

Evaluation of Postharvest Losses in Mango

June - July 2007

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Background and Objectives

This preliminary study was conducted by the ASLP Mango Supply Chain Management Project during 2007, to identify the nature and extent of postharvest quality losses in two major mango cultivars from the tree to the retailer.

Sindhri and Samar Bahisht Chaunsa are the most important commercial varieties of Pakistan. In Sindh province, the cv. Sindhri shares about 70% of the mango production; while in the Punjab province, 55% mango production is captured by Chaunsa only. Since, postharvest losses occur at different stages along the supply chain, this study provides the estimates of these losses at independent stages (harvest maturity; harvest method, packing, transportation and marketing – wholesale and retail) and sets the benchmarks under existing level of postharvest practices.

Evaluation Process

Monitoring of harvesting, grading, packing and transportation of six consignments (four of Sindhri and two of Chaunsa mango varieties) was conducted as per current industry practices. The detail of the six consignments is given below;

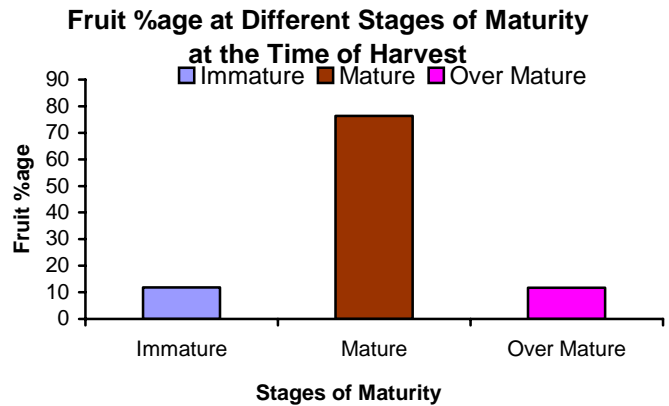
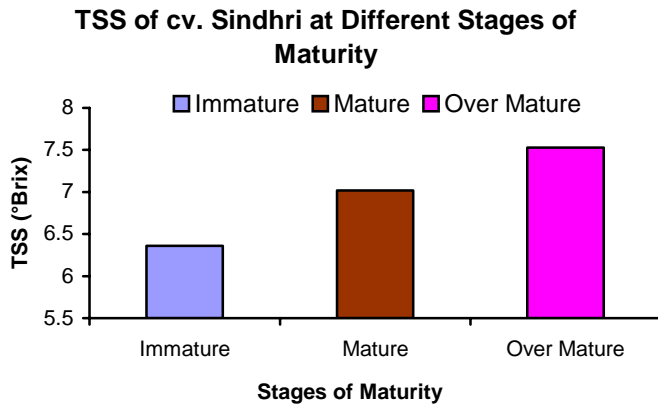
Variety	Origin	Harvest Date	Destination	Date of Analysis at Retail store	Duration (Days-Harvest to Retail)
Sindhri	Tando Allah Yar, Sindh	17 June 2007	MHA, Karachi	21 June 2007	4 Days
	Tando Allah Yar, Sindh	18 June 2007	MDR, Faisalabad	24 June 2007	6 Days
	Tando Allah Yar, Sindh	19 June 2007	Sargodha	26 June 2007	7 Days
	Tando Allah Yar, Sindh	20 June 2007	Sargodha	26 June 2007	6 Days
Chaunsa	Sabri & Co., Multan	17 July 2007	MDS, Karachi	26 July 2007	9 Days
	Sabri & Co., Multan	18 July 2007	Al-Sharif Traders, Faisalabad	23 July 2007	5 Days

The statistical analysis was done for all the factors of different parameters independently at all stages of the supply chains. The results of the different parameters are as follows;

