Cauliflower Post Harvest System: A Lens View on Current Status and Knowledge

C. SIVANANTH AND M. ESAKKIMUTHU[1*]
Tamil Nadu Agricultural University, Madurai

Abstract

Quality and condition of produce sent to market and its subsequent selling price are directly affected by the care taken during harvesting and field handling. Even though, number of post harvest handling practices is being recommended to minimize the post harvest losses at field level the fruits and cauliflower growers are not following the recommended practices. Thus, the technologies vary from farmer to farmer according to their personal and socio-economic characteristics, perceived training needs, availability of factors of production and the practical problems in following post harvest handling. A study has conducted in Dindigul district of Oddanchatram block with sample size of thirty. The study findings reveals that, cauliflower growers has medium level of knowledge in cultivation aspects.

Keywords: *Cauliflower growers, Market, Production, Quality, Training needs*

Introduction

Vegetables are the most nutritious, valuable agricultural produces which are categorized as protective foods. India's diverse agro climate ensures availability of all varieties of fresh vegetables. India ranks second in vegetables production in the world, after China. During 2011-12 India produced 156.33 million metric tonnes of vegetables. The area under cultivation of vegetables was cultivated at 8.99 million hectares. India is the largest producer of cauliflower. The 2011-12 statistic reveals that India produced 7.34 million metric tonnes of cauliflower. (National Horticulture Board). Accordingly (WHO/FAO) report that vegetables are important components of a healthy diet, and their sufficient daily consumption could help to prevent major diseases, such as cardiovascular diseases and cancers. Approximately 16.0 million (1.0%) disability adjusted life years (DALYs, a measure of the potential life lost due to premature mortality and the years of productive life lost due to disability) and 1.7 million (2.8%) of deaths are attributable to low vegetable consumption. Moreover, insufficient intake of vegetables is estimated to cause around 14% of gastrointestinal cancer deaths, about 11% of ischemic heart disease deaths and about 9% of stroke deaths globally. Food and agricultural organization recommends a minimum of 400g of vegetables per day for the prevention of chronic diseases such as heart disease, cancer, diabetes and obesity, as well as for the prevention and alleviation of several micronutrient deficiencies, especially in developing countries. Wastage rates in vegetables are high ranging between 20-30 %. In the last five years, the prices of vegetables have increased above the usual level, and lack of affordability has become one of the major factors that limit adequate consumption of vegetables, especially in poorer households.

According to (FAO) report revealed that in developing countries, poor care and post harvest handling of vegetables frequently result in loss of quality, especially when not consumed immediately. In some developing countries, people are not sufficiently informed on how to make technical choices for better preservation and post harvest handling of vegetables. This is resulting in post harvest losses, which directly influences the country's economy and food accessibility of consumers. Even though a number of post harvest management practices are being recommended to minimize the post harvest losses at field level, the vegetables growers are not following the recommended practices. Thus, the technologies vary from farmer to farmer according to their personal and socio-economic characteristics, perceived training needs, availability of factors of production and the

[1]Govind Ballabh Pant University of Agriculture and Technology, Pantnagar
*Corresponding author: esakkimuthu418@yahoo.com

practical problems in following post harvest handling. Considering the above points, it is essential to understand the present status of post harvest handling practices, level of knowledge on post harvest handling practices and the constraints faced by farmers during post harvest handling so as to facilitate framing appropriate strategies to minimize the post harvest losses. Keeping this in view, the present investigation was conducted in the predominantly cauliflower producing Dindigul districts of southern Tamil Nadu with the following objectives. The objective of this paper is, to study the present status of post harvest handling practices of cauliflower; to assess the knowledge level of farmers in post harvest handling practices of cauliflower.

Methodology

The study has conducted in Dindigul district which was purposively selected. From the district Oddanchatram block has selected based on high production of cauliflower. From the block viz., Palkadai and Ambilikai villages were selected for conduct of the study. From each village fifteen progressive banana growers were selected based on size of land holding by using simple random sampling method. Accordingly, the total number of respondents for the study is thirty. Ex-post facto design was adopted in the study. The pre-tested interview schedules have used to collect the data from the farmers by personal interview method. The appropriate statistical tools such as mean, standard deviation, percentage analysis were used and interpretations were made.

Results and Discussion

Status of post harvest handling practices of cauliflower

The facts and reasons responsible for the existing post harvest handling practices are discussed in following headings. The results pertaining to harvesting of cauliflower is depicted in Table 1.

Assessment of crop maturity: All the cauliflower farmers are using field method to judge the maturity of cauliflower. None of the farmers using scientific methods or any other methods to judge the maturity of cauliflower. The result shows that all the farmers harvest cauliflower based on the size of the head and this finding has inline with (Zheng *et al 2001*).

Harvesting factor: Majority of the (63.30 %) cauliflower growers harvest their produce based on crop maturity and (36.70 %) of the farmers harvest their produce based on price index and this finding has

inline with (Udas *et al 2005*).

Stage of harvesting: From the results (66.70 %) of cauliflower growers harvest their produce at fully matured stage while (33.30 %) farmers harvest their produce at matured stage and this finding has inline with (Olayemi *et al 2010*).

