

## KNOWLEDGE OF RESPONDENTS ON SELECTED LEMON BASED PRESERVED PRODUCTS

ANUSHA PUNIA<sup>1</sup>, RITA GOEL<sup>2</sup> & BEENA YADAV<sup>3</sup>

<sup>1</sup>Research. Scholar, Department of Home Science Extension Education,

I.C College of Home Science, CCS HAU, Hisar, Haryana, India

<sup>2</sup>Professor, Department of Home Science Extension Education,

I.C College of Home Science, CCS HAU, Hisar, Haryana, India

<sup>3</sup>Associate Director, Directorate of Research, CCS HAU, Hisar, Haryana, India

### ABSTRACT

The Persian name of lemon is 'Limu' akin to the original Sanskrit word 'Nimbuka' meaning the varieties of lemons. It is from here that the word lemon has been derived- as is believed. The lemon grows in subtropical climates all over the world. The study was conducted in Haryana state by selecting two villages from each of the selected block at random. A sample of 200 respondents i.e. 50 from each village was drawn at random to assess existing knowledge of rural women. 32.0 per cent respondents had knowledge to preserve fruits and vegetables for adding variety to food before exposure while majority of respondents (98.0%) had knowledge to preserve fruits and vegetables for avoiding spoilage after post-exposure. Most of the respondents (55.0%) had knowledge about freezing method to preserve fruits and vegetables at pre-exposure stage while 99.0 per cent respondents had knowledge about freezing, drying, fermentation and use of sugar methods at post-exposure stage.

**KEYWORDS:** Lemon, Knowledge, Vegetables

### INTRODUCTION

India, endowed with fertile land and diverse agro climatic conditions such as tropical, sub-tropical, arid and temperate, so it holds a unique position for growing a wide range of food grains as well as horticultural crops specially fruits and vegetables. These horticultural crops cover slightly more than 7 per cent of the gross cropped area but contribute more than 18 per cent to the gross value of the agricultural output of the country (Kaul, 2013).

Citrus fruits have a prominent place among popular and exclusively grown tropical and sub-tropical fruits. Their wholesome nature, medicinal value has made them so important. Citrus fruits are very nutritious and contain appreciable amount of vitamin C besides other vitamins and minerals.

Lemon originated in Asian countries such as India and Malaysia. The scientific name for lemon is *citrus limon*. Botanically lemon is known by different names like *citrus medica*, *citrus limonum*, *citronnier*, *neemoo*, *leemoo*, *limonum* and *limone*. In India it is known as nimbu, Bara nimbu, naranga etc. 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.

Lemon fruits yielded 48.12 to 48.63 per cent juice content. Lemon fruits had carotenoids content of 1.11 to 1.24 mg/ 100 ml juice, besides being good source of vitamin-C. The seed and peel of lemon fruits had substantially higher content of limonin, whereas, peel had higher naringin content than juice. So these bittering compounds are present in quite high concentration in seed and peel. Thus 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, 2012).

Every part of the lemon is used in sweets or cooking delicious dishes. From the rind to the juice, it is used. Lemons are good for oral diseases, throat disorders, fevers, beauty aid, stomach problems, cough reliever etc. They can be used for jellies, jam, lemon curd etc. Lemons coated with an emulsion containing an essential oil (including basil essential oil) or a volatile compound (*Citrus reticulata* Blanco) had a longer shelf life than uncoated ones (Arora and Pandey, 2014). By preservation and proper storage of food, it can be saved for future use at the time of scarcity, natural drought, etc. In India citrus is processed into a number of products: acid lime - pickles, squash, cordials, sweet orange - juice, squash, marmalade, mandarin - juice, marmalade and squash. Lemon pickle was an excellent, simple, easy to prepare, so tasty with just a few simple ingredients and is highly acceptable (Rick, 2010). So, the study was conducted with the objective to assess knowledge of rural women regarding preservation of fruits, vegetables and also about lemon products.

## 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 200 respondents i.e. 50 from each village was drawn at random to assess existing knowledge of rural women regarding lemon products. 100 respondents were drawn from four villages for pre and post exposure. Intervention programme was designed for selected four lemons based preserved products for 100 rural women. 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 and attitude constituted the dependent variables for the study. Data were collected with the help of pre-tested structured interview schedule. The inferences were drawn on the basis of frequency and percentage, mean scores.

## RESULTS AND DISCUSSIONS

To assess the knowledge of respondents regarding lemon based preserved products four components were included in knowledge inventory these were reasons to preserve fruits and vegetables, different methods to preserve fruits and vegetables, methods to preserve lemons, points to consider while preserving lemon products. Knowledge of women regarding lemon based preserved products was analyzed in the following manner.

