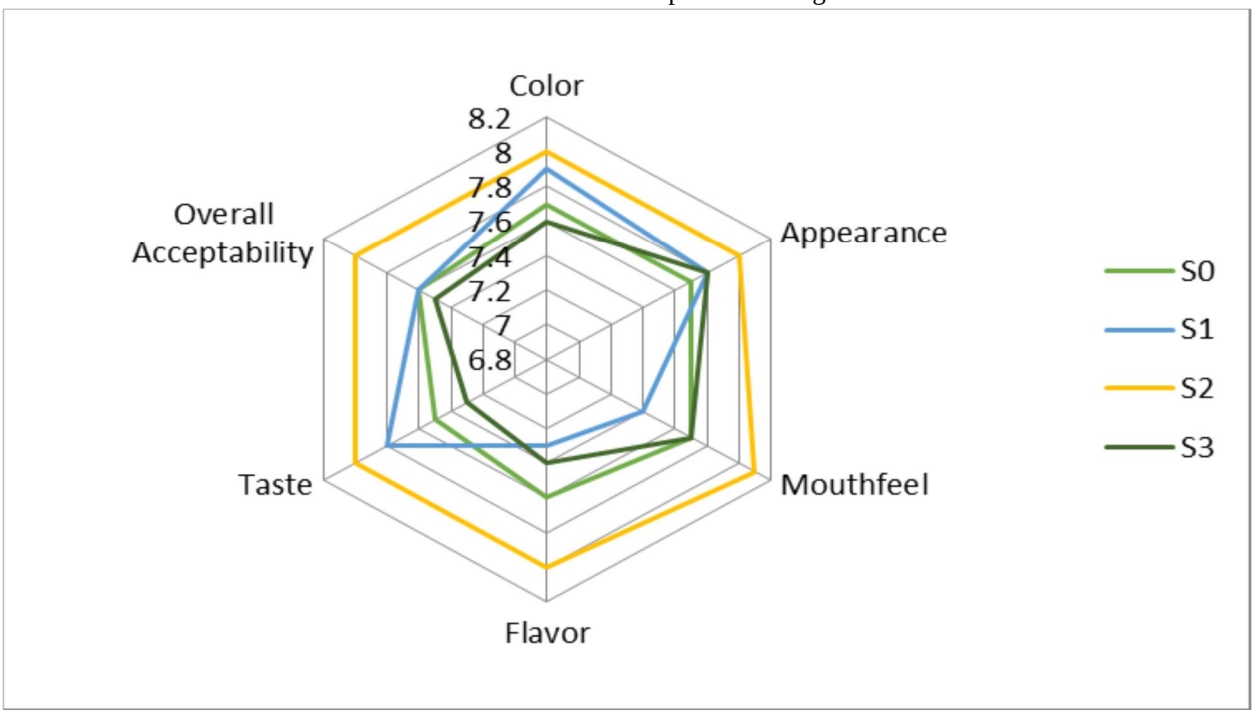
B. Sensory Evaluation Of Pomegranate Aloe Vera Mix Juice

All three formulations of pomegranate aloe vera mix juice with addition of stevia were prepared and evaluated for sensory characteristics such as color, appearance, mouthfeel, flavor and overall acceptability, by a semi-trained panel, using a 9-point hedonic scale. The data acquired from the sensory evaluation of S0, S1, S2 and S3 formulations, revealed that formulation S2 obtained a maximum score (overall acceptability) of 8, with scores for color (8), appearance (8), mouthfeel (8.1), flavor (8), taste (8) overall acceptability as shown in table 6 Thus, formulation S2 was selected for further analysis and study.

Table 2. Sensory evaluation of pomegranate aloe vera mix juice

Sample	Colour	Appearance	Mouthfeel	Flavour	Taste	Overall
S0	7.7	7.7	7.7	7.6	7.5	7.6
S1	7.9	7.8	7.4	7.3	7.8	7.6
S2	8	8	8.1	8	8	8
S3	7.6	7.8	7.7	7.7	7.4	7.5

*Values are mean of triplicate readings



A. Diagram Of Sensory Properties Of Four Pomegranate Aloe Vera Mix Juice Formulations

Were,

S0 = Pomegranate: Aloe vera (80:20), S1 = Pomegranate: Aloe vera (80:20:1.5),

S2 = Pomegranate: Aloe vera (80:20:2), S3 = Pomegranate: Aloe vera (80:20:2.5)

