



## IMPACT ASSESSMENT OF TRAINING ON FOOD PRESERVATION AND PROCESSING

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### ABSTRACT

Population growth has outstripped the agricultural productivity in Pakistan which is a contributory factor in upsurge of food insecurity. Food insecurity is lack of access to a nutritionally satisfactory diet in a household or country. Household food security exists when household members have access to quality food needed for a healthy life at all times. Food processing and allied activities are important factors in promotion of food access and the production of safe and nourishing foodstuffs. In this background, training is an essential aspect of development of skills especially for women. The present study was designed to evaluate the impact of food preservation and processing trainings organized by Food Technology Section, Ayub Agricultural Research Institute (AARI) at five Vocational Training Institutes during 2019. Main target of these trainings were women with an objective to educate them about value addition of different fruits and vegetables at household level particularly for awareness of availability of nutritious food all the year. Study results indicated that 66.84% respondents were under the age of 25 years with secondary level of education and utilizing their free time for capacity building in terms of expertise in food preservation and processing. Almost 12.63% attendants showed interest in entrepreneurship. Majority of the respondents (77.37 and 68.94%) were familiar only with freezing and pickling techniques before training while canning, salting and drying were least familiar food preservation techniques. Knowledge about food safety and preparation of jam, marmalade and squashes was 100% after attending the training. Present skill development training program was considered very useful by the participants for capacity development. It empowered them in confidence building, and skills of different techniques of food preservation and processing. Participants interested in entrepreneurship took this opportunity as advantageous in income generation and self-employment opportunities which could be a great factor in their socioeconomic uplift. This will ultimately help in economic growth of the country by enhancing the GDP through reducing the losses in agriculture sector.

KEYWORDS: Food preservation; food processing; food security; training; impact assessment; Pakistan

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Article received on:  
05/08/2019

Accepted for publication:  
21/01/2020

### INTRODUCTION

Population growth has outstripped the agricultural productivity in Pakistan which is a contributory factor in upsurge of food insecurity. Food insecurity is lack of access to a nutritionally adequate diet in a household or country (Webb *et al.*, 2006). Food security may be defined as physical social, and economical access to sufficient, safe, and nutritious food to meet dietary needs and food preferences for an active and healthy life (Barrett, 2010). Household food security exists when household members have access to the food needed for a healthy life and eventually engenders food secure geo-political region where people have access to adequate quality and quantity of food at all times. For food security to be ensured at individual household, region, or nation, three important factors have to be in place *i.e.*, food availability, food accessibility and food utilization. "Food availability"

concerns the physical presence of food, which depends on domestic food ingestion and production as well as affordability (Bruchi and De-Muro, 2016). Accessibility of food depends on purchasing power of people and is economically constrained.

Food processing and allied activities are important factors in the promotion of food access and making of safe and healthy foodstuffs. Food processing is obligatory in extending useful life of foods and optimization of nutrient availability in food while maintaining the quality (Weaver and Ziegler, 2010). Availability of healthy and balanced food for today and next generations require technological solutions through collaborative efforts across agriculture, food, nutrition and health. Use of low grade fruits and vegetables for jams, jellies, pickles, squashes and different sauces ultimately help in reduction of losses and waste (De Fries *et al.*, 2015).

Training is one of the important aspects of entrepreneurship development. It is considered as a part of strategy for growth and progress of an organization. Basically training is intended to help individuals to learn and bring a desired standard of efficiency, condition and behavior and may be defined as an act of increasing the knowledge and skills of personnel for doing a good job. It is also suggested that increase in knowledge should be a pre-requisite for building confidence among trainees while assessing the efficacy of training on food preservation in Indian Punjab. Among women, efficacy of trainings for entrepreneurship is well established in developing countries (Schreinemachers *et al.*, 2016; Weinberger, 2013). Sharma (2018) described the various modules of food processing trainings for micro-entrepreneurship in women for growth of their agribusiness. These included marketing, account keeping and production management along with food preservation and processing techniques.

