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A study of lambu- subu food and beverages in Arunachal Pradesh

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ABSTRACT

Kiwi, also called Chinese gooseberry is native to China and is cultivated commercially in New Zealand and California. The main varieties of kiwi are Hayward, Abbot, Allison, Bruno etc. Italy is the leading country in the production of Kiwi in the world followed by China, New Zealand and Chile. Kiwi is an important fruit crop grown in Arunachal Pradesh and it is also considered to be an economically important crop grown in some hilly regions of the state. Arunachal Pradesh is the leading producer of kiwi in India accounting for 56 percent of the total 8.5 thousand tons of kiwi production in the country (Gyanendra *et al.,* 2018). Kiwi wine "NAARA-AABA" brewed by Lambu-Subu Food and Beverages is known as the India's first organic kiwi wine. Therefore, a case study was conducted at Lambu-Subu Food and Beverages located at Hong village, Ziro in Arunachal Pradesh with the following objectives viz., (1) To study the value addition of Kiwi fruit and (2) To find out the constraints faced by the firm. The winery has processing capacity of 60,000 litres and has two different quantities of product i.e. 375ml and 750ml. The study was conducted by using both primary and secondary data. In the result it was obtained that the company has a gross return of ₹ 37,49,500 per month from kiwi wine with total processing cost of ₹12,03,950 per month. And the processing cost of 1 quintal of kiwi wine was ₹8889 having returns per quintal of amount ₹74,089. So, the value addition of 1 quintal of kiwi was ₹8889. And the gross annual return was approximately ₹1,57,98,000. The second objective's results are there are market competition from the local kiwi wine seller, lack of awareness of the product among people etc. The recommendations are as follows ,the winery should explore the possibility of exploiting their processing facility using alternative fruit, cold storage facility should be made available, development of infrastructure facility, the winery should produce more value added products of kiwi fruit such as kiwi jam, jelly, ice cream and so on apart from the kiwi wine

1. Introduction

Kiwi (Actinidia deliciosa) or Chinese gooseberry is a native to Northern China and it was considered to be a wild fruit and it was largely eaten for medicinal purposes. In the early 20th century kiwi fruit had spread from China to New Zealand where the fruit got renamed to kiwi fruit, after the New Zealand bird and being cultivated there. Italy is considered to be the largest producer of Kiwi in the world followed by New Zealand and Chile (FAOstat.org). In India, it is a relatively new fruit and grown in Himachal Pradesh, Uttar Pradesh, Jammu and Kashmir, Sikkim, Meghalaya, Arunachal Pradesh, Nagaland, Manipur etc. The annual average production of kiwi in India is about 8.5 thousand tonnes from an area of about 4.63 thousand hectares (Anonymous 2018). Arunachal Pradesh is the largest producer of Kiwi in India having 56 percent (4,800 tons) of the total production (Gyanendra *et al.,* 2018). Lower Subansiri district is the highest producer of kiwi from Arunachal Pradesh. Kiwifruit has a bright prospect in

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Arunachal Pradesh. It provides high return per unit area and the farmers can earn about Rs. 4 to 5 lakhs per hectare annually. Kiwifruit bears heavily every year with no crop failure.

2. Methodology

The study was conducted at Lambu-Subu Food and Beverages located at Ziro, Lower Subansiri district, Arunachal Pradesh, as they work exclusively in the field of horticulture and allied services facilitating skills training, value addition and product development through the adoption of scientific and innovative methodologies. The study was based on primary and secondary data. Primary data was acquired using the questionnaires and interview for obtaining necessary information pertaining to the objectives from the owner of the firm. Secondary sources like literature review, web sources, journals, etc. were also used for acquiring the required information of the study interest.

3. About the industry

Lambu-Subu Food and Beverages is located at Hong village, Ziro in Lower Subansiri district, Arunachal Pradesh and was established in the year 2016. The Chief Managing Director of the firm is Tage Rita, she is an engineer turned entrepreneur. Although she had a secure government job she had quit her job so that she can serve the mankind by venturing into boutique winery of Kiwi fruit. "NAARA-AABA" is the India's first organic kiwi wine which is a tribute to her father in law as he was lovingly known by that name. When it comes to the organization structure, at the top most level is the Chief Managing Director which is followed by Orchard manager, Production manager, Processing manager, Marketing manager, Finance manager. Each of the managers manages the workers below them. The unit has processing capacity of 60,000 liters' and can accommodate all the kiwis produced in the state in a single batch. The wine is available in the market at 375ml costing ₹600 and 750ml costing ₹1500 in Arunachal Pradesh. In other state like Guwahati 375ml costs ₹800 and 750ml costs ₹1600 due to the transportation charges and the excise duty paid to the Assam Government.

