



Consumers' Awareness and Attitude towards Seabuckthorn Products

K. Kathuria¹, S. Naryal¹, P. Thakur¹, R. Sharma²

10.18805/ajdfr.DR-2048

ABSTRACT

Background: Seabuckthorn (Seabuckthorn plant, Seabuckthorn berries and Seabuckthorn-based products) as a valuable resource has huge market potential all over the world. Nutritional and bioactive substances in Seabuckthorn berries and other parts of the plant have attracted many foods, cosmetic and pharmaceutical companies to develop Seabuckthorn-based consumer products. Thus, the present study attempted to investigate the consumer's awareness and attitude toward the Seabuckthorn plant and various categories of Seabuckthorn-based products.

Methods: The study was conducted in the Solan and Mandi towns of Himachal Pradesh. The primary data had been collected from 101 respondents by personally interviewing them with the help of a pre-tested structured questionnaire. Appropriate statistical methods such as percentage, mean, standard deviation and chi-square was used to analyze the data collected.

Result: The findings revealed that the majority of the consumers were not aware of the Seabuckthorn plant, Seabuckthorn-based products, and their benefits. Most of the consumers showed a positive attitude toward Seabuckthorn-based products.

Key words: Consumer Attitude, Consumers Awareness, Ethnomedicine, Seabuckthorn products, Seabuckthorn.

INTRODUCTION

Seabuckthorn (*Hippophae spp.*) is a deciduous shrub that belongs to the family Elaeagnaceae with a vast area of natural habitat in temperate regions, extended widely in Canada, China, India, Mongolia, Nepal, Pakistan, Russia, and Tibet. Seabuckthorn (SBT) is known for its ecological and economic importance. Every part of the plant viz. fruits the most popular, leaves, roots, and twigs have been utilized traditionally for medical purposes, nutrient supplements, fuel, and fodder. The efficacy of seabuckthorn for its medicinal properties for the treatment of indigestion, throat infection, gynecological problems, ulcers, gastritis, bronchitis, acidity, diarrhea, hypertension, blood disorder, fever, tumor, gallstones, cough, cold, food poisoning can be traced to modern-day technology and clinical trials. Seabuckthorn oil is used for the treatment of oral mucositis, vaginal mucositis, cervical erosion, duodenal ulcers, gastric cancers and skin ulcers. The beneficial effects of Seabuckthorn on human health have been thoroughly researched and supported by studies, indicating that the plant has a lot of promise to preserve and promote human health (Katiyar and Desyong, 2020).

Despite the diverse use of other parts of the plant, the most important part that gaining popularity is the SBT berries and the products made out of them, such as ready-to-serve beverages, oils, jams, tea, nutritional capsules, and cosmetic products. Vitamin C is the most abundant vitamin in Seabuckthorn berries, with 400 mg/100 g values (Gutzeit *et al.*, 2008). The concentration of vitamins B and E is much higher than in other fruits such as apricot, banana, mango, orange, and peach (Stobdan *et al.*, 2013).

This valuable plant is grown in the cold regions of the Himalayas in India and widely distributed in the high-altitude

¹Department of Business Management, Dr. Yashwant Singh Parmar University of Horticulture and Forestry Nauni Solan, Nauni-173 230, Himachal Pradesh, India.

²Department of Food Science, Dr. Yashwant Singh Parmar University of Horticulture and Forestry Nauni Solan, Nauni-173 230, Himachal Pradesh, India.