A: SINDHRI

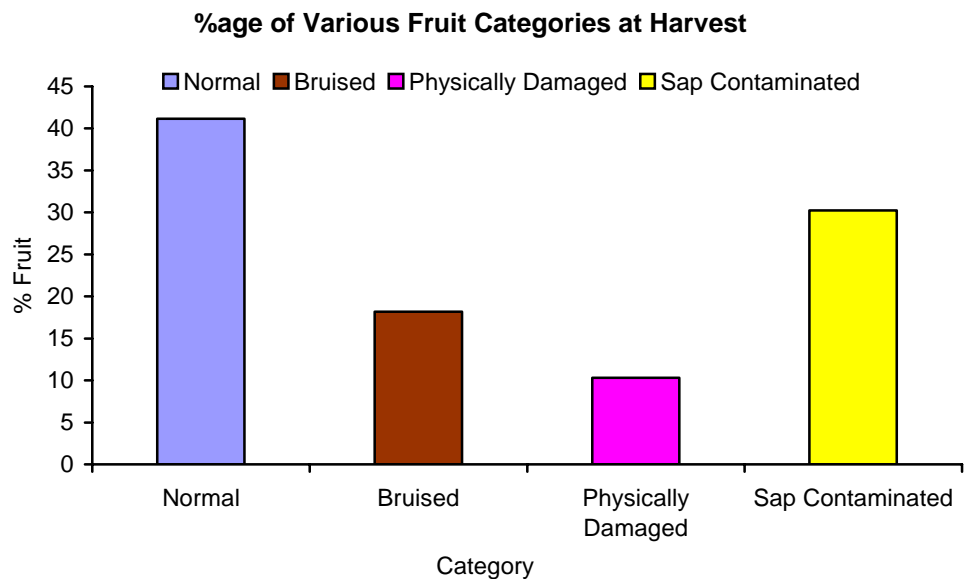
Maturity

The average TSS of immature, mature and over mature fruits was 6.36° Brix, 7.02° Brix and 7.53° Brix respectively. The %age of immature, mature and over mature fruit at the time of harvest was 12%, 76% and 12% respectively.



Harvesting Method in Sindhri

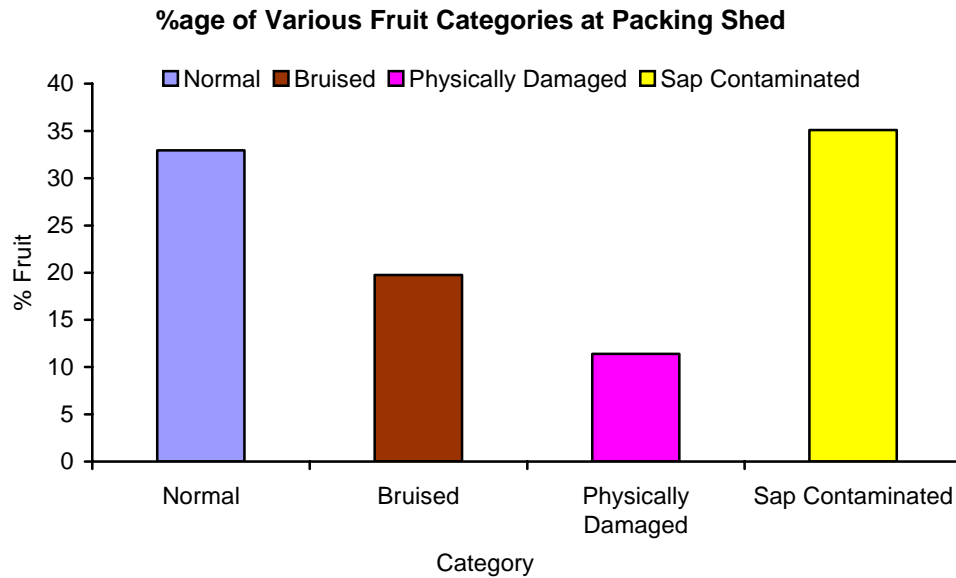
The data of normal fruits and fruit affected with bruising, physical damage and sap contamination was recorded separately to explore the effect of method of harvest on fruit loss. According to these mean values, it is evident that only 41.17% Sindhri fruit were free from any disorder, while 58.75% fruit suffer from one or a combination of different disorders (bruising, physical damage, sap contamination) at the stage of fruit harvest. The share of bruising, physical damage and sap contamination in loss at this stage is 18.17%, 10.3% and 30.25% respectively, which clearly shows the defects in existing harvesting system i.e; use of harvesting poles, etc.