Food Technology Section, AARI have been conducting trainings on food processing and preservation, on campus and in various vocational institutes of Punjab. Main target of these trainings are women to educate them regarding value addition of different fruits and vegetables at household level particularly for awareness of availability nutritious food all the year. Present study was aimed to assess the impact of food processing and preservation trainings conducted by Food Technology Section with the following objectives:

1. To study the demographic attributes of trainees
2. To assess the impact of training programme
3. To obtain the feedback of trainees for improving future training programme

### Methodology

Data was acquired from seven trainings held at Vocational Training Institutes of Faisalabad, Toba Tek Singh and Samundari. Frequency and percentage of respondents at different institutes are presented in Table 1. From three vocational training institutes of Faisalabad, percentage of respondents was 24.5, 21.1 and 18.4% while from Toba Tek Singh and Samundari institutes, 13.2 and 22.6% respondents were included in study, respectively.

**Table 1. Percentage of respondents from different vocational training institutes**

Institute	f	%
Sanatzar, D-Ground, Faisalabad	47	24.7
Vocational Training Institute, Peoples Colony, Faisalabad	40	21.1
Sanatzar, Toba Tek Singh	25	13.2
Vocational Training Institute, Samundari	43	22.6
Vocational Training Institute, Ghulam Muhammad Abad, Faisalabad	35	18.4

Data from 190 respondents were collected using a well-developed questionnaire for pre and post-training assessment. Trainees were asked to fill Pre-training questionnaire at the start of training session according to their prior knowledge. Afterwards lectures were delivered about food safety, food security, different food preservation & processing techniques and their practical demonstration. Subsequently, trainees were asked to fill post-training questionnaire and answer the questions according to the knowledge which they have acquired during lectures and practical demonstration.

Data were analysed using SPSS version 20 and descriptive analysis i.e., frequencies & percentage was performed to evaluate the knowledge level of trainees and impact of training.

### Results

Results regarding demographic attributes of the participants are presented in Table 2. Major percentage of participants (66.84%) was below 25 years. Only 8.94% participants were above 30 years and remaining was among 25-30. Major proportion of the participants (62.63%) was having secondary education. Participants having education up to higher secondary and graduation level were 22.63 and 10.0%, respectively. Only 4.74% females were having education up to masters level.

**Table 2. Demographic frequencies of the participants**

Demographic Attributes	f	%
<b>Age (years)</b>		
Less than 25	127	66.84
25 to 30	46	24.21
More than 30	17	8.94
<b>Education</b>		
Secondary	119	62.63
Higher Secondary	43	22.63
Graduation	19	10
Masters	9	4.74
<b>Marital Status</b>		
Unmarried	164	86.32
Married	26	13.68
<b>Family Size</b>		
Less than 5	52	27.37
5 to 6	46	24.21
More than 6	92	48.42
<b>Source of Income (Household Head)</b>		
Govt. job	23	12.11
Private job	48	25.26
Business	87	45.78
Labourer	32	16.84
<b>Reason for getting training</b>		
Capacity development	54	28.42
Free from studies	94	49.47
Efficient use of limited Resources	18	9.47
Entrepreneurship	24	12.63

Married participants were only 13.68% while remaining were unmarried. Regarding family size of the participants, 48.42% belonged to families having more than six family members, 24.21% to families having 5-6 members and 27.37% belonged to families having less than five members.

From Table 2, it is indicated that income source of family head of the participants was categorized into four types i.e., Govt. job, private job, small business and labourer. Most of the participants (45.78%) were grouped in small business category followed by private job (25.26%). When participants were enquired why they were attending training, 28.42% replied for capacity development, 49.47% were free from studies,

9.47% wishing to be efficient in use of limited resources and 12.63% joined training for entrepreneurship.

Pre and post-training knowledge of the participants regarding food safety and balanced food was checked by different questions and results are shown in Table 3. It is indicated from the results that pickling and freezing were the food preservation techniques, the participants were most familiar with (68.94 and 77.37%, respectively) before training. None of the participants were having knowledge of canning and only 5.79 and 7.89% were knowledge of salting and drying, respectively. Percentage of participants increased having knowledge of food preservation techniques after attending the training.

