

# Adoption Feasibility of Lemon Products

<sup>1</sup>Anusha Punia, <sup>2</sup>Rita Goel, <sup>3</sup>Beena Yadav

<sup>1</sup>M.Sc. Scholar, <sup>2</sup>Professor, <sup>3</sup>Scientist

<sup>1,2,3</sup>Department of Home Science Extension Education College of Home Science, CCS HAU, HISAR, INDIA

---

**Abstract:** Lemon originated in Asian countries such as India and Malaysia. The scientific name for lemon is *citrus limon*. In India it is also known as nimbu, Bara nimbu, naranga etc. The study was conducted in two blocks of Hisar district namely Hisar-I and Hansi-I by random selection and by selecting two villages from each of the selected block at random. A sample of 100 respondents i.e. 25 from each village was drawn at random to assess adoption feasibility of lemon products. Perceived feasibility of lemon products was considered as profitable (50.0%), culturally and physically compatible (56.0% and 66.0% respectively), simple to make (47.0%) and most triable (57.0%). Regarding constraints, 81.0 per cent respondents perceived marketing of the product as the main constraint in adoption of lemon products.

**Keywords:** Lemon, adoption, feasibility, constraints.

---

## 1. INTRODUCTION

Fruits are very delicate, nutritious and perishable commodity essential for human beings as they are rich source of minerals, vitamins and are important for metabolism processes of human body. Kaul (1997) pointed out that horticulture has been acknowledged as a remunerative means for nutritional security, increasing employment opportunities, expanding returns from the land and providing raw material for fruit processing industries and fetching foreign exchange earnings. Citrus fruits have a prominent place among popular and exclusively grown tropical and sub-tropical fruits. In citrus fruits we mainly include- lemon or lime, grape, orange etc.

Lemon originated in Asian countries such as India and Malaysia. The scientific name for lemon is *citrus limon*. In India it is also known as nimbu, Bara nimbu, naranga etc. It is an evergreen aromatic shrub and the trees mostly with thorny branches, distributed throughout the tropical and temperate regions of the world (Anonymous, 2008). The fruit is juicy with few seeds and is very aromatic. It is a soothing drink in summer as well as in disease conditions such as fever, diarrhoea etc. It is also used in cosmetic's therapy.

Lemon peels contain pectin, which helps to set jams and jellies. Strips of peel can be added to serve with coffee or add to cakes and puddings. It is widely used in pickle and sherbets. Lemon pickle was an excellent, simple, easy to prepare, so tasty with just a few simple ingredients and is highly acceptable (Rick, 2007). Every part of the lemon is used in sweets or cooking delicious dishes. From the rind to the juice, it is used. Chaudhary and Devi (1996) suggested that the squash preparation is convenient alternative to prolong the period of consumption of fruits. Orange and lemon squashes are very easily digestible and highly rich in nutrition with respect of minerals and vitamins and good source of vitamin-c. Preparation of squashes of orange and lemon has been proved quite economical and can be conveniently adopted at home. Lemons are good for oral diseases, throat disorders, fevers, beauty aid, stomach problems, cough reliever etc. Lime is a sour, suppressor of wind and bile, digestive and stimulator of the digestive system. It is easily digestive, wards off intestinal worms and ailments like stomach troubles, distaste of food. Lemon is best for relieving dryness of scalp. It is unique in warding off dental carries and other disorders of gums (Dhawan, 2000). It works as a natural cleanser and nourishes skin and hair by providing Vitamin C.

Citrus fruits are grown in abundance in Haryana. The most common fruits grown are- Lemons, Kinnow, Mandarin, sweet orange (Malta) and sweet lime (Mitha Nimboo). Citrus fruits can be encouraged in the districts of Sirsa, Fatehabad, part of Hisar, Faridabad, Gurgaon, Bhiwani and irrigated areas of south-western zone.

Lemons can be stored and transported to long distance, as they do not damage easily. They can be stored at room temperature for weeks and for months under refrigeration. By preservation and proper storage of fruits, it can be saved for future use at the time of scarcity, natural drought, etc. To avoid the high degree of bitterness in the juice, proper care should be taken while extracting the juice so that unnecessary crushing of seeds and peel is avoided to have a juice with comparatively lesser bitterness (Thakur, Kaushal and Joshi, 2002). The demand for the processed fruit and vegetable products is likely to increase tremendously during the next decade due to increase in urban population, changing social pattern, increase of working female population. So, the study was conducted with the objectives to design, implement and assess the impact of intervention programme for adoption of lemon products and to identify the constraints in adoption of lemon products.

