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Value Addition: A Tool to Minimize the Post-harvest Losses in Horticultural Crops

***Saima Parveen, Bushra Ishfaq, Humaira Kausar, Shazia Saeed and M. Azhar Ali**

Assistant Research Officer, Food Technology Section. AARI, Faisalabad.

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ABSTRACT

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***Corresponding Author**

Saima Parveen

E-mail: seharsaima@yahoo.com

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Current regional economic intensification and changes in dietary patterns played a vital role in both the production and consumption of fruit and vegetables. Pakistan is one of the leading producer of citrus; mango, apricot, dates and huge amounts of potatoes, tomatoes, pepper, onions, cucumber etc. are grown in its diverse agro-ecological zones. In spite of high yield, this sector suffers significantly from postharvest losses of about 30–40%, because inherently this sector are more liable to deteriorative nature of fresh fruit and vegetables under tropical conditions characterized by high ambient temperatures and humidity, and a high incidence of pests and diseases which diminishes returns for producers. Tremendous opportunities exists for vertical diversification within the fruit and vegetable sector in terms of increase in farm income, poverty alleviation, food security, and sustainable agriculture. The vibrant agro-food industry have unlimited potential in the form of processed or value added products and consumers all over the country can get opportunity to enjoy them throughout the year. In this transaction, processing of food crops into a variety of products with extended shelf life. Adding value to the original crop also helps the farmer not only to overcome the spoilage and losses, but also fetches high returns due to the newly added technology. Value addition enterprises are aimed at giving value to the raw commodities into multiple products like fruit candies, jam, jellies, marmalade, fruit nectars, juices, dehydrated products and semi-processed food etc. which we can envisage in this category as well as remunerative prices to farmers. It provides convenience & safe food to consumers and promotes diversification and commercialization of agriculture by providing effective linkage between consumers and farmers. Moreover, it will make farm produce more exportable. The need for technology generation and commercialization at small scale are of critical importance to growth and diversification. The development of a dynamic agro-food industry will depend on innovative research and the deliberate engagement of the national inventive system comprising academia, industry, and government sector.

Horticulture Sector Status in Pakistan: Horticultural crops have an important place in the agricultural economy and a wide variety of fruits and vegetables has been produced in Pakistan with total annual production estimated at 13.72 million tons that include 6.67 million tons of fruits, 6.5 million tons of vegetables and 2.27 million tons of condiments. Among fruits, citrus is leading in term of production followed by mango, dates and guava. Potato and onion are leading among vegetables and condiments (GOP, 2012-13).

Exports of fruits and vegetables from Pakistan stood at US\$ 538 million in 2011-12 went up to US\$ 625 during 2012-13. During July, 2012 –November, 2013 exports of vegetables were 109,378 tonnes worth of \$47.4 million that increased to 197,855 worth of \$63 million in 2013-14. During the same period export of fruits were 191,739 tonnes worth of \$103 million that rose to. 218,203 tonnes worth of \$143.4 million. The export of fruit & vegetable preparations (mostly juices) is US\$ 5.6 million (4.2%). Their share in Pakistan's total exports is slightly over one percent (Abdullah, 2010; MINFSR 2013-14).

Owing to lack of proper fruit processing industry and non-availability of post-harvest operations agriculture sector faces loss of worth Rs. 32-40 billion annually as up to 35 percent of the total agriculture produces face physical loss at various stages, after the crops have been matured and before the food is consumed (Sabir, 2009).

Post Harvest Technology and Value Addition:

Current regional economic intensification and changes in dietetic patterns have made both the production and consumption of fruit and vegetables progressively more important. The fruit and vegetable sector has a fundamental role in farm revenue improvement, poverty mitigation, food security, and sustainable agriculture. This sector, however, suffers greatly from postharvest losses. Some estimates suggest that about 30–40% of fruit and vegetables are lost or dumped after leaving the farm gate. Huge postharvest losses result in diminished returns for producers. International markets discard fruits and vegetables containing illegal pesticides, with pesticide residues beyond permissible limits, and with inadequate labeling and packaging (FAO, 2006).

Value addition is a process of increasing the economic value and consumer appeal of a commodity. It is a production/ marketing strategy driven by customer needs and preferences. Produce is changed from its original form to a more desirable form e.g. apple pie, jams, jellies and pickles etc. The primary reason for processing fruits and vegetables is to extend the shelf life beyond the period when there is plenty into the bend or away of season period. For instance, when a scrupulous produce comes in season, there may be a loads of it, and if the excess is not conserved it will decay and go to waste. Usually when there is excess,

supply outweighs demand and product fetches less money. Value is added to the particular produce item: when the product is still available. when the season is out and the demand for the product outweighs the supply accessible Produce is packaged to make it easier to prepare and serve, for example: Chopping and packaging green beans and peas. Freezing/cooling fruits and vegetables as in salads. Steam/cook in bag. Vegetables produce is processed in such a way that it becomes easier to incorporate into other foods, like sauces; it is processed in such a way that the predominant component(s) desired by the consumer is captured, as in fruit and vegetable juices.

Too much of the food harvest is lost to spoilage and infestations on its journey to the consumer. In countries like Pakistan, where tropical to subtropical weather and poorly developed infrastructure contribute to the problem, losses are sometimes of staggering proportions (Abdullah, 2010). Losses occur in all operations from harvesting through handling, from harvest to consumption would reduce losses and increase profitability margins of the produce. Proper evaluation of post harvest technologies includes technical, economic and social components and is being increasingly focused in agricultural research.