4. Results

4.1 To study the value addition of kiwi wine

Value addition is a change in the physical state or form of the product (such as making kiwi wine from kiwi fruit or making strawberries into jam). It is the production of a product in a manner that enhances its value (such as organically produced products). It is an important technique of profit maximization for any business.

4.2 Procurement of raw materials

The kiwis were brought to the processing center after procuring it from the local farmers at ₹100 per kg as well as from the owner's own orchard. They have an orchard of approx. 4ha which having around 300 plants. The producer of the company procures about 95 MT of kiwi every year for processing of kiwi wine. The harvested fruits were sorted, graded and packed entirely manually and there was no mechanical sorting, grading line or pack-house in the district for kiwi. The broken or very small size kiwi were at times fed to pigs as the farmers perceive that this way it enhances the yield of pork. Moreover, some farmers prepare homemade kiwi wine for self-consumption with lower grade or damaged kiwi. The graded produce is designated as A+, A, B, C and D based on weight.

4.3 Processing of kiwi wine

The processing of Kiwi fruit in Lambu-Subu Food and Beverages industry involves the following steps:

- Weighing: The kiwis were brought to the winery and it was weighed with the help of a platform scale. The weighing was done by keeping the kiwi fruit on a tray and the average weight of the tray filled with kiwi was 20kg. After weighing the kiwi was sent for the cleaning process.
- Cleaning: Cleaning in agricultural processing means the removal of foreign matter and undesirable matters from the desired product. This may be accomplished by washing, screening, hand picking etc. Kiwi after weighing was dumped in the washing container for removal of undesirable matters. The cleaning was done manually by hand. Once the cleaning was done the washed kiwi was forwarded to the next step i.e. crushing.
- Crushing: Crushing is the process of size reduction in which the kiwi fruit was cut or broken into smaller pieces or reduced to workable size. The crushed fruit was then pumped to the fermentation tank through a food grade pipe.

Table 1: Grades and prices

Grade	A+	A	B	C	D
Weight per fruit	>100gm	80-100 gm	60-80 gm	50-60 gm	< 50 gm
Price (per kg in ₹)	>120	100	80	60	50

- Fermentation: Fermentation is a metabolic process by which molecules such as glucose are broken down anaerobically. Microorganisms like yeast and bacteria usually help in the fermentation process creating beer, wine etc. Fermentation process takes place in the fermentation tank. Yeast was added in the ratio of 15-25g/Hectolitre (hl) and sugar was also added. The mixture was then kept inside the fermentation tank until the Brix level reached zero (i.e. for 15-30 days). During the fermentation process the cap of the tank was kept open. Brix is the percentage of total dissolved solid or sugar. Hectolitre is a metric unit of capacity equal to one hundred litres, used especially for wine, beer, grain, and other agricultural produce.
- Racking: Racking is a process of moving clear wine from one tank to another tank and removal of lees (solid particles) as a waste to gutter. The wine was racked from tank to another empty tank on a number of occasions. This helps clarify the wine by removing the fine lees or sediments. Temperature was maintained at 20^{o}C before racking. Racking was done when the brix level became zero.
- Blending: Blending is a technique to produce the wine by mixing different strengths of tanks in one particular tank. In the blending process the sample of wine was tasted and the standard is checked
- Fining: Fining is a process of removing unwanted material from wine while still in the cellar. It is part of the clarification and stabilization process and involves adding a substance to the wine that will flush out certain elements that may cause a wine to look hazy or affect its aroma, colour or bitterness. The fining agent binds to the unwanted particles in the wine, which means they become sizable enough to be filtered out.

