

Elixir Bars: Crafting Immunity with *Chyawanprash*

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Abstract

Ayurveda is a holistic science. Its aim isn't solely on the cure of diseases however additionally on its hindrance. It emphasises chiefly on healthy life of an individual. This title conveys the idea of *Chyawanprash* Bar being a potent and crafted elixir for enhancing immunity. It combines elements of traditional Ayurveda with the modern convenience of a nutrition bar. *Chyawanprash* is one amongst well-known *Rasayana*. Contents of *Chyawanprash bar* shows a widespread range of actions on respiratory diseases as well as on boosting immunity. *Chyawanprash* bar is developed by processing around 50 healthful medicinal herbs and their extracts, including the major ingredient, Aonla (Indian gooseberry), which is the world's richest supply of vitamin C. *Chyawanprash* bar production entails making a decoction of herbs, then drying the extract, mixing it with honey, and adding aromatic herb powders (specifically clove, cardamom, and cinnamon) as a standard before drying.

Keywords: Aonla, Bar, *Chyawanprash*, Drying

Introduction

The typical name of Chyawanprash originates from the legend of Chyawan Rishi, who was a forest sage. Various ancient sacred treatises, such as the Mahabharata, the Puranas, etc., describe how the twin Ashwini Kumar brothers (the royal physicians to the Gods during the Vedic era) invented this polyherbal preparation to make the sage Chyawan Rishi younger and improve his vitality and strength. The formulation was prepared at his hermitage at Dhosi Hill near

the Narnaul area, in the state of Haryana, India; drawing its name from the ancient sage, the formula was called "Chyawanprash". He followed strict practices to become enlightened, and this had made him weak, emaciated, and aged. To regain his youthfulness, vitality, and strength, he used Chyawanprash (Panda, 2002). The foremost historically recorded recipe for Chyawanprash is reported in the Charaka Samhita, the ancient Ayurvedic classic, where it is appreciated as being superior to all other herbal rejuvenative tonics. Chyawanprash is a potent antioxidant paste, prepared through the synergistic blending of around 50 herbs and spices. Chyawanprash falls, by virtue of its consistency and form of dosage, under the category of Awaleha (electuaries/herbal jams), a group of Ayurvedic formulations (Anonymous, 2003). Typically, Chyawanprash includes four classes of herbal drugs: The Dashmula class (ten roots); the Chaturjata class (four aromatic plants); Ashtavarga (threatened medicinal herbs from the Northwest Himalayas, which are not commercially available in the modern era) (Balakrishna et. al., 2013)

The immune system is one of the most complicated physiological systems, consisting of a network of cells, chemicals, tissues, and organs that work together to protect the body. The immune system consists mostly of white blood cells, antibodies, the complement system, the lymphatic system, the spleen, the thymus, and bone marrow. These are the immune system components that actively combat

infection. The immune system uses memory cells, which are specific types of white blood cells (B- and T-lymphocytes) that store a history of every germ the body has ever beaten. This implies that if the bacterium re-enters the body, it will be rapidly recognized and destroyed so that it cannot grow and cause illness. Our bodies would be vulnerable to invasion by bacteria, viruses, parasites, and other pathogens if we didn't have an immune system. As we navigate a sea of viruses and pathogens, our immune system keeps us safe. India is endowed with a wealth of ayurvedic spices and herbs, of which Chyawanprash is a wonderful blend. *Chyawanprash* is a complex blend of over thirty spicy spices, mostly in modest proportions, with a significant amount of aonla in a honey base. One anti-aging supplement that is only herbal in nature and has been shown to increase immunity is *chyawanprash*. Acharya Charaka was the first to mention this herbal medicine (Bhikshu, 1978). All ingredients of *Chyawanprash* are rich source of phyto-nutrients and antioxidants and it improves digestion and respiration and is a good source of metabolic energy. It is useful in cough and cold. It aids in the correct nourishing of young people as well as the rejuvenation of the elderly. It works well for treating gout, chest infections, urinary tract infections, and throat infections. It enhances intelligence (Medha), memory, luster of the skin, age, strength of the senses, immunity, sexual drive, and appetite. It is an effective natural anti-aging product.

Effects of *Chyawanprash* on different systems (Sharma *et al.*, 2019)

1) *Effects on digestion system*: Hyperacidity, flatulence, and dyspepsia can be treated using *chyawanprash's* components, which also serve to ease nausea and aid in digestion. Aonla and cinnamon are two such substances.