**Table 3. Pre and post-training knowledge of the participants**

Statements	Pre-training		Post-training	
	f	%	f	%
<b>Do you know about methods of food preservation</b>				
Pickling	131	68.94	190	100
Salting	11	5.79	182	99.47
Drying	15	7.89	179	94.21
Freezing	147	77.37	190	100
Canning	0	0	152	80
Quartet	88	46.52	186	97.89
<b>What do you know about food safety</b>				
Food free from Bacteria and fungi	80	42.10	190	100
Food free from heavy metals	29	15.26	190	100
Both of these	82	43.16	190	100
<b>What do you know about balanced diet</b>				
Food contain carbohydrates, proteins and fats	152	80	190	100
Food contain essential vitamins	65	34.21	179	94.21
Food contain essential minerals and salts	38	20	174	91.58
All of these	164	86.32	171	90
<b>What do you know about infection of food</b>				
Appearance of fungi on food	115	60.52	190	100
Food becomes smelly	177	93.16	190	100
Food changes colour	127	66.84	184	96.84
All of these	92	48.42	183	96.32
<b>How food infection could be controlled</b>				
Personal hygiene	66	34.74	182	95.79
Use of clean utensils	107	56.32	185	97.37
Use of clean fruits and vegetables	123	64.74	182	95.79
All of these	58	30.53	176	92.63
<b>What do you know about role of salt in food preservation</b>				
Salt reduces moisture of food	18	9.47	129	67.89
Salt inhibits microbial growth	21	11.05	108	56.84
All of these	19	10	79	41.58
<b>What do you know about role of sugar in food preservation</b>				
Sugar reduces moisture of food	19	10	95	50
Sugar inhibits microbial growth	21	11.05	72	37.89
All of these	23	12.10	76	40
<b>What do you know about food security</b>				
Food security is the condition in which all people, at all times, have physical, social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life	11	5.79	53	27.89
Balanced food free from bacteria is available	40	21.05	58	30.52

Regarding food safety, 42.10% participants were considering it as food free from microbes while, only 15.26% were having idea of food free from heavy metals before training. About concept of balanced food, a satisfactory percentage (86.32%) of participants was

having knowledge of concept of balanced diet having proteins, carbohydrates and fats along with essential vitamins and minerals before training and this portion further increased up to 90%.

Only 48.42% of trainees were having idea of infected

food before training and after getting trained, 96.32% of participants were clear about infected food. 30.53% of participants were having information how to control of infection of food and after training, 92.63% of the trainees were having idea of controlling food infection. Only 10 and 12.10% of the trainees were knowing about role of salt and sugar in food preservation before training and this percentage was increased up to 41.58 and 10% after training, respectively. Regarding food security, 21.05% of the trainees were taking food security as food safety i.e., considering food free from microbes as food security before training. It could be inferred from the results that majority of the respondents were unaware of food security and even after training concept was not very much clear.

Results pertaining to knowledge of trainees regarding different food processing techniques are presented in Table 4. None of the participants were having knowledge how to prepare apple jam, lemon barley and strawberry squash before training and after attending training, 100% of trainees knew how to prepare apple jam, lemon barley and strawberry squash. However, 8.95% trainees knew how to make pickle before training while, after training 94.74% trainees got knowledge about pickling technique.

**Table 4. Percentage of pre and post-training knowledge of trainees regarding different food preparation**

Food	Pre-training		Post-training	
	f	%	f	%
<b>Apple jam</b>				
Yes	0	0	170	89.47
No	190	100	20	10.53
<b>Marmalade</b>				
Yes	11	5.79	181	95.26
No	179	94.21	9	4.74
<b>Mango squash</b>				
Yes	13	6.84	190	100
No	177	93.16	0	0
<b>Lemon barley</b>				
Yes	0	0	184	96.84
No	190	100	6	3.16
<b>Mix Pickle</b>				
Yes	17	8.95	180	94.74
No	173	91.05	10	5.26
<b>Strawberry squash</b>				
Yes	0	0	177	93.16
No	190	100	3	1.58

At the end of training, trainees were asked to give their suggestions for improvement of training programme and results about their propositions are presented in Table 5. All of the trainees (100%) were satisfied with the methodology adopted by staff for delivering lecture and practical demonstration as well as with the behaviour of the training staff. Major proportion

of the trainees (95.26%) suggested for increasing the duration of training for a week so as to get more practical knowledge of preparing food items. However, 92.63% participants submitted to advertise training venue and schedule on local TV channels or newspapers. Only 11.58% trainees proposed to cover marketing aspect of the food items. This may be due to less number of participants getting training as entrepreneurs.