  Filtration: Filtration is any of various mechanical, physical or biological operations that separate solids from fluids (liquids or gases) by adding a medium within which only the fluid can pass. Wines were filtered from time to time as per physical status of the wine. Particles and elements like yeast or bacteria were removed. It was done to give a clearer and healthier appearance and speed up the aging process. The filtration size was 1.2-micron, 0.45 -micron & 0.25- micron
- Cold stabilization: Cold stabilization of wine is a method used to avoid tartaric acid crystals from forming after the wine has been bottled. This process is referred to as cold stabilization as it is the act of cooling the wine that causes tartaric acid to form tartrate crystals, also known as wine crystals or wine diamonds. If wines are not cold stabilized there is a chance that the crystals will form when consumers place bottles of wine in the refrigerator or store it for long periods of time. While the crystals are harmless it can be rather unsettling to find what looks like broken glass in your wine if you don't know what it really is. Kiwi wine was kept at -5^{o}C for 48 hours in a cold stabilization tank. Cold stabilization was done in insulated tank
- Bottling: At first the bottles were rinsed with sterilized and micro filtered water and then the bottles were dried out with an air shot and then 99.8% of nitrogen was added to the bottle. This process protects the wine and ensures its quality and purity. And then the wine was pumped out of wine tanks then two bottles at a time were filled with the designed quantity of wine.
- Capping: Capping machines are used for the application of plastic and metal threaded caps as well as plastic snap caps, some fitments and some types of corks and plugs.
- Labelling: Labelling is a process of dispensing, applying or print-and-apply labels to various items, products, containers, or packages. They were operated by hand and were not automated, but still assist in the process of removing labels from their liners. The products are rejected if the labelling was not done properly. Operation was performed by pulling the liner/backing paper around a plate or bar which causes the label to peel away from the backing paper. This happens because the backing paper is usually thinner than the label itself and is also underneath
- Storage: After processing of kiwi wine they were packed and stored in a box ready to be transported to the market.

Gross return per month of kiwi wine

Table 2: Gross return per month

Quantity (ml)	Total production (no. of bottles)	Rate (₹)	Return (₹)
375	1,250	500	6,25,000
750	2,083	1400	31,24,500
		Total	37,49,500

Table 2 showed that 1,250 numbers of 375ml quantities of wine bottle had a return of ₹6,25,000 having wholesale rate of ₹500 per bottle. And 2,083 numbers of 750ml quantity of wine bottles had a return of ₹31,24,500 having a wholesale rate of ₹1400.So, the total return per month was ₹37,49,500.

Table 3: Processing cost per month

Particulars	Amount (₹)
Electricity charge	6,800
Water	400
Packaging charge	2,82,750
Labour charge	5,42,000
Miscellaneous (transportation etc.,)	3,72,000
TOTAL COST	12,03,950

Table 3 showed that the total processing cost per month of kiwi wine including all the particulars like electricity charge, water, packaging material, labour charge, miscellaneous etc. was a sum total of ₹12,03,950. Among all the particulars labour charge was the maximum i.e. ₹5,42,000.

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Table 4: Value addition of 1 quintal kiwi

Sl. no	Particulars	Amount (₹)
1	Electricity	50
2	Water	2.90
3	Packaging charge	2,088
4	Labour charge	4,002
5	Miscellaneous charge	2,747
	TOTAL	8889

It can be seen from the table 4 that the total processing cost of 1 quintal kiwi of all the particulars like electricity charge, water charge, packaging charge, labour charge and miscellaneous charge etc. was a sum total of 8889. Therefore, value added of 1 quintal kiwi was ₹8889.

Table 5: Return per quintal of kiwi

Sl. no	Particulars	Amount (₹)
1	Gross return	24,800
2	Total processing charge	88,889
3	Cost of raw material	10,000
4	Total cost (2+3)	98,889
5	Net return (1-4)	74,089

Since 1 quintal is equal to 100 kg so from 1 quintal 28 numbers of kiwi wine bottles can be produced i.e. 12 bottles of 750ml wine and 16 bottles of 375 ml wine can be produced. From selling 28 kiwi wine bottles the gross return was ₹24,800, total processing charge was ₹88,889, cost of raw material was ₹10,000, total cost (total processing cost + cost of raw material) was ₹98,889 with net return (gross return-total cost) of ₹74,089.