Method of harvesting: All the farmers using manual method of harvesting and they were using harvesting knife for cauliflower harvesting and this finding has inline with (Gudila *et al 2013*).

Time of harvesting: It was noticed that (46.70 %) of farmers harvest their produce in morning (23.30 %) of farmers harvest their produce after noon and (30 %) farmers harvest their produce any time they don't have any time frame for harvesting and this finding has inline with (Chikhale *et al 1998*).

Field container for harvesting: All the farmers did not have field container to hold produce during harvesting the main reason is the unavailability of suitable container for field handling purposes and this finding has inline with (Deshmukh *et al* 1998).

Agents causing loss during harvesting: It was noticed that (56.70 %) of farmers field the main loss causative agent in harvesting stage is physiological agents followed by (43.30 %) of climatic factors.

Sorting and grading of cauliflower: All the farmers follow sorting and grading and (60 %) farmers done grading based on size of the cauliflower head while (40 %) of farmers done grading based on color of the cauliflower head and this finding has inline with (Waman and Patil 1998).

Pre-cooling: None of the cauliflower growers did not cool their produce prior to marketing. They did not use any of the available pre-cooling technique to cool their produce and this finding has inline with (Kubde *et al 200*).

Pre and post harvest treatments: It was observed that none of the farmers give any pre and post harvest treatments to the produce and this finding has inline with (Palande *et al 2001*).

Packaging: The cauliflower growers package their harvested produce for marketing and all the farmers were using cauliflower leaves as main cushioning material all the farmers were using bags and sacks as a main packaging material and this finding has inline with (Gowda and Gowda 2004).

Agents cause loss in packaging: The results shows that (46.70%) of loss during packaging is caused by mechanical factors (30 %) loss is caused

Table 1: Distribution of respondents based on harvesting of cauliflower

Particulars	Frequency
Assessment of crop maturity	
Field method	30 (100)
Size	30 (100)
Harvesting factor	
Crop maturity	19 (63.30)
Price index	11 (36.70)
Stage of harvesting	
Matured stage	10 (33.30)
Fully matured stage	20 (66.70)
Method of harvesting	
Harvesting knife	30 (100)
Time of harvesting	
Morning	14 (46.70)
After noon	7 (23.30)
Any time	9 (30)
Field container for harvesting	
No	30 (100)
Unavailability of suitable container	30 (100)
Agents cause loss in harvesting	
Physiological	17 (56.70)
Climatic factors	13 (43.30)
Sorting and grading	
Size	18 (60)
Color	12 (40)
Packaging	
Bags and sacks	30 (100)
Use of cushioning wrap in packaging	30 (100)
Leaves	30 (100)
Agents cause loss in packaging	
Mechanical	14 (46.70)
Climatic factors	9 (30)
None	7 (23.30)
Agents cause loss in transport	
Mechanical	17 (56.70)
Climatic factors	13 (43.30)
On farm storage facility	
Yes	25 (83.30)
No	5 (16.7)
(for 'Yes' type mode of on farm storage category)	
Shade under the tree	12 (40)
Temporary protective structures	10 (33.30)
Permanent protective structures	3 (10)
None	5 (16.70)
Processing and value addition(Reasons for non adoption)	
Lack of knowledge and awareness	22 (73.30)
Small scale farming	8 (26.70)
Time spent on post harvest handling	
1-5 hrs	19 (63.30)
5-10 hrs	11 (36.70)

*Parenthesis indicates percentage

by climatic factors and (23.30%) farms did not have any loss causative agent during packing and this finding has inline with (Moulasab 2004).

Transport: All the cauliflower growers having on farm transport facility and they use manual method of on farm transport. In case of mode of transport to market all the farmers using lorry and van to transport their harvested crop to market. None of the farmers using cushioning and wrapping during transport and this finding has inline with (Selvarani and Manoharan 2004).

Agents causing loss during transport: It was observed that (56.70 %) loss is mainly caused by mechanical factors and (43.30 %) loss is caused by climatic factors the major factor responsible for loss during transport is mechanical factor and this finding has inline with (Kumar 2004).

Marketing: All the farmers sell their produce through whole sale market. All the farmers dispose their produce in time to market. They did not cause any delay in harvesting to market post harvest chain. They move their produce to market as soon as possible. It was observed that climatic factor is the major loss causative factor in market and this finding has inline with (Moulasab 2004).

Storage: Majority of (83.30 %) farmers having on farm storage facility from this (40 %) of farmers using shade under the tree as main on farm storage technique and (33.30 %) farmers using temporary protective structures for on farm storage (10 %) farmers having permanent protective structures (16.70 %) farmers did not have any on farm storage technique. The farmers never store their produce for long time selling and to improve marketing life. The cauliflower growers have a distance of 100 kms to access cold storage godown. None of the farmer using cold storage godown to store their produce and this finding has inline with (Gowda and Gowda 2004).

Processing and value addition: None of the cauliflower growers done processing and value addition. The reason for none adoption is lack of knowledge and awareness (73.30 %) and (26.70 %) is mainly due to small scale farming and this finding has inline with (Kubde *et al 2000*).

