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Effect of value addition training on knowledge of rural women regarding underutilized fruits in Banaskantha district, Gujarat

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ABSTRACT

The study examined the effect of value addition training on rural women's knowledge of underutilized fruits and their potential for value addition. The study was conducted in Banaskantha district of Gujarat. Palanpur and Deesa talukas were purposively selected, followed by random selection of ten villages. Thirty rural women from each village were selected, giving a total sample of 300 respondents. A structured interview schedule was used to collect information on personal, socio-economic and communicative characteristics. Knowledge was assessed through a standardized knowledge test administered before and after the training intervention. Paired *t*-test was used to examine changes in knowledge scores. The respondents were predominantly young (59.60%), had secondary education (25.70%), belonged to the Other Backward Class (66.00%), lived in joint families (86.30%) and were largely landless (64.60%). Low mass media exposure (43.34%) and low social participation (54.00%) were also common. Training resulted in significant improvement in knowledge for most items. The largest gains were observed for the availability of wood apple (mean difference = 0.40; *t* = 12.446), understanding of value addition (0.40; *t* = 14.119), medicinal benefits of underutilized fruits (0.39; *t* = 11.749), and reduction of post-harvest losses and market risks (0.38; *t* = 10.546). Knowledge of Amla availability did not change significantly (mean difference = 0.02; *t* = 2.470), which is consistent with the high level of prior familiarity with the fruit. The findings indicate that focused value addition training can address specific knowledge gaps and strengthen the extension support needed for women to explore processing and income-generating opportunities.

Keywords: Underutilized fruits, value addition, knowledge gain, rural women, extension training

1. Introduction

Underutilized fruits are locally available fruit resources that receive less attention in production, marketing and processing despite their nutritional, therapeutic and economic potential. Aonla, tamarind, Jamun, bael and wood apple are among the fruits that can be processed into beverages, preserves, candies, chutneys, powders and other products. Processing can improve the usability of seasonal produce, reduce post-harvest losses and create opportunities for small-scale enterprise, particularly where raw fruit has limited market value. Khandelwal and Gupta reported that value addition of underutilized fruits can provide an alternative livelihood avenue for rural women and can improve the economic value of locally available fruit resources (Khandelwal *et al.*, 2016) [1].

Training is an important extension strategy for converting awareness into usable knowledge and skills. Evidence from vocational training programmes has shown that value addition training can improve women's knowledge of processing and related practices (Pandey *et al.*, 2017) [2]. Similarly, hands-on training in fruit processing has been associated with improved processing practices and income opportunities among rural women (Gurjar *et al.*, 2018) [3]. These findings suggest that the effectiveness of a training programme should be assessed not only through skill performance but also through the change in knowledge between the pre-training and post-training stages.

Banaskantha has a substantial rural population and a range of locally available fruit resources. However, limited awareness of the uses, processing potential and economic benefits of underutilized fruits can restrict their utilization. The present study was therefore undertaken to assess the change in rural women's knowledge following training on value addition of selected underutilized fruits.

Objective: To assess the effect of value addition training on the knowledge of rural women regarding underutilized fruits and their value addition.

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2. Materials and Methods

2.1 Study area and sampling

The study was conducted in Banaskantha district of North Gujarat. The district was selected purposively because of the availability and potential of underutilized fruits for nutritional, medicinal and economic value addition. Palanpur and Deesa talukas were purposively selected. Ten villages were then selected randomly, and 30 rural women from each village were selected randomly. Thus, the final sample comprised 300 respondents, with 150 respondents from each taluka.

2.2 Training intervention

The intervention focused on five locally relevant underutilized fruits: Indian gooseberry (Amla; *Emblica officinalis*), tamarind (Aamli; *Tamarindus indica*), Indian blackberry (Jambu; *Syzygium cumini*), stone apple (Bili; *Aegle marmelos*) and wood apple (Kottha; *Feronia limonia*). The training covered the basic concepts, availability, nutritional and medicinal importance, value addition and potential benefits of processing these fruits. The source manuscript reports training on products such as candies, preserves, beverages, chutneys and powders.