## 2. METHODOLOGY

The study was conducted in Hisar district of Haryana state. For present study, two blocks of Hisar district namely Hisar-I and Hansi-I were selected randomly and by selecting two villages from each of the selected block at random. Thus, Ladwa and Mirka villages from Hisar-I, Dhanderi and Sultanpur from Hansi-I block were selected. A sample of 100 respondents i.e. 25 from each village was drawn at random for exposure of intervention programme and to assess adoption of lemon products. The intervention programme consists of demonstration on selected lemon based preserved products which were lemon pickle in oil, sweet lemon pickle, lemon squash and lemon rind pickle in present instance. Demonstration was accompanied by distribution of relevant literature in form of a booklet to reinforce the information delivered. Various socio-economic, personal, psychological and communication variables constituted the independent variables and knowledge, attitude and adoption constituted the dependent variables for the study. Data were collected with the help of pre-tested structured interview schedule.

## 3. RESULTS AND DISCUSSION

Adoption feasibility here refers the potential lemon based preserved products possess for their adoption by rural women. Thus, in present context feasibility was defined as the extent to which rural women perceived the lemon products as their relative advantage, cultural compatibility, physical compatibility, simplicity/complexity and triability.

Table 1 revealed that preparation of lemon products was perceived as profitable by 50.0 per cent respondents followed by 25.0 per cent of respondents perceived it as most profitable, somewhat profitable (24.0%) and only 1.0 per cent respondents reported as least profitable. Hindustan Times (1997) reported that the improved methods of processing food would both combat hunger and provide mass employment. More than two million people work in Indian food factories.

**Table1: Profitability of lemon products as perceived by respondents (n=100)**

Sr. No.	Attributes	Villages				
		Ladwa (n=25)	Mirka (n=25)	Dhanderi (n=25)	Sultanpur (n=25)	Total (n=100)
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
1.	Most profitable	4(16.0)	10(40.0)	5(20.0)	6(24.0)	25(25.0)
2.	Profitable	12(48.0)	11(44.0)	11(44.0)	16(64.0)	50(50.0)
3.	Somewhat profitable	9(36.0)	4(16.0)	8(32.0)	3(12.0)	24(24.0)
4.	Least profitable	-	-	1(4.0)	-	1(1.0)
5.	Not at all profitable	-	-	-	-	-

*Figures in parentheses indicate percentage*

**Table 2: Cultural compatibility of lemon products as perceived by respondents (n=100)**

Sr. No.	Attributes	Villages				
		Ladwa (n=25)	Mirka (n=25)	Dhanderi (n=25)	Sultanpur (n=25)	Total (n=100)
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
1.	Most Compatible	3(12.0)	6(24.0)	4(16.0)	10(40.0)	23(23.0)
2.	Compatible	16(64.0)	17(68.0)	12(48.0)	11(44.0)	56(56.0)
3.	Somewhat Compatible	5(20.0)	2(8.0)	8(32.0)	4(16.0)	19(19.0)
4.	Least Compatible	1(4.0)	-	1(4.0)	-	2(2.0)
5.	Not at all Compatible	-	-	-	-	-

*Figures in parentheses indicate percentage*

Regarding cultural compatibility, lemon products were perceived as compatible by 56.0 per cent respondents followed by most compatible (23.0%), somewhat compatible (19.0%) and only 2.0 per cent of them found it least compatible. Nagy (2005) reported that variability in the vitamin-c contents of citrus fruits like lemon and their products is influenced by variety, cultural practice, maturity, climate, fresh fruit handling, processing factors, packaging and storage conditions. Aerobic and anaerobic mechanisms are mainly responsible for the destruction of vitamin-c in processed products.