Table 6: Return from the sale of value-added fruit per month

Sl. no	Particulars	Amount (₹)
1	Gross return	37,49,500
2	Total processing cost	12,03,950
3	Cost of raw materials	12,29,000
4	Total cost (2+3)	24,32,950
5	Net return (1-4)	13,16,550
6	B:C ratio (1/4)	1.56

Table 6 showed the return from the sale of value- added fruit per month of all the particulars. 1,250 bottles of 375ml and 2,083 bottles of 750ml were made per month. And about 2.5 kg of kiwi fruit was required for a bottle of 375ml and 5 kg for a bottle of 750ml. Therefore, in a month 135.4 quintals of kiwis were used for producing 3333 bottles of kiwi wine, costing ₹12,29,000. Gross return was ₹37,49,500, total processing cost was ₹12,03,950, total cost (total processing cost + cost of raw materials) was ₹24,32,950 and net return (Gross return -Total cost) of ₹13,16,550 with Benefit Cost Ratio of ₹1.56.

1.1 To find out the constraints faced by the firm

- Market competition: Various farmers have become aware of the commercial potential of kiwi fruit; they have started preparing kiwi wine at home at small scale for their self-consumption or they sell it locally at a much lower price. This way the firm faces market competition.
- Lack of awareness of the product: The customers were not quite aware of their products and their health benefits as it was newly introduced in the market.
- Lack of credit support from financial institutions: The initial cost of establishing an orchard was capital intensive which was around ₹5 lakh per ha and farmers were capital constrained, they lack access to credit from banks and other such financial institutions. There was high inventory and transportation cost. This discourages the farmers from going for kiwi plantation.
- Accessibility: There was a accessibility problem of the winery to the market as it was located at the remote area.

  No variety specific orchard: The kiwi fruit in the orchard have a combination of varieties, and these when This was because of the absence of variety specific nurseries. marketed without grading leads to low wine quality.
- Less trained farmers: Because of the less trained farmers there was untimely harvesting of kiwi fruit which degrades the fruit quality. Untimely harvesting takes more time for fermentation ultimately delaying the production of kiwi wine.

5. Conclusion

At present the Lambu-Subu Food and Beverages was the only processing unit in Arunachal Pradesh which was famous for its product kiwi wine, India's first organic kiwi wine. The winery has a processing capacity of 60,000 litres and at present there were two different quantities of kiwi wine available i.e. 375ml costing ₹600 and 750ml costing 1500. The firm has a gross return of ₹37,49,500 per month of kiwi wine with total processing cost of ₹12,03,950 per month. And the processing cost of 1 quintal of kiwi wine was ₹8889 having returns per quintal of ₹74,089. So, the value addition of 1 quintal of kiwi was ₹8889. And the constraints of the firm were market competition from the local kiwi wine seller, lack of awareness of the product among people, no variety specific orchard etc.

6. References

Bille, P.G., Shikongo, N.M., and Ahmad, C. (2013). Value addition and processed products of three indigenous fruits in Namibia. *Afr. J. Food Agric. Nutr. Dev.,* 13(1): 7192-7212.

Jianrong, L., Haixia, L., Junli, Z., Yanbo, W., and Xuepeng, L. (2009). Aquatic products processing industry in China: Challenges and outlook. https://doi.org/10.1016/j.tifs.2008.09.008. Accessed 23 November 2019.

Jindal, K.K., and Laxman, S. (2016). Kiwi: A potential fruit crop, in North East India., https://www.researchgate.net/publication/311073505. Accessed 22 November 2019.

Phuse, A.P., Atkare, P., Vitonde, A.K., and Wankhade, R.S. (2008). Constraints and suggestions in Nagpur Mandarin orange production. *J. of Soils and Crop.*, 18(2): 417-412.

Shadab, B and Masrath, B. (2013). Nutritional quality on value addition to jack fruit seed flour. *J. Sci Res.,* 4(4): 2406-2411.

https://indianwildlifeclub.com/forum/forum-post-details.Aspx?fid=912. Accessed 23 November 2019.

https://www.mbaknol.com/financial-management/value-added/. Accessed 23 November 2019. https://www.naaraaaba.com/. Accessed 24 November 2019.

Yadav, R.N., Dutt, T., Singh, D., and Singh, V.K. (2010). Constraints faced by mango orchardists and suitable strategy for promotion of quality mango production. *Prog. Agric.,* 10(1): 106-110.