2.3 Measurement of knowledge

Knowledge was measured using a standardized knowledge test developed and validated for the study. The test covered the selected fruits and their value addition. Each respondent was assessed before and after the training. Knowledge gain was calculated as the difference between the post-training and pre-training scores.

2.4 Statistical analysis

Descriptive statistics were used to summarize the respondents' characteristics. A paired *t*-test was used to compare pre-training and post-training knowledge scores for individual knowledge items. A probability level below 0.01 was considered statistically significant for the items marked as significant in the original analysis.

3. Results

Table 1. Profile of the respondents

Characteristic	Predominant category	Frequency (%)
Age	Young (20–35 years)	179 (59.60%)
Education	Secondary (9th–10th)	77 (25.70%)
Language	Gujarati	227 (75.60%)
Caste	Other Backward Class	198 (66.00%)
Marital status	Married	282 (94.00%)
Family type	Joint	259 (86.30%)
Family size	Medium (5–8 members)	154 (51.33%)
Family income	Medium	156 (52.00%)
Occupation	Labour	82 (27.30%)
Land holding	Landless	194 (64.60%)
Mass media exposure	Low	130 (43.34%)
Social participation	Low	162 (54.00%)
Urban contact	Medium	155 (51.67%)

The respondents were mainly young women, with 59.60 per cent belonging to the 20–35 years age group. Secondary education was the most common educational level (25.70%). Most respondents were from the OBC category (66.00%), married (94.00%) and lived in joint families (86.30%). More than half belonged to the medium family-size (51.33%) and medium-income (52.00%) categories. Labour was the most common occupation (27.30%), while 64.60 per cent of respondents were landless. Low mass media exposure and low social participation were reported by 43.34 and 54.00 per cent of respondents, respectively, whereas 51.67 per cent had medium urban contact.

Table 2. Change in knowledge following value addition training

Sr. No.	Knowledge Items	Mean		Mean Difference	“t” value
		Pre	Post		
1.	Understanding concept of underutilized fruits	0.24	0.54	0.30	7.567 **
2.	Availability of underutilized fruits				
	• Indian goose berry (<i>Amla</i>)	0.98	1.00	0.02	2.470 ^{NS}
	• Tamarind (<i>Aamli</i>)	0.96	1.00	0.04	2.923**
	• Indian blackberry (<i>Jambu</i>)	0.94	0.99	0.05	3.175**
	• Stone apple (<i>Bili</i>)	0.71	0.96	0.25	8.976**
	• Wood apple (<i>Kottha</i>)	0.54	0.94	0.40	12.446**
3.	Benefits of underutilized fruits				
	• Highly nutritious, improve health, food security	0.21	0.46	0.25	7.161**
	• Cheap, locally available and grow on barren land	0.41	0.59	0.18	4.415**
	• Medicinal purposes (curative and therapeutic properties)	0.07	0.46	0.39	11.749**
	• Income generation and enterprise opportunities	0.08	0.42	0.34	10.600**
	• Suitable for processing and home delicacies	0.13	0.44	0.31	8.847**
4.	Knowledge about value addition of underutilized fruits	0.60	1.00	0.40	14.119**
5.	Understanding meaning of value addition	0.18	0.62	0.44	12.221**
6.	Benefits of value addition				
	• Nutritious, medicinal, safe and healthy food	0.37	0.59	0.22	5.579**
	• Enterprise opportunities, income generation	0.14	0.44	0.30	8.531**
	• Easier to consume, off-season preservation	0.39	0.57	0.18	4.341**
	• Reduce post-harvest losses, minimize market risks	0.14	0.52	0.38	10.546**

** Significant at 1% level; NS = non-significant.

Table 2 shows a clear increase in knowledge after the training. Knowledge of the concept of underutilized fruits increased from 0.24 to 0.54 (mean difference 0.30; $t = 7.567$). For fruit availability, significant changes were recorded for tamarind, Jamun, bael and wood apple. The largest increase was observed for wood apple (0.40; $t = 12.446$), followed by stone apple (0.25; $t = 8.976$). In contrast, knowledge of Amla availability was already high before training (0.98) and showed only a small, non-significant increase to 1.00.