- Pre and post exposure knowledge of respondents about reasons to preserve fruits and vegetables.
- Pre and post exposure knowledge of respondents about methods to preserve fruits and vegetables.
- Pre and post exposure knowledge of respondents about methods to preserve lemons.

- Pre and post exposure knowledge of respondents about points to consider while preserving lemon products.

Table 1 indicated the reasons perceived by respondents to preserve fruits and vegetables before and after exposure. At pre- exposure stage about 32.0 per cent respondents replied that preserved fruits and vegetables add variety to food whereas 27.0 per cent respondents told that fruits and vegetables should be preserved to avoid spoilage. Very few respondents told the reasons that to enjoy the taste of fruits and vegetables in off season and additional income to family, preservation of fruits and vegetables technique can be used. But at the post- exposure stage almost all the (98.0%) respondents replied that to avoid spoilage of fruits and vegetables, 85.0 per cent to add variety to food, 82.0 per cent to enjoy taste of fruits and vegetables in off season, 62.0 per cent to add income to family, fruits and vegetables can be processed.

At pre- exposure stage none of the respondent perceived that fruit and vegetable processing can provide employment to unemployed but after post exposure, 41.0 per cent respondents replied that fruit and vegetable processing unit can provide employment to unemployed.

It may be concluded from the Table that after post- exposure stage there was change in knowledge about the reasons for processing of fruits and vegetables.

Miller (2011) reported the importance of salt in the preservation of food items. 3000 years ago, the Babylonians, Egyptians and Chinese were all experts at salting the food stuff to preserve vegetables, fruits and fish. Salt eliminates the growth of bacteria, which spoils the food. It absorbs the moisture of the food and preserves it for a long period of time.

Table 2 presented data about methods perceived by respondents to preserve fruits and vegetables before and after exposure. At pre- exposure stage about 55.0 per cent respondents replied that for preserving fruits and vegetables freezing is used whereas 28.0 per cent respondents told that drying can also be used. Very few respondents i.e. 1.0 per cent told that we preserve fruits and vegetables by using sugar. But at the post- exposure stage almost all the respondents (99.0%) replied freezing is used to preserve fruits and vegetables, drying (89.0%), concentration of salt/vinegar (34.0%), fermentation (27.0%), and use of sugar (21.0%).

So, it was concluded from the Table that at pre-exposure stage none of the respondent knew about the methods besides freezing but at post- exposure stage there was change in their knowledge about methods to preserve fruits and vegetables.

Das (2012) suggested that food preservation is any of a number of methods by which food is kept from spoilage. Among the oldest methods of preservation are drying, refrigeration and fermentation. Modern methods include canning, pasteurization, freezing, irradiation and the addition of chemicals. Advances in packaging materials have played an important role in modern food preservation methods.

Table 3 indicated the methods perceived by respondents to preserve lemons before and after exposure. At pre-exposure stage about 48.0 per cent respondents replied that lemons can be preserved by freezing. None of the respondent knew about the methods- fermentation, use of sugar to preserve lemons.

But at the post-exposure stage 81.0 per cent respondents replied for freezing, concentration of salts/vinegar (66.0%), fermentation (10.0%), use of sugar (6.0%) and only 4.0 per cent told method of drying.

Motarjemi (2008) reported that fermentation is one of the oldest technologies used for food preservation. Over the centuries, it has evolved and been refined and diversified. Today, a variety of food products is derived from this technology in households, small-scale food industries as well as in large enterprises. Furthermore, fermentation is an affordable food preservation technology and of economic importance to developing countries. Fermentation enhances the nutritional quality of foods and contributes to food safety particularly under conditions where refrigeration or other foods processing facilities are not available.

The data in Table 4 showed knowledge of respondents about points to consider while preserving lemon products at pre- exposure and post-exposure. At pre-exposure stage 46.0 per cent respondents replied about cleanliness of the fruits, washing (42.0%) and 23.0 per cent respondents replied for sorting of fruits.

At post- exposure stage almost all the respondents (99.0%) told for sorting of fruits and washing followed by cleanliness (87.0%), filling and corking (70.0%) and only 3.0 per cent respondents replied for avoiding contamination at any stage.

It may be concluded from the Table that at post- exposure stage there was a tremendous change in knowledge about points to consider while preserving lemon products.