Tree to Shed (Sindhri)

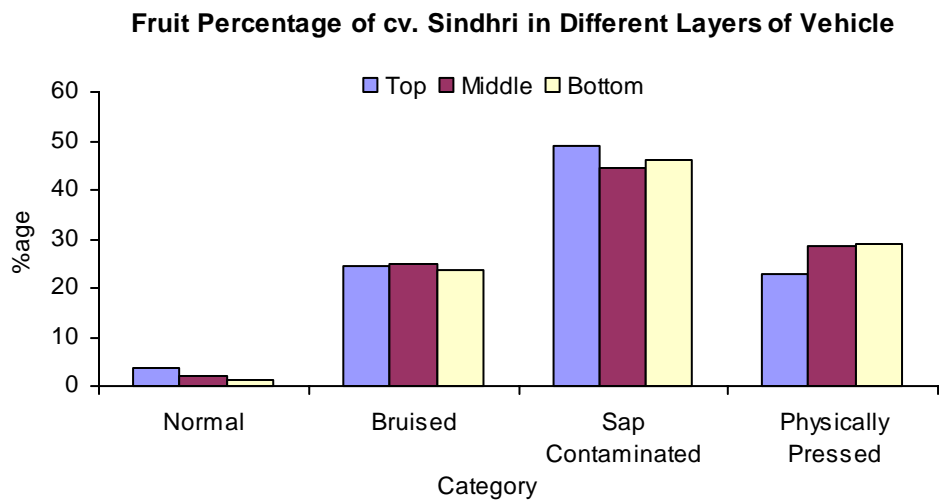
Again, the data of normal fruits and fruit affected with bruising, physical damage and sap contamination was recorded separately to explore the quantity of fruit affected during the carriage of fruit from tree to packing shed. The results represent that at the farm shed, the percentage of fruit quality losses was 66.25% due to the collective share of bruising

(19.75%), physical damage (11.4%) and sap contamination (35.09%), while the normal fruits, free from any disorder, were 32.92%.



Transportation (Farm to Wholesaler) of Sindhri

To evaluate the percentage of fruit affected till it reaches the wholesale markets, the data of normal fruit and that affected with bruises, sap contamination and depression due to load was recorded from top, middle and bottom layers of the vehicle.

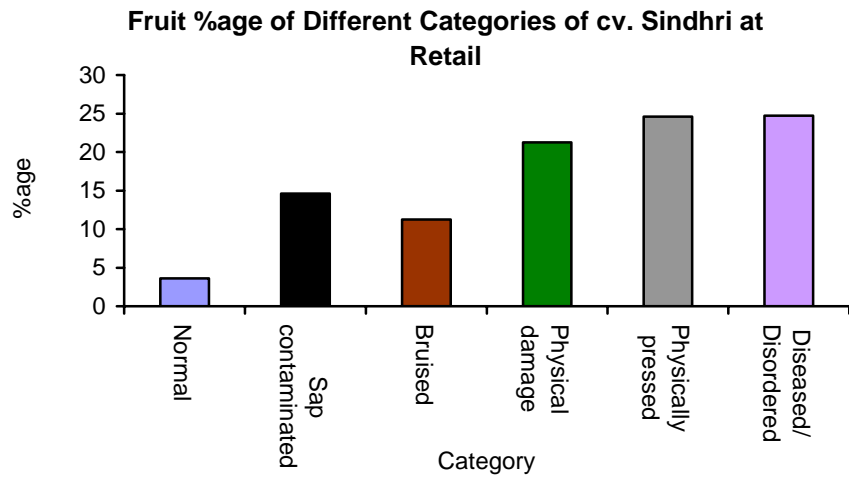


The results of the current study reveal that only 2.3% Sindhri fruits are free from any type of disorder, while 97.7% fruits are suffering from one or the other disorder at wholesale market. The placement of fruit crates in the vehicle have major role in fruit quality and on an average, 3.8% fruit are normal in top layer followed by middle and bottom layers with

1.9% and 1.4% respectively. Similarly the fruit loss is minimum in top layer (96.3%) followed by middle (98.1%) and bottom (98.6%) layers.