2) *Effects on brain and heart*: In addition to promoting intelligence and memory and

nourishing brain cells, *chyawanprash* also calms the nervous system and relieves stress. As a matter of fact, aonla is an excellent cardiac stimulant that promotes the heart's normal activity.

3) *Effects on respiratory system*: By promoting metabolism and preserving moisture balance, *chyawanprash* aids in the proper operation of the respiratory system. It also helps to avoid colds and coughs and lessens asthmatic symptoms.

4) *Effects on Hair, skin, bones and teeth*: In addition to promoting hair development and preventing skin infections, *chyawanprash* also aids in the absorption of calcium, which strengthens teeth and bones.

Chyawanprash as such is very sticky to consume so people try to avoid due to its odd mouth feel. People eat it as an ayurvedic medicine and not as a need of nutrition. So, if *Chyawanprash* ingredients are incorporated in aonla pulp and if bar is made out of it, then it will be easier to consume, just people need to open a wrap and eat it. This could be one kind of value addition to aonla fruits and even the bars can be made available throughout the year and can be consumed by all kind of age groups.

Material and Methods

Experimental set up was made to standardize the procedure for *Chyawanprash* bar. Aonla plays as a major ingredient in the formulation of *Chyawanprash* bar, *Piper Longum*, *Tinospora Cordifoila*, *Elletaria Caramomum*, *Asparagus Racemosus*, *Tribulus Terrestris*, *Cyperus Rotundus*, *Pistacia Integarrima*, *Mesua Ferrea*, *Cinnamoum Zeylanicum*, *Myristica Fragrans*, *Zingiber Officinale*, *Leptadenia Reticulate*, *Papaver Somniferum*, *Chlorophytum Borivillianum*, *Plumbago Zeylanica*, Badbij, Vasankpur, Malpatra these ingredients were used in equal proportions and saffron, ghee, sugar, aonla, honey and raisins were used in their original fixed concentrations (Kikani *et al.*, 2008).

Herbal ingredients were procured from the local market and processed into a fine powder using an electric grinder. The resulting powder was sieved through a 425 μ mesh (Geologists Syndicate, Kolkatta) to achieve a finer consistency. Pectin was incorporated into the chyawanprash formulation at concentrations of 0.0%, 0.5%, and 1.0%. Subsequently, the mixture underwent tray drying at various thickness levels (4 mm, 6 mm, and 8 mm) and temperatures (60 °C, 70 °C, and 80 °C).

The Chyawanprash bar was crafted using the process depicted in Fig 1. To initiate the preparation, ghee (1.88%) was heated in a frying pan. Aonla pulp (37%), raisins (1.5%), and sugar (45%) were sequentially added and cooked until the product achieved thorough cooking. Subsequently, herbal ingredients (5%), saffron (0.018%), and pectin

(0.0%/0.5%/1.0%) were introduced into the mixture, and the cooking process continued until the mixture was ready for sheeting or the Total Soluble Solids (TSS) reached 80 °Brix. Pectin, initially mixed with ground sugar at a ratio of 1:10, was dissolved in hot water. Saffron was added to hot water for color infusion into the mixture. After cooking, the product was cooled, and honey (8.9%) was incorporated. The consistency of the product was carefully maintained to facilitate easy sheeting without becoming sticky. Later, sheeting of the product was carried out in the moulds of different thickness (4 mm, 6 mm and 8 mm) and then it was placed in SS trays after smearing it with glycerol. These trays were dried in tray drier at different temperatures (60 °C, 70 °C, and 80 °C) till the final moisture content in the product remained 17±0.5 % (w.b.).

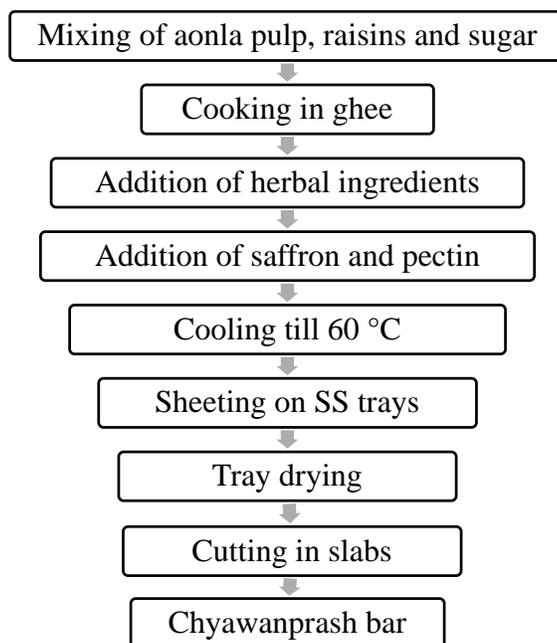


Fig 1: Processing of chyawanprash bar

Later chemical characteristics of aonla and chyawanprash bar were determined along with total viable count study. All the results were calculated using standard methods. Moisture was measured using hot air oven method, Protein by kjeldhal, fat content by

soxhlet, tannin, ascorbic acid and total viable count as mentioned in Ranganna (1997). TSS was measured using ATAGO refractometer and pH was measured using pH meter.