Ways to Add Value to Food: Considerable volumes of unmarketable and physically damaged fruits and vegetables that are without infection can be converted into value added products by processing. By products of fruit and vegetable processing could also be gainfully utilized. In the past, the consumer's preferences were limited to taste and flavour only, after 50's the priorities changed into safe nutritious foods. In 21st century considerable emphasis has been placed on functional, nutraceutical food products and these products gain popularity among the consumers. Previously, fruits and vegetables were processed primarily into jams, jellies, chutneys, etc. Canning and dehydration were considered to be the most sophisticated methods of processing, prior to the discovery of rapid freezing (Abdullah, 2010). Cold storage has considered the only method suited to extending the shelf life of fruits and vegetables, until the development of modified and controlled atmosphere storage. Relatively little emphasis was placed on the handling of fresh fruits and vegetables.

Drawback in the Field of Value Addition: Fruits and vegetables have a great potential to be the source of economic growth and income generation with small farmers as major beneficiaries. Pakistan has a comparative advantage in the production of high traditional crops. This potential is not being fully exploited especially at farm level. Main constraints are absence of policies favouring growers and ineffective and varying approaches towards regulation of product

quality. Although mechanized grading and packaging has started but still due to lack of proper technology in the country, nearly 35 percent of total fruit and vegetable production is lost during harvesting, transportation, preservation and storage. Lack of sufficient number of processing units and other preservation facilities had also hindered the process of value-addition, ultimately affecting the country's export potential in fresh farm and fruits sector.

Almost all the agricultural sub-sectors have superior but unrealized prospective value addition. Number of reasons can be used to illustrate this; like weaknesses in the organization, lack of competitiveness to imported products, lack of financing plans and lack of development initiatives backed by research to develop value addition mechanisms on each crop. Also, due to lack of access to credit conveniences, poor rural communications and weak land title. Agriculture has conventionally been seen as poor rural infrastructure, due to unavailability of adequate energy and water resources, which in turn raises expenditure for processing and value addition. Hence as these are significant elements in value addition their insufficiency in rural areas impedes improvement of value addition in agricultural products thus upsetting prosperity for farmers and other actors along the chain (Nyamulinda *et al.*, 2011).

Present Status of Processing Industries in Pakistan:

Industrial sector regarding the food processing is very much deprived and is estimated at 2% in the case of fruits & vegetables in Pakistan. It is very high in developed countries (80% in USA, 70% in France) and in many developing countries as well (viz. 80% in Malaysia, 30% Thailand). Similarly, value addition in India is estimated at 20% as compared to 45% in Philippines.

Fruits and vegetables are being processed by many companies in Pakistan. There are more than 1000 Food Processing units, producing confectionary and biscuits, jam jellies and squashes, extruded snacks and potato chips, beverages, dehydrated fruits and vegetables, for local consumption and export. Most of the fruit and vegetable production is consumed in fresh form. However, there is a small fruit and vegetable processing industry, which is concentrated around the major cities (Picha, 2007).

There are a number of small and medium industrial units, engaged in the production of squashes, jams and jellies, pickles and a small quantity of canned fruits and vegetables. The production of canned fruits is estimated at 15,000 MT; jams, jellies and marmalades at 2,000 MT; pickles and sauces at 10,000 MT and syrup and squashes at 18,000 million bottles. Most of the producers of these products are based in the urban areas. Approximately 30 fruit juice pulp processing plants with an installed capacity of 500,000 MT per annum are engaged in the production of fruit juices and fruit drinks (Rashid, 2008).

Export Potential of Pakistan in Horticultural Produce:

The world horticulture market is valued at \$80 billion to which Pakistan contributes annually \$130 million (PHDEB, 2009). Only about 16% of fruits are being processed although this activity offers great opportunities to augment volume of value added products using modern technology. The fruits and vegetables exported in fresh form attract discount prices because exporters are unable to provide adequate grading and packing. Once again value is lost from both the fresh fruits and vegetables and also from no-export grade produce that could be processed into e.g., juices, but which isn't because the processing capacity is not in place. The country loses value immediately at the post-harvest stage and then more value at the exporter level because of inability to meet standards. The non-export grade fruit swamps the domestic market, dropping prices while 3rd grade produce is lost entirely because it exceeds the capacity of the industry to process it into manufactured products.

Barriers to Establish Processing Units for Value Addition in Pakistan:

A number of deficiencies currently exist in the processing sector of the country like Insufficient Raw Material Supply, Dislocation of manufacturing units, Fluctuation in raw material supply, Inadequate Safety Standards, Poor Financial Support, Adulterated food products and inadequate Packaging, Operation of old machinery without preventive measure.

Strategy and Action Plan for Value Addition Promotion in Fruits and Vegetables Processing Industries:

Value addition of horticultural commodities requires a strong postharvest support. Some initiatives in this direction include establishment of research centres and cooperative institutes for development, demonstration and transfer of technology to the stakeholders. The various measures adopted include development of infrastructure like farm to market roads, storage facilities, cool supply chain, cargo and shipment convenience, marketing and export documentation. These steps including Global GAP and HACCP have to some extent helped to improve and maintain quality of horticultural produce. Grades and standards should also been introduced to compete in international market (Bajwa, 2009). Postharvest temperature management particularly pre-cooling process for high quality horticultural produce is mandatory. There should be good cooperation among the research organizations with relevant government agencies and private sector, both locally and internationally. There is a need of National and international public-private partnership to be encouraged to improve postharvest and processing quality and introduce new technologies, and diversify the range of processed products. Promotion of value added products rather than fresh produce, export for indigenous products for ethnic groups and Linkages between industry and research organizations is required.

It is suggested to use Simple, reliable and cost effective machineries for horticultural produce.

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