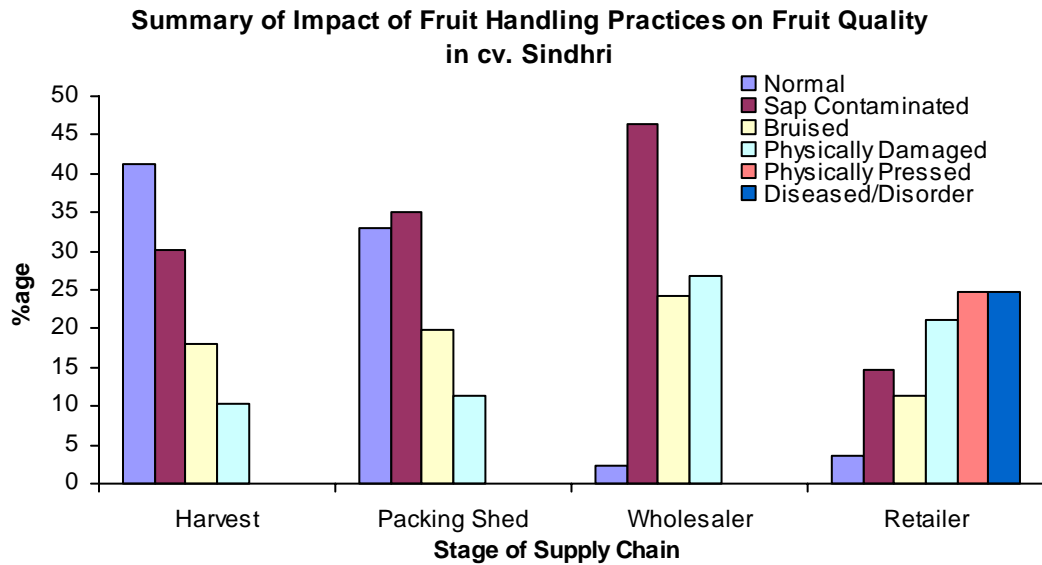
Wholesaler to Retailer (Sindhri)

Mean values of the various factors indicating normal and disordered fruits reveal that only 3.62% fruit remained free from any disorder at the retail end, while 96.5% fruit were affected with any one of the detailed factors. The major factor causing fruit quality loss at the retail level in the current study was diseases (24.75%) followed by physically pressed fruits (24.62%), physical damage (21.25%), sap contamination (14.62%) and fruit bruising (11.25%).



Commulative Postharvest Losses in Sindhri

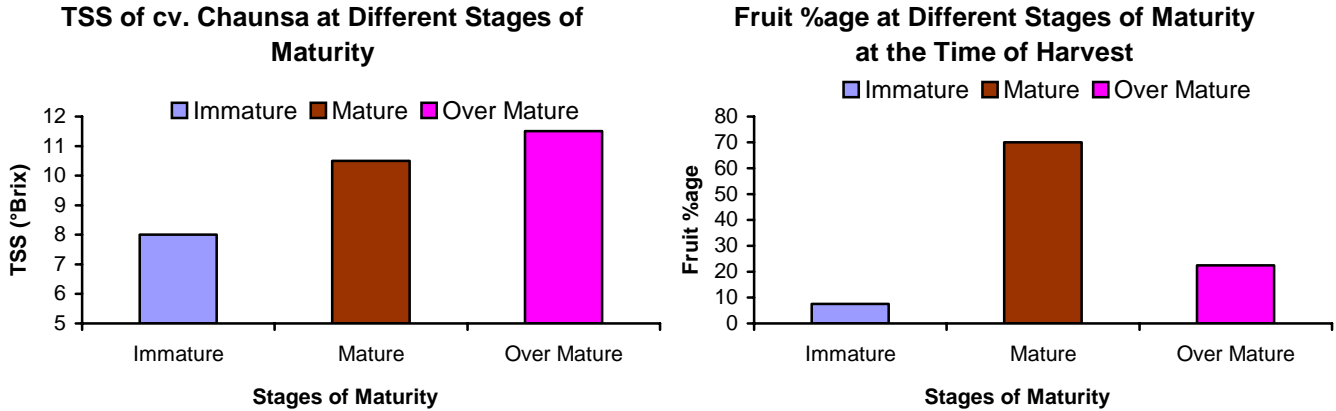
Taking in account the losses in Sindhri mangoes at every independent stage of the supply chains and calculating the mean of all the values, according to the current study, the estimated postharvest losses of Sindhri from harvest to the retailer were 68.56%.