RESULT AND DISCUSSION

Given that aonla served as the primary ingredient, particular attention was directed towards preserving its ascorbic acid content in the final product (Athawale *et.al.*, 2017). Moisture content to be 82 %, ash content 3 %, ascorbic acid was found between 148- 152 mg/ 100g, fat content was 0.3 %, protein content was 0.12 %, TSS was

8 °Brix, acidity was 1.71 %, fibre content was 8 %, pectin content was 0.8 %, tannin content was 0.089 %, pH obtained was 3.1, reducing, nonreducing and total sugars obtained were 3.0 %, 0.2 % and 3.57 % respectively. The chemical characteristics can be found in Table 1.

Table 1: Chemical characteristics of aonla

Characteristics	Range
Moisture content	82± 0.5 %
Ash content	3 ± 0.8%
Ascorbic acid	140 ± 0.52 mg/100g
Fat content	0.3± 0.5 %
Protein	0.12 ± 0.2%
Reducing sugars	3.0 ± 0.6 %
Non- reducing sugars	0.2 ± 0.7 %
Total sugars	3.57± 0.2 %
TSS	8 °Brix
Fibre content	8 ± 0.5 %
pH	3.1 ± 0.2
Acidity	1.71 ± 0.2%
Tannin content	0.089 ± 0.7%
Pectin	0.8 ± 0.5 %

Effect of temperature and thickness of sheet on ascorbic acid

The ascorbic acid content during tray drying was influenced by the thickness of the sheet, drying temperature, and pectin concentration. The maximum ascorbic acid content observed was 89.41 mg/100 g at a drying temperature of 60 °C and a sheet thickness of 4 mm with 0.5% pectin concentration. Conversely, the minimum ascorbic acid content was 75.83 mg/100 g, recorded at 80 °C with an 8 mm sheet thickness and 0.5% pectin

concentration. While using 1.0% pectin concentration, the maximum ascorbic acid content was 84.50 mg/100 g, achieved at 60 °C and a 4 mm sheet thickness. The minimum value under these conditions was 72.18 mg/100 g, found at 80 °C and an 8 mm sheet thickness. Overall, a decreasing trend in ascorbic acid content was observed with increasing sheet thickness and drying temperature across all pectin concentrations. This trend was consistent with the results observed for both 0.5% and 1.0% pectin levels.

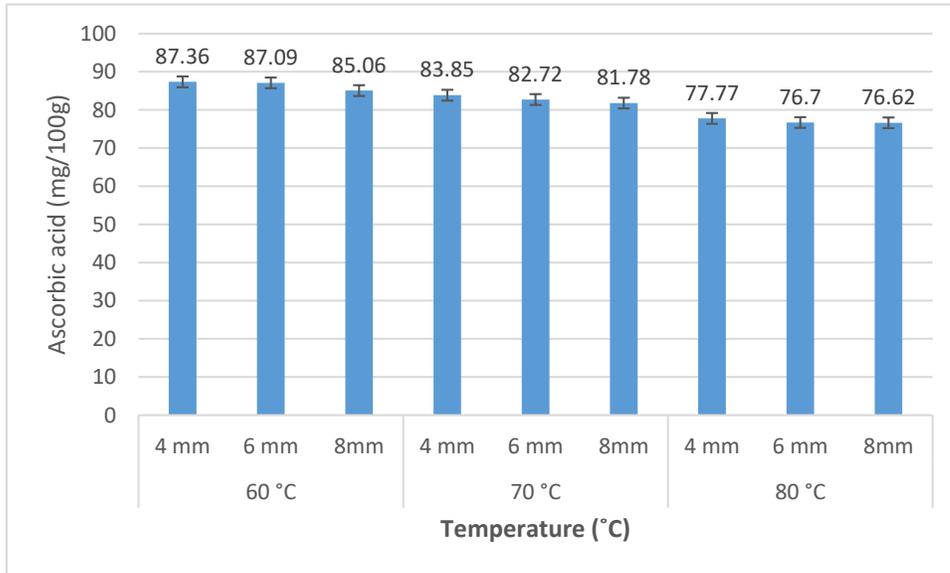


Fig 2: Effect of temperature and thickness on ascorbic acid at 0.0 % pectin level