Corresponding Author: P. Thakur, Department of Business Management, Dr. Yashwant Singh Parmar University of Horticulture and Forestry Nauni Solan, Nauni-173 230, Himachal Pradesh, India. Email: pankajthakur1290@gmail.com

How to cite this article: Kathuria, K., Naryal, S., Thakur, P. and Sharma, R. (2023). Consumers' Awareness and Attitude towards Seabuckthorn Products. Asian Journal of Dairy and Food Research. doi:10.18805/ajdfr.DR-2048

Submitted: 21-11-2022 **Accepted:** 17-04-2023 **Online:** 23-05-2023

cold desert of Ladakh (Leh and Kargil), some pockets of Himachal Pradesh, some districts of Uttarakhand, Arunachal Pradesh and Sikkim (Bali *et al.* 2016). In India, Seabuckthorn covers 16,300 hectares of area. The natural Seabuckthorn fruit production is around 20,000 tonnes in total and wild plants provide about 600 tonnes of berries only in Ladakh in 2020 (ISA, 2021). Therefore, the Seabuckthorn is popularly known as Leh Berry, a wonder plant, and Ladakh Gold. Seabuckthorn has received increasing attention among people in India after the Defence Institute of High-Altitude Research (DIHAR), Leh, a constituent institute of the Defence Research and Development Organization (DRDO), found this plant as a golden bush. To get the most out of this plant, DRDO has developed the harvesting, post-harvesting techniques, and value-added technology for the

tiny orange-colored fruits, popularly known as berries, which are used to make ready-to-drink beverages and other products.

According to estimates, one hectare of Seabuckthorn stands can produce 750-1,500 kg of berries per year. A mature Seabuckthorn plant provides 500 gm to 2,000 g of fresh berries on average, with a highest of 4 kg/plant documented in the natural habitat (Singh *et al.*, 2012). Plantation of Hippophae Rhamnoides spp. Turkestanica has been carried out by the Department of Forest in the district of Lahaul-Spiti in 800 ha of marginal lands in Himachal Pradesh and of Hippophae Salicifolia by farmers in 120 ha (ISA, 2021).

The increasing application of Seabuckthorn leaves, flowers and fruits in the production of food, medicine, and personal care products because of its nutritional and therapeutic value is predicted to drive the market of Seabuckthorn in India. The rising interest of people in search of processed food with nutritional value and changing consumer perception towards ethnomedicine can boost the demand for Seabuckthorn. Keeping this in view, the present research was undertaken to study the consumers' awareness and attitude towards Seabuckthorn-based products and to find the reasons and factors influencing the purchase of these products.

MATERIALS AND METHODS

Research setting

The study was conducted in Himachal Pradesh, a hilly state in northern India. Some of the companies based in Himachal currently working on Seabuckthorn products are Zeon Life Sciences Limited, Minchy, Chandigarh Agritech Private Limited, and Hindustan Farmdirect Ingredient Private limited. These companies have been promoting Seabuckthorn products for some time in urban areas of Himachal Pradesh. Thus, the study will partially evaluate the results of the marketing efforts of these food companies. The Mandi and Solan town of Himachal Pradesh were purposefully selected for the study. Mandi town is situated at the center of Chandigarh and Manali, whereas Solan town is situated at the center of Chandigarh and Shimla making them a preferred destination for tourists from all over the country. The tourists and people from different parts of the state and country are living in Mandi and Solan towns counting on a good consumer base.

Sample and data collection

The primary data for the study had been collected from 101 respondents by personally interviewing them with the help of a structured questionnaire. The questionnaire was vetted by drawing insights from three academic experts for content validity. Convenience sampling was used for selecting the respondents for this exploratory study. Table 1 presents an overview of the respondents' demographic profile.

Measurement of variables

The collected data was recorded and analyzed by using Microsoft Excel software. To know the consumers' awareness of the Seabuckthorn plant and Seabuckthorn-based products, the respondents were simply asked to provide a yes or no response. The Seabuckthorn products under five categories (Food, Beverages, Wellness, Health and Animal Feed) were listed.

Consumers' attitude towards Seabuckthorn products was measured on a Likert Type Scale. The participants' responses were obtained on a five-point continuum namely Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree with their respective scoring of 5, 4, 3, 2 and 1 for the positive statements. For analysis purposes, arithmetic means, percentage method, aggregate ranking method, and Chi-Square test were applied. The formula used for the Chi-Square method was:

$$\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$$

χ^2 = chi-squared.

O_i = observed value.

E_i = expected value.