B. Analysis of physicochemical properties of pomegranate aloe vera mix juice

The physicochemical attributes of the developed and standardized formulation were determined and recorded in table 7. The color of developed pomegranate aloe vera mix juice was found to be reddish, whereas the pH and TSS was estimated to be 3.9±0.0 and 13.2± 0.0, respectively. The acidity of developed juice was found to be 3.3±0.68 and phenolic content was estimated as 1.36± 0.1mg/ml GAE. The antioxidant content was determined by DPPH and FRAP assay and the results showed the content to be 84.8± 0.1% inhibition and 42.6± 0.76mg/ml AAE, respectively.

Table 3 . Physicochemical properties of pomegranate aloe vera mix juice at 0 days

Parameters	Values
Color	Red
pH	3.9± 0.0
TSS	13.2± 0.0
Acidity	3.3±0.68
Antioxidant (DPPH) % Inhibition	88.8± 0.1
Antioxidant (FRAP) (mg/ml AAE)	42.6± 0.76
Phenolic Content (mg/ml GAE)	1.36± 0.1

C. Cost Analysis

Table 4.

NAME OF MATERIAL	QUALITY	RATE RS/KG
Pomegranate	50 gram	10 Rs
Aloevera leaves	15 gram	5 Rs
Steavia powder	35 gram	25 Rs
Total	100 grams	40 Rs

D. Shelf-Life Study

According to our research by doing sensory analysis and microbial analysis we observe that the pomegranate Aloe Vera juice has a shelf life of **3 to 4** months at room temperature after **4** months we observe some changes in taste, texture, aroma and flavor so we observe that it's better to use before **4** months.

VII. CONCLUSION

Consumer demand base food product formulation trends always motivating the researchers to formulate the food product with distinct sensory properties and health attributes. The present investigation entitled date bar by using pomegranates and aloe vera was carried out in the department of food technology, Ballarpur institute of technology, Dr. Babasaheb Ambedkar Technologies University, Lonere, Maharashtra India, during the academic year 2022-23. The experiment was conducted to develop **POMALO.** with different composition. It can be concluded that POMOGRANATES & ALOE VERA can be incorporated in suitable proportion in the POMALO which has many health benefits. From the above study. also covers some of the risks associated with use.

It contains healthful plant compounds.

It has antioxidant and antibacterial properties.

It accelerates wound healing.

It reduces dental plaque.

It helps treat canker sores.

It reduces constipation.