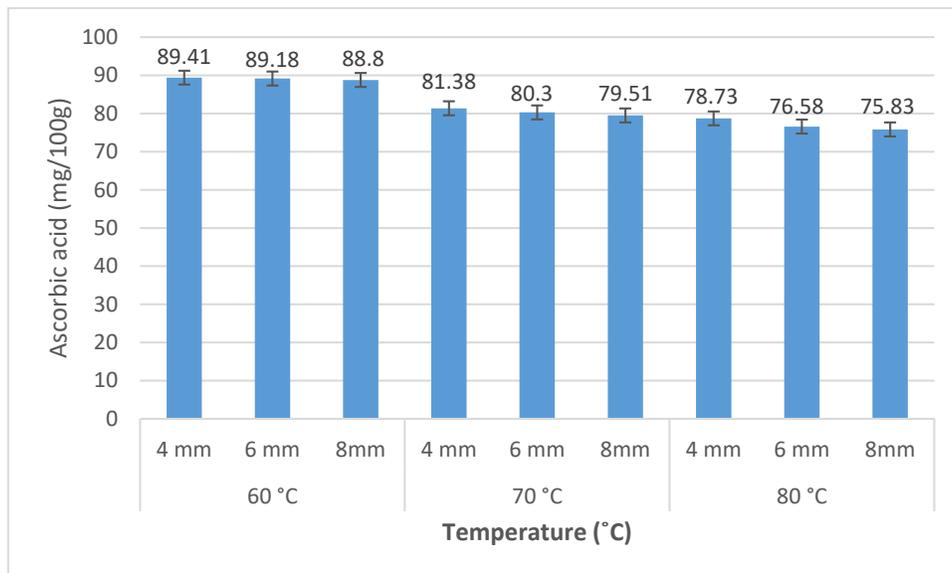


Fig 3: Effect of temperature and thickness on ascorbic acid at 0.5 % pectin level

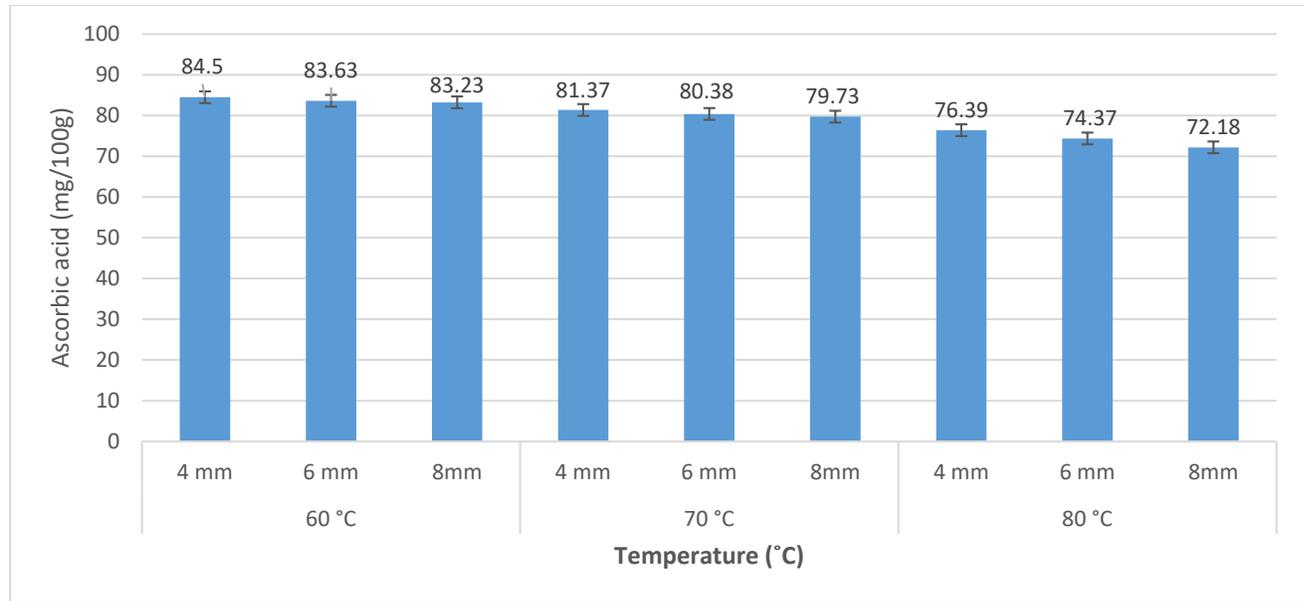


Fig 4: Effect of temperature and thickness on ascorbic acid at 1.0 % pectin level