RESULTS AND DISCUSSIONS

Consumers' awareness of seabuckthorn plant and its benefits

Primarily consumers were asked about their awareness of the Seabuckthorn plant, its products, and its benefits. Table 2 provides detailed information regarding these aspects.

It is clear from Table 2 that the majority of respondents (66.34%) were aware of the Seabuckthorn plant while the Seabuckthorn plant was not known to 33.66 per cent of respondents. Only 45.54 per cent of the respondents were aware of the Seabuckthorn-based products. This shows that most consumers were not aware of Seabuckthorn products. When it comes to the benefits of Seabuckthorn products, 53.46 per cent of the respondents were aware. So, the companies using Seabuckthorn should augment consumer awareness through promotion.

Consumers' awareness of seabuckthorn products as per product categories

Secondly, efforts had been made to find the consumers' awareness towards Seabuckthorn products as per its product categories.

Awareness of seabuckthorn based food products

It is clear from Table 3 that the majority of consumers were not aware of all the Seabuckthorn-based food products. 39.60 per cent of consumers were aware of pickle, jam and jelly, where 30.69 per cent of consumers were aware of bakery products, 25.74 percent of consumers were aware

of Seabuckthorn tomato chili sauce, followed by 23.76 percent of consumers were aware of Yogurt. Whereas, in the case of 18.81 per cent of consumers Seabuckthorn cornflakes were least known. Thus, consumers are highly aware of Seabuckthorn pickles, jams and jelly and least aware of cornflakes.

Awareness of seabuckthorn based beverages products

Table 4 depicts that the majority of consumers were not aware of Seabuckthorn-based beverages. 45.54% of the consumer were aware of the SBT Juice, 33.66 per cent of the consumers were aware of the Seabuckthorn tea and 32.67 percent of the consumer were aware of the SBT Herbal

Table 1: Respondents' demographic profile.

Characteristic	Frequency	
	N (101)	%
Town		
Mandi	52	51.49
Solan	49	48.81
Gender		
Male	47	46.54
Female	54	53.46
Age in years		
18-30	85	84.16
31-45	9	8.91
46-60	7	6.93
Employment status		
Student	48	47.52
Home maker	12	11.88
Private Job/business	22	21.78
Government Job	19	18.82
Educational status		
Up to 12 th	6	5.94
Graduation	26	25.74
Post-graduation	54	53.47
Ph. D. and above	15	14.85
Total annual income of family (In Lakh)		
Less than Rs 1 Lakh	12	11.88
Rs 1 Lakh to Rs 5 lakh	44	43.56
Rs 6 lakh to Rs 10 Lakh	31	30.7
More than 10 Lakh	14	13.86
Type of family		
Nuclear	68	67.33
Joint	33	32.67

*N represents the sample size.

Table 2: Awareness about seabuckthorn plant and its benefits.

	Frequency	%
Awareness of seabuckthorn plant		
Aware	67	66.34
Not aware	34	33.66
Awareness of seabuckthorn based products		
Aware	46	45.55
Not aware	55	54.45
Awareness of benefits of seabuckthorn products		
Aware	54	53.46
Not Aware	47	46.54

* Frequency represents the responses received.

appetizer. Seabuckthorn crush was the least-known product with only 12.87 per cent awareness. Thus, Seabuckthorn tea is the highest-known product whereas Seabuckthorn crush is the least known.

Awareness of seabuckthorn based personal care products

It is evident from Table 5 that most of the consumers were not aware of the Seabuckthorn personal care products. About 34.65 per cent of consumers were aware of SBT Soap,

33.66 percent of consumers were aware of Seabuckthorn face oil followed by 27.72 percent of consumers were aware of Seabuckthorn hair oil. Whereas, Seabuckthorn toothpaste and Seabuckthorn face oils were the least known products with 20.79 per cent and 19.80 awareness.

Awareness of seabuckthorn based health care products

Table 6 makes it clear that most of the Seabuckthorn Health Care products were unfamiliar to a large majority of

Table 3: Awareness for seabuckthorn based food products.