**Table 1: Pre and Post Exposure Knowledge of Respondents about Reasons to Preserve Fruits and Vegetables**

Sr. No.	Reasons	Villages									
		Ladwa (n=25)		Mirka (n=25)		Dhanderi (n=25)		Sultanpur (n=25)		Total (n=100)	
		Frequency (%)		Frequency (%)		Frequency (%)		Frequency (%)		Frequency (%)	
	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	
a)	To avoid spoilage	5(20.0)	23(92.0)	3(12.0)	25(100.0)	17(68.0)	25(100.0)	2(8.0)	25(100.0)	27(27.0)	98(98.0)
b)	To add variety to food	2(8.0)	23(92.0)	13(52.0)	23(92.0)	4(16.0)	20(80.0)	13(52.0)	19(76.0)	32(32.0)	85(85.0)
c)	To enjoy the taste of fruits and vegetables in off-season	1(4.0)	22(88.0)	7(28.0)	19(76.0)	2(8.0)	23(92.0)	3(12.0)	18(72.0)	13(13.0)	82(82.0)
d)	Additional income to family	-	18(72.0)	1(4.0)	14(56.0)	2(8.0)	14(56.0)	1(4.0)	16(64.0)	4(4.0)	62(62.0)
e)	Employment to unemployed youth	-	10(40.0)	-	9(36.0)	-	12(48.0)	-	10(40.0)	-	41(41.0)

*Figures in parentheses indicate percentage*

\* Multiple responses

**Table 2: Pre and Post Exposure Knowledge of Respondents about Methods to Preserve Fruits and Vegetables**

Sr. No.	Methods	Villages									
		Ladwa (n=25)		Mirka (n=25)		Dhanderi (n=25)		Sultanpur (n=25)		Total (n=100)	
		Frequency (%)		Frequency (%)		Frequency (%)		Frequency (%)		Frequency (%)	
		Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure
a)	Drying	3(12.0)	23(92.0)	6(24.0)	20(80.0)	11(44.0)	24(96.0)	8(32.0)	22(88.0)	28(28.0)	89(89.0)
b)	Freezing	14(56.0)	25(100.0)	13(52.0)	24(96.0)	11(44.0)	25(100.0)	17(68.0)	25(100.0)	55(55.0)	99(99.0)
c)	Fermentation	-	18(72.0)	-	1(4.0)	-	6(24.0)	-	2(8.0)	-	27(27.0)
d)	Concentration of salts/ vinegar/acetic acid	-	17(68.0)	-	7(28.0)	-	9(36.0)	-	1(4.0)	-	34(34.0)
e)	Use of sugar	1(4.0)	14(56.0)	-	-	-	6(24.0)	-	1(4.0)	1(1.0)	21(21.0)

Figures in parentheses indicate percentage

\* Multiple responses

**Table 3: Pre and Post Exposure Knowledge of Respondents about Methods to Preserve Lemons**

Sr. No.	Methods	Villages									
		Ladwa (n=25)		Mirka (n=25)		Dhanderi (n=25)		Sultanpur (n=25)		Total (n=100)	
		Frequency (%)		Frequency (%)		Frequency (%)		Frequency (%)		Frequency (%)	
		Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure
a)	Concentration of salts/ vinegar	3(12.0)	22(88.0)	-	16(64.0)	6(24.0)	18(72.0)	-	10(40.0)	9(9.0)	66(66.0)
b)	Freezing	10(40.0)	22(88.0)	14(56.0)	19(76.0)	9(36.0)	19(76.0)	15(60.0)	21(84.0)	48(48.0)	81(81.0)
c)	Fermentation	-	3(12.0)	-	1(4.0)	-	3(12.0)	-	3(12.0)	-	10(10.0)
d)	Drying	2(8.0)	1(4.0)	-	-	-	3(12.0)	-	-	2(2.0)	4(4.0)
e)	Use of sugar	-	4(16.0)	-	-	-	1(4.0)	-	1(4.0)	-	6(6.0)

Figures in parentheses indicate percentage

\* Multiple responses

**Table 4: Pre and Post Exposure Knowledge of Respondents about Points to Consider While Preserving Lemon Products**

Sr. No.	Points	Villages									
		Ladwa (n=25)		Mirka (n=25)		Dhanderi (n=25)		Sultanpur (n=25)		Total (n=100)	
		Frequency (%)		Frequency (%)		Frequency (%)		Frequency (%)		Frequency (%)	
		Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure	Pre-Exposure	Post-Exposure
a)	Sorting of fruits	4(16.0)	25(100.0)	6(24.0)	24(96.0)	5(20.0)	25(100.0)	8(32.0)	25(100.0)	23(23.0)	99(99.0)
b)	Washing	9(36.0)	25(100.0)	12(48.0)	25(100.0)	8(32.0)	24(96.0)	13(52.0)	25(100.0)	42(42.0)	99(99.0)
c)	Avoiding contamination at any stage	-	-	-	-	-	2(8.0)	-	1(4.0)	-	3(3.0)
d)	Cleanliness	11(44.0)	24(96.0)	17(68.0)	21(84.0)	12(48.0)	21(84.0)	6(24.0)	21(84.0)	46(46.0)	87(87.0)
e)	Filling and corking	-	19(76.0)	-	16(64.0)	-	18(72.0)	-	17(68.0)	-	70(70.0)

*Figures in parentheses indicate percentage*

\* Multiple responses

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