Total effect of individual parameter on ascorbic acid was calculated using the sequential sum of squares during tray drying as given in Table 2. The factors of temperature, pectin concentration, sheet thickness, and the interaction between pectin concentration and temperature significantly affected ascorbic acid content, as indicated by their F-values (F_{CAL}) exceeding the critical F-value (F_{TAB}) at the 5% level of significance. In contrast, the

interactions between pectin concentration and sheet thickness, sheet thickness and temperature, and temperature, pectin concentration, and sheet thickness did not have a statistically significant effect on ascorbic acid content at the 5% level of significance. These findings underscore the importance of temperature, pectin concentration, and sheet thickness as individual factors, while certain interactions between these parameters may not significantly impact ascorbic acid preservation.

Table 2 : ANOVA for retention of ascorbic acid during tray drying

Source	D.F.	S.S.	M.S.	F _{CAL}	F _{TAB}	S.E.M	CD	Test
Temperature (T)	2	962.96	481.48	368.39	3.35	0.274	0.782	*
Pectin (P)	2	82.262	41.131	31.47	3.35	0.274	0.782	*
T*P	4	54.990	13.748	10.52	2.73	0.466	1.354	*
Thickness (H)	2	36.053	18.027	13.79	3.35	0.274	0.782	*
T*H	4	3.592	0.898	0.69	2.73	0.466	NS	NS
P*H	4	0.873	0.218	0.17	2.73	0.466	NS	NS
T*P*H	8	6.680	0.835	0.64	2.30	0.808	NS	NS
Error	27	35.289	1.307					
CV%	1.406							

* Significant at 5 % level of significance

To maximize the ascorbic acid content in the bar, it was recommended to dry

the sheets at 60 °C with a reduced thickness (4mm). Increased drying temperatures lead to

greater degradation of ascorbic acid due to prolonged exposure to higher temperatures. Additionally, thicker sheets require extended drying times to reach the final moisture content of 17% (w.b.), resulting in prolonged exposure to the drying temperature (60/70/80 °C) and subsequent ascorbic acid degradation. Therefore, both lower drying temperatures and reduced sheet thickness are crucial for preserving higher levels of ascorbic acid in the final product. Hence the standardized *chyawanprash* bar was

developed at drying temperature 60 °C having sheet thickness 4 mm made from 0.5 % pectin concentration. The drying time required was 11.30 h to achieve the desired moisture content of 17±0.5 % (w.b.) in the bar. Each *chyawanprash* bar was evaluated for comprehensive evaluation of moisture content, ascorbic acid, TSS, acidity, pH, reducing sugars, non-reducing sugars, total sugars, and ash content. The obtained results are presented in Table 3.

Table 3 Chemical characteristics of *Chyawanprash* bar dried at 60 °C

Properties	Tray drier								
	Thickness (4mm)			Thickness (6mm)			Thickness (8mm)		
	Pectin (0.0%)	Pectin (0.5%)	Pectin (1.0%)	Pectin (0.0%)	Pectin (0.5%)	Pectin (1.0%)	Pectin (0.0%)	Pectin (0.5%)	Pectin (1.0%)
Moisture content (%)	17.02	17.38	17.48	17.38	17.46	17.55	17.58	17.41	17.59
Ascorbic acid (mg/100g)	87.36	89.41	84.50	87.09	89.18	83.63	85.06	88.80	83.23
TSS(°Brix)	81.20	81.50	81.90	82.00	82.00	82.00	83.20	82.50	82.00
Acidity (%)	0.97	0.97	0.96	0.97	0.97	0.94	0.92	0.92	0.92
pH	3.21	3.42	3.57	3.53	3.63	3.54	3.67	3.76	3.56
Reducing sugars (%)	23.68	22.35	23.47	23.47	23.98	25.98	25.65	21.77	22.77
Non-reducing sugars (%)	31.55	29.88	34.76	35.91	28.12	32.19	33.48	35.41	35.33
Total sugars (%)	55.23	52.23	58.23	59.38	52.10	58.17	59.13	57.18	58.10
Ash content (%)	1.57	1.14	1.31	1.34	1.34	1.35	1.14	1.31	1.36