**Table 3: Physical compatibility of lemon products as perceived by respondents (n=100)**

Sr. No.	Attributes	Villages				
		Ladwa (n=25)	Mirka (n=25)	Dhanderi (n=25)	Sultanpur (n=25)	Total (n=100)
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
1.	Most Compatible	2(8.0)	3(12.0)	3(12.0)	12(48.0)	20(20.0)
2.	Compatible	16(64.0)	21(84.0)	17(68.0)	12(48.0)	66(66.0)
3.	Somewhat Compatible	7(28.0)	1(4.0)	5(20.0)	1(4.0)	14(14.0)
4.	Least Compatible	-	-	-	-	-
5.	Not at all Compatible	-	-	-	-	-

*Figures in parentheses indicate percentage*

Physical compatibility was studied and lemon products was reported as compatible by 66.0 per cent respondents followed by 20.0 per cent who perceived it as most compatible and somewhat compatible (14.0%). Baba *et al.* (2009) revealed that (57.14 %) of women were found to participate in pickle making and 7.14 per cent in squash making.

**Table 4: Simplicity/complexity of lemon products as perceived by respondents (n=100)**

Sr. No.	Attributes	Villages				
		Ladwa (n=25)	Mirka (n=25)	Dhanderi (n=25)	Sultanpur (n=25)	Total (n=100)
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
1.	Very simple	13(52.0)	15(60.0)	6(24.0)	11(44.0)	45(45.0)
2.	Simple	12(48.0)	8(32.0)	13(52.0)	14(56.0)	47(47.0)
3.	Neither simple nor complex	-	2(8.0)	6(24.0)	-	8(8.0)
4.	Complex	-	-	-	-	-
5.	Very complex	-	-	-	-	-

*Figures in parentheses indicate percentage*

Most of the respondents (47.0%) found making lemon products as simple followed by very simple (45.0%) and 8.0 per cent respondents perceived it as neither simple nor complex.

**Table 5: Triability of lemon products as perceived by respondents (n=100)**

Sr. No.	Attributes	Villages				
		Ladwa (n=25)	Mirka (n=25)	Dhanderi (n=25)	Sultanpur (n=25)	Total (n=100)
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
1.	Most triable	17(68.0)	11(44.0)	13(52.0)	16(64.0)	57(57.0)
2.	Triable	4(16.0)	9(36.0)	6(24.0)	7(28.0)	26(26.0)
3.	Somewhat triable	4(16.0)	5(20.0)	6(24.0)	2(8.0)	17(17.0)
4.	Least triable	-	-	-	-	-
5.	Not at all triable	-	-	-	-	-

*Figures in parentheses indicate percentage*

Regarding triability attribute, preparation of lemon products was perceived as most triable by 57.0 per cent followed by triable (26.0%) and somewhat triable (17.0%).

**Table 6: Perceived adoption feasibility of lemon products by the respondents (n=100)**

Sr. No.	Attributes	Total score	Percentage	Rank
1.	Relative advantage	399	79.8	V
2.	Cultural compatibility	400	80.0	IV
3.	Physical compatibility	406	81.2	III
4.	Simplicity/complexity	437	87.4	II
5.	Triability	440	88.0	I

Women often have different training needs than men since they are more likely to work as contributing family workers, subsistence farmers, home-based micro-entrepreneurs, or low-paid seasonal labourers, in addition to handling their domestic work and care responsibilities (Jetting and Morrisson, 2009).

Perceived adoption feasibility of lemon products was ranked I<sup>st</sup> in terms of triability, simplicity (Rank II), physically compatible (Rank III), culturally compatible (Rank IV). Anonymous (2009) reported that a huge quantity of lemon squashes is consumed in the dry season and other times. All the squashes available in the market are synthetic products. It is beyond discussion that natural products are far better than synthetic products. In Bangladesh, about 6105 tons of lemon is produced annually. Extent of lemon products in terms of relative advantage was comparatively low than the other four attributes and it was 79.8 per cent. Waghmare and Chaudhary (1989) reported that most of the tribal farm women need training in cooking, food preservation, child care, handicraft and kitchen gardening.

Campbell and Dunnette (2003) reported that training is a planned learning experience designed to bring about permanent change in an individual's knowledge, attitudes or skills.

**Table 7: Impact of training (n=100)**

Sr. No.	Attributes	Villages				
		Ladwa (n=25)	Mirka (n=25)	Dhanderi (n=25)	Sultanpur (n=25)	Total (n=100)
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
i)	Low (16-25)	-	3(12.0)	-	2(8.0)	5(5.0)
ii)	Medium (26-35)	9(36.0)	4(16.0)	2(8.0)	6(24.0)	21(21.0)
iii)	High (36-48)	16(64.0)	18(72.0)	23(92.0)	17(68.0)	74(74.0)

*Figures in parentheses indicate percentage*

It was evident from the Table 7 that the majority of respondents (74.0%) were reported to possess high level impact followed by medium level (21.0%) and low level of impact of training programme (5.0%). It is anticipated that training programme might have provided effective learning situation by providing information in simple language for better attitude towards lemon products. Kashyap *et al.* (2000) reported that a skill training was imparted on need based areas related to food processing and income generating activities. Most of the trainees acquired sufficient level of knowledge, attitudinal change and skill acquisition in aforesaid activities.