B: CHAUNSA

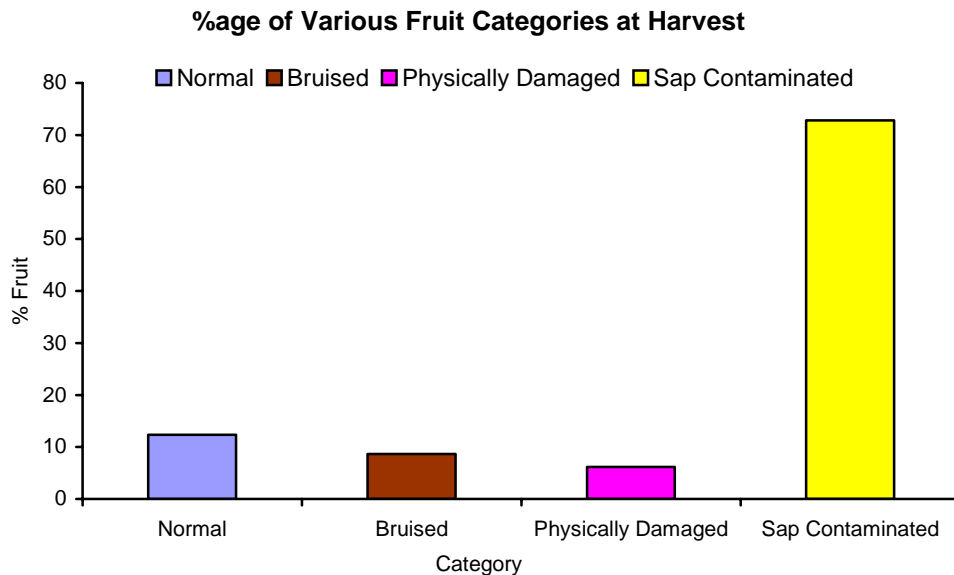
Maturity

The average TSS of immature, mature and over mature fruits was 8.0° Brix, 10.5° Brix and 11.5° Brix respectively. The %age of immature, mature and over mature fruit at the time of harvest was 8%, 70% and 22% respectively.



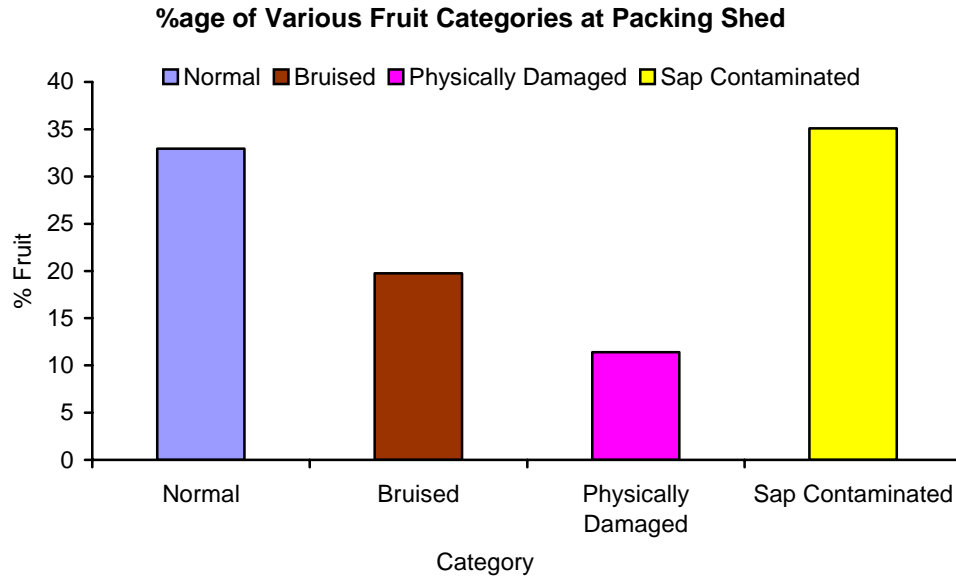
Harvesting Method in Chaunsa

The data of normal fruits and fruit affected with bruising, physical damage and sap contamination was recorded separately to explore the effect of method of harvest on fruit loss. According to the mean values, only 12.33% Chaunsa fruit were free of any disorder, while 87.67% fruit were suffering from one or a combination of different disorders (bruising, physical damage, sap contamination) at the stage of fruit harvest. The share of bruising, physical damage and sap contamination in loss at this stage was 8.67%, 6.17% and 72.84% respectively.