Time spent on post harvest handling: The time spent on post harvest handling denotes the times taken to complete the process of post harvest handling from the harvesting to marketing its observed that (63.30 %) farmers take 1-5 hrs and (36.70 %) farmers

take 5-10 hrs time to complete the post harvest handling prior to selling and this finding has inline with (Gudila *et al 2013*).

Knowledge level of farmers in post harvest handling practices of cauliflower

The results pertaining to Knowledge level of farmers in post harvest handling practices of cauliflower is depicted in Table 2.

Harvesting of cauliflower: It was observed that all the farmers were aware of maturity determination and matured head size of cauliflower (70 %) farmers were aware of correct time to harvest the produce and this findings has inline with (Bhople *et al 1996).*

Pre and post harvest treatment: The result shows that (60 %) cauliflower growers had knowledge about the benefits of washing. None of the farmers having knowledge about the chemical used to control post harvest infection, loss, method of removing field heat and this findings has inline with (Waman and Patil 1998).

Grading of cauliflower: It was noticed that all the farmers have knowledge about grading techniques and objective of grading and this findings has inline with (Mehta *et al 2000)* .

Recommended packaging for cauliflower: The result shows that all farmers were aware of recommended packaging material and ideal cushioning material for cauliflower and this findings has inline with (Raju *et al 2002).*

Transport of cauliflower: Transportation technique suitable for distant market is known to (73.30 %) cauliflower growers and criterion considered for distant market is known to (80 %) of the farmers and this findings has inline with (Moulasab 2004).

Marketing techniques: All the cauliflower growers had knowledge about various marketing techniques to sell their produce and this findings has inline with (Kumar 2004).

Storage of cauliflower: The main aim of storage is known to all the farmers and they don't have knowledge about storage temperature, relative humidity required for storage of cauliflower, storage period of cauliflower, storage method not recommended for cauliflower and chilling injuriy of cauliflower and this findings has inline with (Gudila *et al 2013).*

Processing of cauliflower: It was observed that only (13.30 %) cauliflower growers had knowledge about stage of vegetable suitable for processing and

Table 2: Distribution of cauliflower growers based on knowledge level

Post harvest handling practices	Frequency (Known)	Frequency (Unknown)
Harvesting		
Maturity determination	30 (100)	0
Matured head size	30 (100)	0
Correct time to harvest produce	21 (70)	9 (30)
Pre and post harvest treatment		
Chemical recommended to reduce loss	0	30 (100)
Pre-cooling suitable for cauliflower	0	30 (100)
Benefits of washing	18 (60)	12 (40)
Disinfectant agent in fruits and vegetables	0	30 (100)
Grading	30 (100)	0
Objective of grading	30 (100)	0
Recommended packaging	30 (100)	0
Ideal cushioning material for cauliflower	30 (100)	0
Transport		
Transport suitable for distant market	20 (73.30)	10 (27.70)
Criterion considered for distant transport	24 (80)	6 (20)
Marketing techniques	30 (100)	0
Storage	0	0
Processing		
Stage of vegetable suitable for processing	4 (13.30)	26 (86.70)
Post harvest losses		
Causes for major loss	19 (63.30)	11 (36.70)
Ricy appearance	30 (100)	0
Reason for discoloration heads	30 (100)	0
Post harvest diseases spread by	18 (60)	12 (40)
Techniques for reduction of deterioration	17 (56.70)	13 (43.30)

*Parenthesis indicates percentage

this findings has inline with (Moulasab 2004).

Post harvest losses of cauliflower: The result shows that (63.30 %) of farmers were aware of major cause for loss during post harvest handling (60 %) of farmers were aware of post harvest diseases (56.70 %) of farmers have knowledge about the techniques for reduction of deterioration during post harvest handling and all the farmers were aware of reason for ricy appearance and reason for discoloration of heads in cauliflower and this findings has inline with (Raju *et al).*

Constraints and strategies for post harvest handling of cauliflower

The field level experienced constraints are labor shortage for harvesting of the produce, lack of suitable tools for harvesting, high cost of packaging material, low quality of packaging material, high transportation charges, lack of vehicles for timely transport, exploitation by traders and merchants in marketing, low price for produce, price fluctuations, lack of local markets, unavailability of storage structures, inaccessibility of storage godown, distant storage structures, lack of technical guidance for storage. The key strategies are in harvesting of the guava produces; regulate the supply of adequate labor and machinery for harvesting and development and supply of maturity index chart. Mostly, pre and post harvest treatment is promote the use of growth regulator in season times and regulate the use of sanitation spray and chemicals and promote the use of pre-cooling methods. Transportation of harvested produce is commercialization and regulation of cold, modified and controlled atmospheric transport system from farm to consumers. In marketing is regulation of marketing, giving price fixation rights to farmers, controlling of commodity flow in full season time, establishment of whole sale markets at crop intensive areas and retail shop at people intensive areas and formation of local markets and establishment of fruits and vegetables outlets by government and identification and establishment of cold storage structures at crop specific zones.

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