Table 4: Chemical characteristics of *Chyawanprash* bar dried at 70 °C

Properties	Tray drier								
	Thickness (4mm)			Thickness (6mm)			Thickness (8mm)		
	Pectin (0.0%)	Pectin (0.5%)	Pectin (1.0%)	Pectin (0.0%)	Pectin (0.5%)	Pectin (1.0%)	Pectin (0.0%)	Pectin (0.5%)	Pectin (1.0%)
Moisture (%)	17.69	17.65	17.01	17.53	17.27	17.44	17.29	17.24	17.19
Ascorbic acid (mg/100g)	83.85	81.38	81.37	82.72	80.30	80.38	81.78	79.51	79.73
TSS(°Brix)	82.2	82.4	82.0	82.0	82.5	82.6	81.90	82.00	82.00

Acidity (%)	0.92	0.93	0.92	0.95	0.93	0.93	0.95	0.99	0.91
pH	3.65	3.75	3.56	3.76	3.87	3.97	3.7	3.98	3.76
Reducing sugars (%)	23.98	23.66	22.46	21.98	22.98	23.97	23.97	22.78	22.86
Non-reducing sugars (%)	21.23	24.65	26.66	31.2	32.83	32.84	34.21	36.35	35.37
Total sugars (%)	45.21	48.31	49.12	53.18	55.81	56.81	58.18	59.13	58.23
Ash content (%)	1.73	1.23	1.31	1.16	1.37	1.32	1.13	1.31	1.52

Table 5 : Chemical characteristics of *Chyawanprash* bar dried at 80 °C

Properties	Tray drier								
	Thickness (4mm)			Thickness (6mm)			Thickness (8mm)		
	Pectin (0.0%)	Pectin (0.5%)	Pectin (1.0%)	Pectin (0.0%)	Pectin (0.5%)	Pectin (1.0%)	Pectin (0.0%)	Pectin (0.5%)	Pectin (1.0%)
Moisture (%)	17.03	17.28	17.16	17.45	17.64	17.34	17.58	17.19	17.30
Ascorbic acid (mg/100g)	77.77	78.73	76.39	76.70	76.58	74.37	76.62	75.83	72.18
TSS(°Brix)	82.0	82.0	82.1	82.2	82.1	82.0	81.8	81.9	82.0
Acidity (%)	0.97	0.89	0.97	0.95	0.97	0.98	0.97	0.97	0.96
pH	3.85	3.57	3.67	3.54	3.53	3.54	3.65	3.54	3.76
Reducing sugars (%)	21.57	21.66	22.66	22.46	22.52	22.78	22.24	22.07	22.15
Non-reducing sugars (%)	31.74	30.76	30.64	30.74	34.71	36.35	32.95	36.11	32.97
Total sugars (%)	53.31	52.42	53.30	53.20	57.23	59.13	55.19	58.18	55.12
Ash content (%)	1.46	1.25	1.21	1.42	1.72	1.35	1.62	1.62	1.36

The standardized *chyawanprash* bar was stored at 24±1 °C for further microbial analysis. On the initial day, the Total Viable Count (TVC) was zero, indicating that the processing conditions were hygienic. Microbial changes, specifically in terms of TVC, were assessed in a sterile environment. After 15 days of storage, the TVC was recorded at $<1.5 \times 10^3$ cfu/g, which was within the acceptable safety limits. After 30 days, the TVC was $<2.0 \times 10^3$ cfu/g, confirming that the samples remained within

safe consumption limits throughout the storage period.

CONCLUSION

Chyawanprash, rooted in a history spanning thousands of years, is a traditional Ayurvedic herbal jam crafted from an ancient Ayurvedic formula. Renowned for its role as an immunity booster, antioxidant, rejuvenator, and rich source of vitamin C, *Chyawanprash* is hailed as an excellent energy provider. While its health merits are well acknowledged, the traditional form of *Chyawanprash*, being sticky, often deters

consumption due to its peculiar mouth feel. Recognizing this, efforts have been directed toward enhancing the palatability of *Chyawanprash*. Current work offers a wonderful alternative. Offering the convenience of a simple unwrapping and immediate consumption, the *Chyawanprash* bar transforms the traditional supplement into a more accessible and enjoyable form, making it a convenient choice for individuals seeking the benefits of Ayurvedic medicine without compromising on taste and ease of consumption.

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