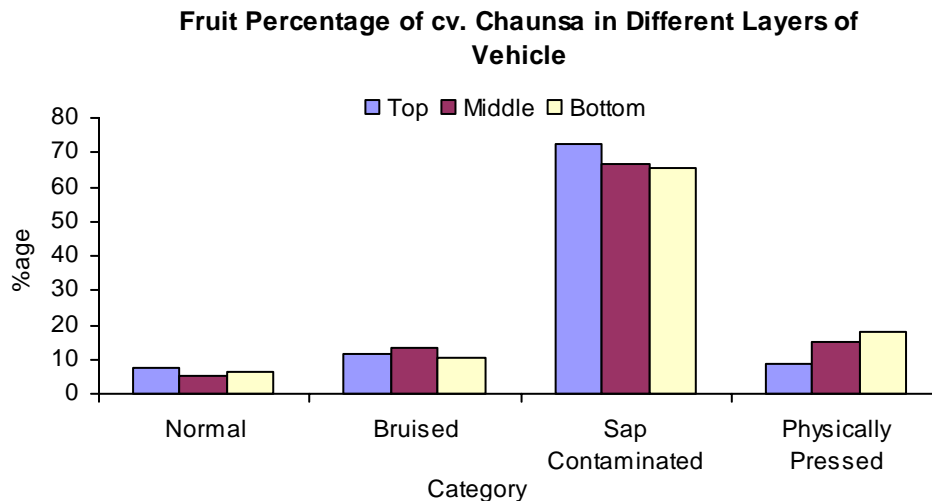
Tree to Shed (Chaunsa)

Again, the data of normal fruits and fruit affected with bruising, physical damage and sap contamination was recorded separately to explore the quantity of fruit lost during the carriage of fruit from tree to packing shed. The results represent that at the stage of farm shed, the percentage of fruit quality losses was 72.83% due to the cumulative share of bruising (6.5%), physical damage (5.5%) and sap contamination (60.84%), while the normal fruits, free from any disorder, were 27.17%.



Transportation (Farm to Wholesaler)

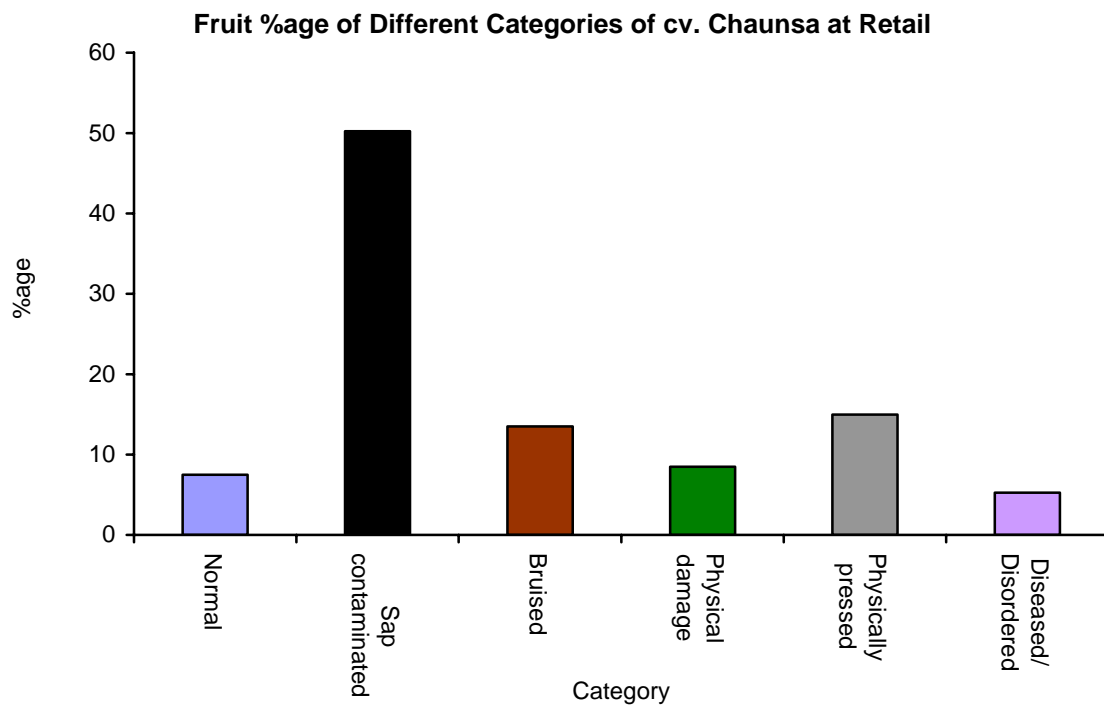
To evaluate the percentage of fruit lost till it reached the wholesale markets, the data of normal fruit and that affected with bruises, sap contamination and depression due to load was recorded from top, middle and bottom layers of the vehicle and statistically analyzed. The mean values of the fruit lost in each consignment due to the given factors are given in figure below;