Products	Aware		Not aware	
	Frequency	%	Frequency	%
Food products				
Seabuckthorn tomato chili sauce	26	25.74	75	74.25
Seabuckthorn corn flakes	19	18.81	82	81.18
Yogurt	24	23.76	77	76.23
Pickle	40	39.60	61	60.39
Jam and Jelly	40	39.60	61	60.39
Bakery products	31	30.69	70	69.30

* Frequency represents the responses received

Table 4: Awareness of seabuckthorn based beverages products.

Products	Aware		Not aware	
	Frequency	%	Frequency	%
Beverages				
Seabuckthorn Tea	34	33.66	67	66.33
Seabuckthorn Crush	13	12.87	88	87.12
Herbal Appetizer	29	28.71	72	71.28
Seapricot Juice	27	26.73	74	73.26
Juice	46	45.54	55	54.45
Wine	33	32.67	68	67.32

*Frequency represents the responses received.

Table 5: Awareness of seabuckthorn based personal care products.

Products	Aware		Not aware	
	Frequency	%	Frequency	%
Personal care products				
Soaps	35	34.65	66	65.34
Seabuckthorn face oil	28	27.72	73	72.27
Seabuckthorn hair oil	34	33.66	67	66.33
UV Screen	20	19.80	81	80.19
Seabuckthorn toothpaste	21	20.79	80	79.29

*Frequency represents the responses received.

Table 6: Awareness of seabuckthorn based health care products.

Products	Aware		Not aware	
	Frequency	%	Frequency	%
Health products				
Antioxidant herbal supplement	33	32.67	68	67.32
Seabuckthorn capsules (Enrichedwith Omega 3, 6, 7 and 9)	29	28.71	72	71.28
Seabuckthorn berry oil	32	31.68	69	68.31
Seabuckthorn seed oil	35	34.65	66	65.39
Seabuckthorn berry powder	29	28.71	72	71.28
Seabuckthorn immunity booster	30	29.79	71	70.29

*Frequency represents the responses received.

consumers. About 34.65 percent of the consumers were aware of Seabuckthorn seed oil, 32.67 per cent of the consumers were aware of Antioxidant herbal supplements, 31.68 per cent of the consumer were aware of Seabuckthorn berry oil followed by 29.79 per cent of consumers were aware of Seabuckthorn immunity booster. Whereas Seabuckthorn capsules (enriched with Omega 3, 6, 7 and 9) and Seabuckthorn Immunity booster were the least known product with 28.71 per cent awareness. Thus, Seabuckthorn seed oil is the highest known product whereas Seabuckthorn capsules and Seabuckthorn berry powder are the products with the least awareness.

Awareness of seabuckthorn based animal feed products

Table 7 depicts that a large majority of respondents were unaware of the Seabuckthorn pomace (84.15%).

Sources of awareness

The respondents were interviewed about the source of their information regarding the Seabuckthorn products. Table 8 represents different sources of awareness of respondents. It is observed from Table 8 that 45.53 per cent of the respondents received awareness regarding Seabuckthorn products from friends respectively followed by 43.56 per cent of respondents who received information from other sources. The most important sources of information were friends and other sources. The respondents also got information from other sources such as TV (4.95%), newspapers (3.96%), and relatives (1.98%).

Relationship between consumer education and their awareness of seabuckthorn based products

Table 7: Awareness of Seabuckthorn based animal feed products.

Product	Aware		Not aware	
	Frequency	%	Frequency	%
Animal feed				
Pomace	16	15.84	85	84.15

Table 8: Source of awareness.

Source of information	Frequency	Percentage (%)
Friends	46	45.53
Relative	2	1.98
Newspaper	4	3.96
TV	5	4.95
Other sources	44	43.56

Table 9: Chi-square test.

Education level	Aware	Not aware	Total
Up to graduation	9 (14.16)	23 (17.43)	15
Post-graduation and above	37 (31.43)	32 (37.57)	26
Total	46	55	101
p Value	0.016669		
Calculated Chi-square statistics value	5.7308 (At 0.05 Significance Level)		
Tabulated Chi-square statistics value	3.841 (At 1 Degree of freedom)		

*Figures in parenthesis are expected values for Chi-square.