**Table 5. Suggestions for improving future training programmes**

Suggestions	f	%	Ranks
Emphasis should be given on skill development			
Yes	167	87.89	V
No	23	12.11	
Duration of training must be increased for a week			
Yes	181	95.26	II
No	9	4.74	
Visit to the food-processing unit must be arranged for practical experience			
Yes	172	90.53	IV
No	18	9.47	
Training programme advertisement should be given in the local newspapers/local tv channels			
Yes	176	92.63	III
No	14	7.37	
Marketing aspect of food items should also be covered			
Yes	22	11.58	VI
No	168	88.42	
Are you satisfied with methodology of training staff			
Yes	190	100	I
No	0	0	
Are you satisfied with behaviour of training staff			
Yes	190	100	I
No	0	0	

## Discussion

Training involves the facilitation of learning by people who can benefit by attaining new knowledge, skills and attitude (Kapila, 2015). Present study was conducted to outline the needs of trainees along with impact of food preservation and processing trainings conducted by Food Technology Section, AARI for further betterment of these events. It was inferred from previous studies that effective trainings focus on the real wants of the participants (Asif, 2000; Rowell *et al.*, 2013).

Vocational education and skill development for food preservation and processing can play an important role in improving household productivity, income, earning opportunity and employability. These activities may also promote food security and sustainable development.

Roopa *et al.*, (2016) stated that by focusing on women involved in agriculture; target of achieving food security and sustainable rural development could be accomplished. Food processing trainings could be most important device in improving rural women productivity and work efficiency.

Present skill development training program was considered very useful by the participants for capacity development. It empowered them in confidence building, and skills of different techniques of food preservation and processing. Participants interested in entrepreneurship took this opportunity as advantageous in income generation and self-employment opportunities which could be a great factor in their socioeconomic upliftment. Trainings were well organized, sequential and liked by participants. All the trainees showed active involvement in lectures and practical sessions. They gained new knowledge and skills which can open new doors to them to upgrade their quality of life in all aspects and necessitated further trainings of longer duration.

Such training programs should be conducted regularly to improve employability and socio-economic standard of life of youth. Government should start a series of food processing and preserving trainings in rural areas specifically tailor-made for women by enabling them to utilize their resources for income. This will ultimately help in economic growth of the country by enhancing the GDP through reducing the losses in agricultural sector (Tiwari *et al.*, 2017).

### Conclusions and Recommendations

Following conclusions could be drawn from results:

- It is clear from the results that major proportion of the participants were having secondary level of education, were aged between 25-30 and attending training as they were free from studies. They wanted to learn more techniques for capacity building; therefore, training duration should be increased up to one week giving more time to practical demonstration.
- Training schedules and venues should be advertised on social media as most of the respondents were staying at homes and no other source of information about such kind of trainings was available.
- Regarding food safety and food security, respondents were taking both terms same and related to infected food. It is suggested that women should be taught more specifically about food security and food safety so that they should be able to store and utilize healthy and nutritious food by avoiding health hazards due to unhealthy practices

and cooking or eating in unhygienic conditions. This will also enable females to select a healthy and nourishing diet for different members of the family according to their need i.e., children, elderly and patients.

- A very low proportion of participants were having knowledge of salt and sugar in controlling food infection. Lectures about specific roles of different nutrients in food, lowering moisture content of food to avoid infection for preservation should be delivered before the practical demonstration of these techniques rather than a general lecture.
- More food processing and preservation techniques like drying, canning and salting should be added in the training module as participants were not having any practical knowledge of these techniques.
- A significant proportion of respondents were interested in entrepreneurship which is a good sign that females are inclined to enter in food related business. Special training modules should be devised for entrepreneurs covering technology, finances and marketing. It will help women to be more empowered financially and socially.

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