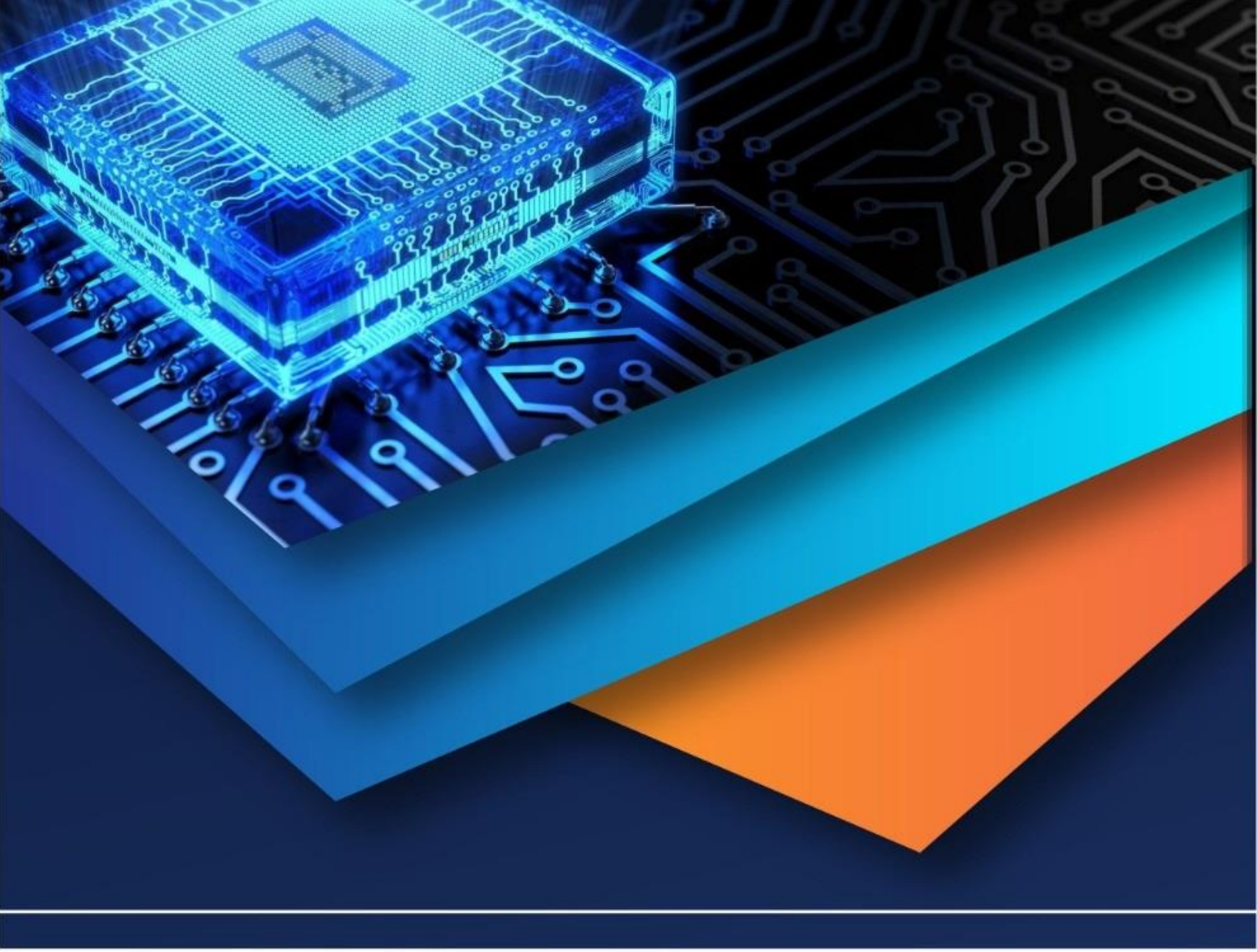
It may improve skin and prevent wrinkles.

Regular consumption of pomegranate & aloe vera helps in improving gut health, digestion, and keep bowel diseases at bay. 3. "Adding it in your daily diet will also assist in improvising and regulating the flow of blood,"

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

REFERENCES

[1] Ağçam, E., Akyıldız, A., & Dündar, B. (2018). Thermal Pasteurization and Microbial Inactivation of Fruit Juices. Fruit Juices: 309-339
[2] Ahlawat, K. S., &Khatkar, B. S. (2011). Processing, food applications and safety of aloe vera products: a review. Journal of Food Science and Technology, 48(5), 525–533.
[3] Ahsen, R. and T. Baysal (2011). Yield and quality effects of electroplasmolysis and microwave applications on carrot juice production and storage. J. Food Sci.76,4.
[4] Akhtar S., Ali J., Bilal J. and Khan F. (2013). Studies on the preparation and storage stability of pomegranate juice based drink. Middle East Journal of Scientific Research. 16. 191195.
[5] Ames BN. (1998) Micronutrients prevent cancer and delay aging. Toxicol Lett.: 102– 103:5–18
[6] AOAC Official method (2008) Applicable for the determination of Specific Gravity beer, Wort and non-pulpy fruit juice beverages
[7] AOAC Official Methods of Analysis. The Association of Official Analytical Chemists. 17th Ed.Arlington, Virginia, USA, 2005
[8] Banjare K, Kumar M, Nanda HC, Karthikeyan S, Lakpale R (2014) Advances in herbal prospects processing and food products researches on Aloe Vera: a review. Int J Food Nutr Sci 3(3):28–34
[9] Barboni T, Luro F, Chiaramonti N, Desjobert JM, Muselli A, et al. (2009) Volatile composition of hybrids citrus juices by headspace solid-phase micro extraction/ gas chromatography/mass spectrometry. Food Chem 116: 382-390.
[10] Barch DH, Rundhaugen LM, Stoner GD, Pillay NS, Rosche WA. (1996) Structure- function relationships of the dietary anticarcinogen ellagic acid. Carcinogenesis. 17: 265-269
[11] Basu, A., &Penugonda, K. (2009). Pomegranate juice: A heart-healthy fruit juice. Nutrition Reviews, 67(1), 49-56.
[12] Br J Gen Pract (49) 823-828.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)