Table 9 is an attempt to find the relationship between participants' education level with their awareness of Seabuckthorn-based products. The results show that there is a significant relationship between consumer education and their awareness of Seabuckthorn based products as the calculated p value (0.016669) was less than 0.5 and also calculated shi-square Statistics value (5.7308) was less than the Tabulated Chi-Square Statistics Value at 0.05 significance level and 1 degree of freedom. This simply implies that the higher the education higher is the awareness towards Seabuckthorn-based products.

Consumers' attitude towards seabuckthorn products

For measuring consumers' attitudes towards Seabuckthorn products, they were asked to rate the statements relating to Seabuckthorn products on a scale of 5 points continuum. The responses are summarized in Table 10.

It is evident from Table 10 that the majority of the respondents showed a positive attitude toward the listed statement for Seabuckthorn products. For most of the statements, neutral to agreed responses were received. On the aspect of nutrition and health, most of the respondents agreed with the benefits of Seabuckthorn products.

Reasons and factors influencing the purchase decision of Seabuckthorn products

Respondents were asked to provide reasons for purchasing Seabuckthorn products.

The main reason mentioned by the respondent for the purchase of Seabuckthorn products has arranged in descending order on the rank basis as Seabuckthorn

Table 10: Consumers' attitude towards seabuckthorn products.

Statements	SA	A	N	D	SD	Total score	Mean score
SBT products are rich in nutrition.	42	35	24	0	0	422	4.18
It is Good for the health	30	48	23	0	0	411	4.07
Seabuckthorn products are costlier than other products	15	37	47	2	0	368	3.64
Those who buy SBT products are not wasting money.	17	40	41	2	1	373	3.69
SBT is a convenience food product	13	30	43	7	8	336	3.33
SBT is a convenience wellness product	14	40	35	6	6	353	3.50
There are very few branded Seabuckthorn products available in the Market	32	39	26	3	1	401	3.97

*(SA- Strongly Agree, A- Agree, N- Neutral, D- Disagree, SD- Strongly Disagree).

Table 11: Reasons for purchasing Seabuckthorn products.

Reasons	Rank				Frequency*	Aggregate
	1	2	3	4	rank	rank
Nutritive Value	48	23	15	15	199	Rank 1
Economic in use	15	41	27	18	250	Rank 3
Easy to consume	18	38	26	19	248	Rank 2
Easily available	11	35	29	26	270	Rank 4

Table 12: Factor influencing purchase of SBT products.

Parameters	Very High	High	Average	Low	Very Low	Mean score	Standard deviation
Quality	15 (14.85)	36 (35.64)	31 (30.96)	12 (11.88)	7 (6.9)	3.51	1.12
Price	25 (24.75)	26 (25.74)	29 (28.71)	17 (16.83)	4 (3.96)	3.50	1.15
Packaging	8 (7.92)	28 (27.72)	39 (38.61)	22 (21.78)	4 (3.96)	3.13	0.98
Advertisement	6 (5.94)	18 (17.82)	39 (38.61)	26 (25.74)	12 (11.88)	2.80	1.05
Brand Name	15 (14.85)	22 (21.78)	31 (30.69)	27 (26.73)	6 (5.94)	3.12	1.14
Taste	16 (15.84)	27 (26.73)	36 (35.64)	18 (17.82)	4 (3.96)	3.32	1.06
Variety	10 (9.90)	23 (22.77)	38 (37.62)	20 (19.80)	10 (9.90)	3.03	1.10
Nutritive value	19 (18.81)	32 (31.68)	28 (27.72)	16 (15.84)	6 (5.94)	3.41	1.14
Lifestyle	9 (8.91)	21 (20.79)	44 (43.56)	19 (18.81)	8 (7.9)	3.03	1.03

*Values in parenthesis are in percentage.

products have high nutritive value (1st Rank), easy to consume (2nd rank), are economic in use (3rd Rank) and easily available had secured last rank (4th rank). The main and important reason for the purchase of Seabuckthorn was its Nutritive value.