Verma and Jain (1989), Yadav (1990), Mande and Patil (1991), Hanuman Lal and Panwar (1994) also confirmed significant change in knowledge, attitude even to illiterate or semiliterate farm women after training.

**Table 8: Reasons to attend training (n=100)**

Sr. No.	Purpose	Villages				
		Ladwa (n=50)	Mirka (n=50)	Dhanderi (n=50)	Sultanpur (n=50)	Total (n=200)
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
a)	For getting new information	42(84.0)	27(54.0)	25(50.0)	20(40.0)	114(57.0)
b)	For improving their skills	8(16.0)	28(56.0)	32(64.0)	29(58.0)	97(48.5)
c)	For starting their own venture	8(16.0)	3(6.0)	9(18.0)	5(10.0)	25(12.5)

*Figures in parentheses indicate percentage*

\* Multiple responses

The above Table revealed that all the respondents were interested in learning new products from lemon. Majority of respondents (57.0%) wanted to attend training for getting new information followed by 48.5 per cent of respondents for improving their skills and 12.5 per cent of respondents were interested in starting their own venture. Das and Baruah (2000) pointed out that involvement of farm women in modernization of farming practices and village industries is absolutely essential. They provided training on squash and pickle preparation to make use of locally available fruits and vegetables and found beneficial to set up their own co-operatives for products and marketing.

Any programme or activity no matter how effectively it has been formulated would encounter constraints. It was therefore assumed that the constraints faced by rural women would be of varied nature which would further help to provide alternate suggestions to make the lemon products viable and useful to rural women.

**Table 9: Constraints in adoption of lemon products by respondents (n=100)**

Sr. No.	Constraints	Villages				
		Ladwa (n=25)	Mirka (n=25)	Dhanderi (n=25)	Sultanpur (n=25)	Total (n=100)
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
i)	Marketing problem	16(64.0)	20(80.0)	22(88.0)	23(92.0)	81(81.0)
ii)	Lack of personal interest	6(24.0)	10(40.0)	8(32.0)	7(28.0)	31(31.0)
iii)	Non-recognition by family	7(28.0)	11(44.0)	11(44.0)	14(56.0)	43(43.0)
iv)	Non-recognition by society	6(24.0)	3(12.0)	2(8.0)	3(12.0)	14(14.0)
v)	Lack of confidence	10(40.0)	12(48.0)	14(56.0)	14(56.0)	50(50.0)
vi)	Lack of credit facility	13(52.0)	15(60.0)	13(52.0)	12(48.0)	53(53.0)
vii)	Non availability of the lemons	1(4.0)	-	-	-	1(1.0)

*Figures in parentheses indicate percentage*

\* Multiple responses

The data in Table 9 revealed the constraints reported by respondents in adoption of lemon products. Nisha and Subramanian (2000) revealed that social morals and taboos, excessive burden of household works and responsibilities and distant location of the society were felt as major constraints faced by the rural women in adoption of products.

It was observed from the data that 81.0 per cent of the respondents reported marketing problem followed by lack of credit facility (53.0%), In 1996 Bhardwaj studied that major constraints felt by trainees were unsuitable time schedule, less labour cost and inadequate marketing facilities, lack of confidence (50.0%), non-recognition by family (43.0%), lack of personal interest (31.0%), non-recognition by society (14.0%). Tawade *et al.* (1995) found that the inadequate training facilities, lack of timely guidance and less frequency of visits of extension workers were the several constraints faced by the trainees during training programmes and the major constraints in adoption of lemon products.

Gill and Singh (1996) listed out the constraints in adoption of lemon products as lack of inputs and inadequate finance etc.

Nikhada *et al.* (1997) reported that serious constraints felt were problem of marketing and transportation, lack of technical know-how and lack of finance.