The results of the current study reveal that only 6.2% Chaunsa fruits were free from any type of disorder, while 93.8% fruits were suffering from one or the other disorder at wholesale market. On an average, 7.3% fruit were normal in top layer followed by bottom and middle layers with 6.3% and 5.0% respectively. Similarly the fruit loss was minimum in top layer (92.8%) followed by bottom (93.8%) and middle (95.0%) layers.

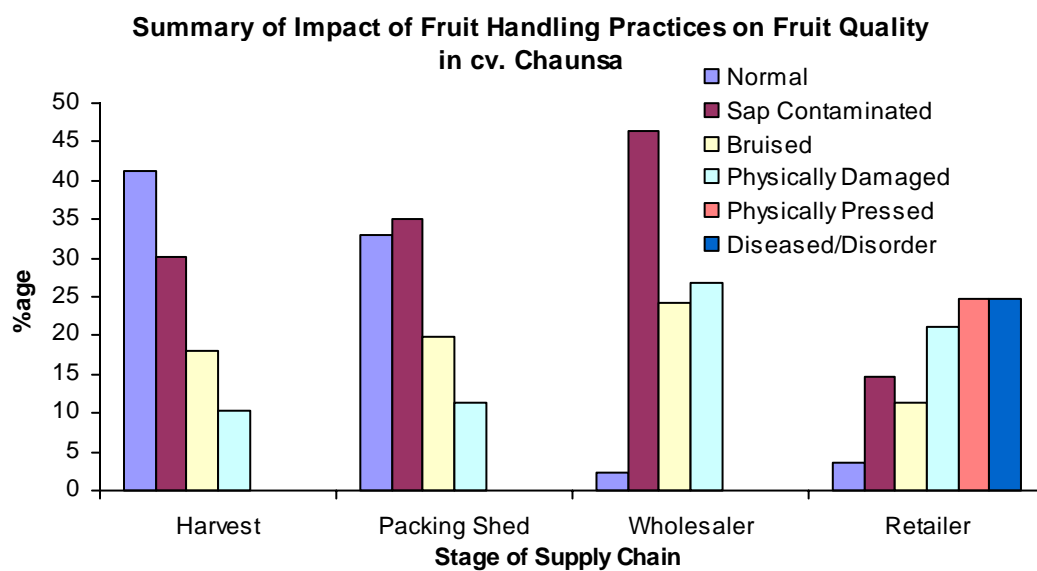
Wholesaler to Retailer

Mean values of the various factors indicating normal and disordered fruits reveal that 7.5% fruit remained free from any disorder at the retail end while 92.5% fruit was affected with any one of the detailed factors. The most important factor causing fruit losses at the retail level in the current study was sap contamination (50.25%) followed by physically pressed fruits (15%), bruising (13.5%), physical damage (8.5%) and diseases or disorders (5.25%).



Commulative Postharvest Losses in Chaunsa

Taking in account the losses in Chaunsa mangoes at every independent stage of the supply chains and calculating the mean of all the values, according to the current study, the estimated postharvest losses of Chaunsa from harvest to the retailer were 75.36%.



Conclusion

It is obvious that for both the mango varieties (Sindhri and Chaunsa), although the postharvest losses increase gradually at every stage of the supply chains, however maximum fruit loss occurs at the stage of harvest and transportation from orchard to wholesaler. Thus, if some interventions could be introduced to reduce the losses at these two stages, the mango fruit available for consumption or export can be increased.