The customers were found to deviate from the factors that affected the purchase of Seabuckthorn Products on a scale of 1 to 5. The responses are summarized in Table 11.

It is observed from Table 12 that quality, price, nutritive value and taste were considered the highly influential factor in purchasing Seabuckthorn products by the consumers. The mean score received for advertisements is less than 3 means that promotional efforts should be made on advertisements to make people aware of these products.

CONCLUSION

The study concluded that on average only 50 per cent of the respondents were aware of the Seabuckthorn plant,

Seabuckthorn-based products and their benefits. Despite being highly beneficial, the majority of the people were not aware of the Seabuckthorn-based product categories like food, beverages, healthcare, personal care, and animal feed products. As per the responses provided by respondents, the majority of the respondents had obtained information about SBT from friends and sources like the internet, retail stores, etc.

The research also shows that a large number of consumers have a positive attitude towards Seabuckthorn products. Nutritive value and ease of consumption were the prime reasons for purchasing Seabuckthorn products. Quality and price were found to be the main influential factor for purchasing Seabuckthorn products.

Consumers' knowledge and awareness of Seabuckthorn based products and their benefits, needed to be enhanced. The study showed that 68.31 per cent of respondents were interested to collect more information about Seabuckthorn

products, so this opens up an opportunity for the marketers to work on the promotion of Seabuckthorn-based products. Intermediaries' role in making Seabuckthorn based products available to the general public and the market should be enhanced by promotions. Producer companies can target the market segments of highly educated people *i.e* educated at the Post-Graduate level and above to sell their products by creating awareness of the Seabuckthorn plant, its benefits, and its products. It is also known that higher education levels lead to higher incomes. This implies that SBT can command a price premium on the strength of perceived benefits.

ACKNOWLEDGEMENT

We are obliged and thankful to Dr. Yashwant Singh Parmar University of Horticulture and Forestry Nauni Solan (HP) for providing us with all the necessary support.

Conflict of interest: None.

REFERENCES

- Bali, R.S., Khanduri, V.P., Makhloka, K. and Sharma, C.M. (2016). Seabuckthorn in India. *Rashtriya Krishi* (English). 11: 75-77.
- Gutzeit, D., Baleanu, G., Winterhalter, P. and Jerz, G. (2008). Vitamin C content in Seabuckthorn Berries (*Hippophae rhamnoides* L. ssp. *rhamnoides*) and related products: A kinetic study on storage stability and the determination of processing effect. *Journal of Food Science*. 73: 615-620.
- Husain, M., Rathore, J.P., Rasool, A., Parrey, A.A., Vishwakarma, D.K. and Mahendar, K. (2018). Seabuckthorn: A multipurpose shrubs species in Ladakh cold desert. *Journal of Entomology and Zoology Studies*. 6: 1330-1337.
- International Seabuckthorn Association. (2021). The Annual Report of International Seabuckthorn Development for the Year of 2020. Ministry of Water Resources, China. 81
- Katiyar, A. and Desyong, N. (2020). Seabuckthorn (*Hippophae rhamnoides* L.): A potential plant for sustainable development of Trans-Himalayan Ladakh region, India. *Indian Journal of Arecanut, Spices and Medicinal Plants*, 21: 3-12.
- Singh, A., Butola, J.S., Samant, S.S., Sharma, P., Lal, M. and Marpa, S. (2012). Indigenous Techniques of Product Development and Economic Potential of Seabuckthorn: a Case Study of Cold Desert Region of Himachal Pradesh, India. *Proceeding of the National Academy of Science*, july-September 2012. India Section b: Biological Sciences. 83: 391-398.
- Stobdan, T., Korekar, G. and Srivastava, R.B. (2013). Nutritional attributes and health application of Seabuckthorn (*Hippophae rhamnoides* L.) - A review. *Current Nutrition and Food Science*. 9: 151-165.