### REFERENCES

- [1] Anonymous. 2008. Wealth of India. Mudran Enterprises New Delhi, India. Vol-II. pp. 188-208.
- [2] Anonymous. 2009. Statistical Year Book of Bangladesh. 19th Ed, Statistical Division, Ministry of Planning, Government of the Peoples Republic of Bangladesh.
- [3] Baba, Z. A, Hakim, A. H, Ganai, N. A, Malik, K. M and Sheikh, T. A. (2009). Role of Rural women in Agriculture and income generating activities. Asian J. Home. Sci. 4(1): 1-3.
- [4] Bhardwaj, S. 1996. Study on the self employment of rural women under integrated rural development programme. M.Sc. Thesis, CCS HAU, Hisar.
- [5] Campbell, A. and Dunnette. S. 2003. Trainees' Attributes and Attitudes : Neglected Influences on Training Effectiveness. The Academy of Management Review: 11 (4) : 736-739.

- [6] Chaudhary, N. and Devi, R. 1996. Squash: Nutritive and refreshing citrus preparation. Haryana Farming. 13 (6) :23-24.
- [7] Das, M. and Baruah, S. 2000. Development of farm women through private sector collaboration and NGO with agricultural university. Agril. Extn. Rev. 12 (3): 16-19.
- [8] Dhawan, S.S. 2000. Processing of Lemon Fruits. Haryana Farming. 30 (8): 2-3.
- [9] Gill, S.S. and Singh, A. 1996. Adoption status of recommended practices for wheat in Punjab. Agril. Extn. Rev. 4(5): 24.
- [10] Hanuman, L. and Panwar, J.S. 1994. Impact of short duration training on gain in knowledge about extension teaching methods and horticultural practices. Maharashtra J. Extn. Edu. 13 (10) : 39-42.
- [11] Hindustan Times. 1997. Indian Food Packer. 51 (3) : 65.
- [12] Jetting, J. and Morrisson, C. (2009). Women, bad jobs, rural area: what can "SIGI" tell us?. FAO-IFAD-ILO Workshop Op.Cit.
- [13] Kashyap, S., Phogat, P. and Sabharwal, K. 2000. Action research pertaining to the training of rural women and adolescent girls for improved home practices. Research Report. CCS HAU, Hisar.
- [14] Kaul, G.L. 1997. Horticulture development strategy. Indian Food Packer. Jan-Feb. 13-15.
- [15] Mande, R.R. 1991. Impact of training on rural youth (Abstr.). Seminar on Training for Rural Development: Prospects and Retrospects. Nov. 22-23. Dapoli.
- [16] Nagy, S. 2005. Effect of processing and packaging on lemon products. Haryana J. Hort. Sci. 33 (1&2): 36-37.
- [17] Nikhada, D.M.; Lianbika, B. and Bhople, R.S. 1997. Knowledge adoption and constraints analysis of pineapple technology. Rural India. 55(2): 33-35.
- [18] Nisha, P.R. and Subramanian, R. 2000. Participation of farm women in dairy co-operatives and their problems. J. of Research. ANGARU. 28 (3) : 32-36.
- [19] Patil, V.G., Sawant, A.G., and Hardikar, D.P. 1991. Paddy technology in relation to its adoption gaps by the trained and untrained farmers of Konkan (Abstr.). Seminar on Training for Rural Development: Prospects and Retrospects. Nov. 22-23. Dapoli.
- [20] Rick. S. 2007. In vitro digestibility of proteins in major fruits. Indian Food Packer. 42(5): 27-28.
- [21] Tawade, N.D.; Nirban, A.J. and Shinde, S.B. 1995. Constraints of local leaders in relation to their agricultural development activities. Maharashtra J. Extn. Edu. 14 : 234-240.
- [22] Thakur, N.K., Kaushal, B.B. and Joshi, V.K. 2002. Studies on overall quality of fruits and juice of lemon. Indian Food Packer. 56 (1&2) : 79-81.
- [23] Verma, T., Jain, V. and Devi, S. 1989. A study on gain in knowledge and change in attitude through training in improved home making tasks. Indian J. Extn. Edu. 25 (1&2): 75-76.
- [24] Waghmare, S.K. and Chaudhary, N.U. 1989. Tribal Women in Agriculture metropolitan Book Co. Pvt. Ltd. New Delhi.
- [25] Yadav, B. 1990. Training strategy for human resource development of rural women. Ph.D. Thesis (Unpubl.), CCS HAU, Hisar.