The training also improved knowledge of the benefits of underutilized fruits. The largest increase was found for medicinal properties (0.39; $t = 11.749$), followed by income-generation and enterprise opportunities (0.34; $t = 10.600$). Knowledge of their suitability for processing and home delicacies increased by 0.31 points, while the gain for nutritional and health benefits was 0.25 points.

Knowledge related specifically to value addition showed substantial improvement. The score for knowledge about value addition increased from 0.60 to 1.00 (mean difference 0.40; $t = 14.119$), while understanding of the meaning of value addition increased from 0.18 to 0.62 (mean difference 0.44; $t = 12.221$). Among the stated benefits of value addition, the largest improvement concerned reduction of post-harvest losses and market risks (0.38; $t = 10.546$), followed by enterprise opportunities and income generation (0.30; $t = 8.531$).

4. Discussion

The results indicate that the training was particularly useful in areas where the respondents had limited initial knowledge. The strong gains for wood apple, medicinal properties, enterprise opportunities and value addition suggest that the intervention introduced information that was not sufficiently familiar to many respondents before training. This pattern is consistent with the broader role of value addition in improving the economic usefulness of underutilized fruits and creating small-scale livelihood opportunities for rural women (Khandelwal *et al.*, 2016) [1].

The findings are also in agreement with (Pandey *et al.*) [2], who reported that vocational training on value addition increased the knowledge of rural women regarding value addition of food grains, fruits and vegetables. The present study extends this evidence to a set of locally relevant underutilized fruits and shows that knowledge gains can be identified at the level of individual concepts, including medicinal value, processing potential and reduction of post-harvest losses.

The non-significant change in knowledge of Amla availability is important. The pre-training mean of 0.98 indicates that respondents were already highly familiar with its availability. Therefore, the limited scope for improvement was not necessarily a weakness of the training; rather, it reflects a ceiling effect for an item that was already well known. Training resources may consequently be better directed towards less familiar fruits and less understood aspects of value addition.

Previous work on processing of fruits by rural women has also shown that practical interventions can support improved processing and income generation (Gurjar *et al.*, 2018) [3]. For extension programmes, the implication is that information on underutilized fruits should not remain limited to nutritional descriptions. It should connect fruit availability with processing methods, product diversification, reduction of losses, local marketing and enterprise opportunities.

5. Conclusion

Value addition training produced a significant improvement in rural women's knowledge of underutilized fruits and their processing potential. The most pronounced gains were related to the availability of wood apple, understanding of value addition, medicinal properties, income-generation opportunities, and reduction of post-harvest losses and market risks. Knowledge of Amla availability did not change significantly because respondents already had high awareness of its local availability. The results support the use of focused, locally relevant

training as an agricultural extension strategy for strengthening women's knowledge and preparing them for value addition and small-scale enterprise activities.

6. Implications for agricultural extension

- Extension programmes should prioritize underutilized fruits that are locally available but less familiar to rural women.
- Training content should link fruit processing with post-harvest loss reduction, local market opportunities and enterprise development.
- Practical value addition training can be integrated with women's groups and other community-based extension activities.
- Follow-up support on product quality, packaging, costing and marketing would help translate improved knowledge into sustained economic activity.

7. Limitations

The study was conducted in selected villages of two talukas of Banaskantha district; therefore, the findings should be generalized to other settings with caution. The analysis reported here focuses on immediate change in knowledge after training. Longer-term retention of knowledge, adoption of processing practices and actual income effects require follow-up assessment.

8. Acknowledgement

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9. Ethical statement

The source manuscript does not provide details of institutional ethics approval or informed-consent procedures. Before submission, the authors should add an accurate statement describing the ethical procedure actually followed, including informed consent where applicable. No ethics approval number has been added here because it is not documented in the source material.

10. Funding

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