CORRELATION DYNAMICS UNDER SURVEY OF PHYSICO-CHEMICAL CHARACTERS OF GUAVA (*Psidium guajava* L.) cv.L-49 GROWING IN JHALAWAR DISTRICT

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Abstract: Correlation studies amongst chemical parameters of guava cv. L-49 with leaf parameters revealed that the total soluble solids content of guava cv. L- 49 orchards exhibited significantly and positive correlations (r = 0.721**) with TSS: acid ratio, (r = 0.543*) with ascorbic acid, (r = 0.804**) with leaf width and (r = 0.682*) with leaf perimeter. Intercorrelation among quality attributes revealed that the total soluble solids content of guava cv. L- 49 orchards showed significantly and positive correlations (r = 0.721**) with TSS: acid ratio and also with ascorbic acid(r = 0.543*). Total sugar content showed significant and positive correlation (r = 0.795*) with non- reducing sugars. Reducing sugar showed significant and positive correlation (r = 0.552 *) with TSS: acid ratio whereas non-reducing showed significant and positive correlation (r = 0.795**) with total sugar while it had negative and significant correlation (r = -0.618*) with sensory quality. Correlation coefficients amongst chemical parameters of Guava cv. L- 49 fruits and soil quality properties revealed that the total soluble solids content of guava cv. L-49 orchards showed significantly and positive correlations (r = 0.721**) with TSS: Acid ratio, (r = 0.543*) with ascorbic acid, (r = 0.660*) with organic carbon, (r = 0.735**) with N_2 content and (r = 0.537*) with Cu content. Ascorbic acid showed significant and positive correlations (r = 0.543*) with TSS content, (r = 0.732**) with organic carbon, (r = 0.678) with N_2 content and also exhibited positive correlation (r = 0.538*) with Zn content.

1.   INTRODUCTION

The correlation study between the physicaland chemical characters are very useful in understanding the inter relationships of morphological, soil and fruit quality attributes, for this purpose a survey was undertaken during October-2016 to April -2017 at the guava bearing orchards of fruit growers in Jhalawar District of Rajasthan state with an aim to identify promising genotypes amongst orchards of guava cv. L- 49 growing in the Jhalawar district. In view of this present, study was under taken on guava cv. L- 49 growing locations in Jhalawar district to study the variability among the guava fruit growers with respect to physico-chemical characters in order to explore desirable attributes. However, fruit growers are predominantly growing cv. L- 49 of guava in Jhalawar district and very meagre

information is available on improvement of guava fruit crop. The exploitation of existing variability of guava cv. L-49 for improvement is much needed for crop guava in order to encourage commercial orcharding of this crop in Jhalawar district of Rajasthan state. The present investigations were carried out to find out the variations in physico-chemical characteristics of guava cv. L-49 fruits being grown among the orchards of Jhalawar district and soil physico- chemical characteristics of orchard soil with a purpose to identify superior genotypes with good fruit qualities attributes. Jhalawar district is blessed with variability of guava orchards at different locations with conductive environmental condition. Therefore, present studies were investigated with intent to find out the extent of variability of guava cv. L-49 orchards in Jhalawar district and to find out interrelationship of quality attributes with morphological, soil properties. So far, no work has been carried out in Jhalawar district, therefore, the present investigation was carried out to investigate the range of physico-chemical variations of guava cv. L-49 in order to ascertain fruit quality attributes growing under Vertisols of Jhalawar district, which is a predominantly Nagpur mandarin growing belt.

2.   MATERIALS AND METHODS

A total of 70 samples at uniform maturity in December 2016 were collected from different guava locations of the Jhalawar district. The survey work comprising ' guava' cv. L- 49 bearing orchards of 14 fruits growers spreading over seven tehsils viz. Aklera, Pirawa, Pachpahar, Gangdhar, Manohar- Thana, Jhalarapatan and Khanpur of Jhalawar district. Leaf, fruit and soil samples were collected from different locations and analyzed at Laboratory of Department of Fruit Science and Department of Soil Science, College of Horticulture and Forestry, Jhalawar under jurisdiction of Agriculture University, Kota. Morphological characters of guava accessions were observed on basis of UPOV (International Union for the Protection of New Varieties of Plants) descriptors (Rodriguez *et al.,* 2010).In Jhalawar district, guava cultivation has naturally acclimatized in the sub mountainous tracts. Jhalawar district is located at $23^{°}4'$ to $24^{°}52'$ N-Latitude and $75^{°}29'$ to $76^{°}56'$ E-Longitude in South Eastern Rajasthan. Agro-climatically, the district falls in Zone V known as Humid South Eastern Plain. About 84.22 per cent population of the district is rural whose main occupation is agriculture. Average rainfall in the region is 954.7 mm. Maximum temperature range in the summer is $43^{°}$-$48^{°}$C and minimum $0^{°}$- $1^{°}$C during winter.

Experimental data recorded during survey of orchards were subjected to variance and correlation analysis as suggested by Panse and Sukhatme (1985).

3. RESULTS AND DISCUSSION

1. Correlation of chemical parameters of Guava cv. L- 49 fruits and along with Leaf parameters:

Correlation coefficients amongst chemical parameters of Guava cv. L- 49 fruits and leaf parameter are presented in table 1. The total soluble solids content of guava cv. L- 49 orchards showed significantly and positive correlations (r = 0.721**) with TSS: acid ratio, (r = 0.543*) with ascorbic acid, (r = 0.804**) with leaf width and (r = 0.682*) with leaf perimeter. Acidity per cent showed significant and positive correlation(r = 0.635*) with leaf length.TSS: acid ratio showed significant and positive correlations (r = 0.721**) with TSS content and with reducing sugar (r = 0.552*). Ascorbic acid showed significant and positive correlations (r = 0.543*) with TSS content and also exhibited positive correlation (r = 0.611*) with leaf length. Total sugar content showed significant and positive correlation (r = 0.795**) with non- reducing sugar content. Reducing sugar showed significant and positive correlation (r = 0.552*) with TSS: acid ratio however non- reducing sugar showed significant and positive correlation (r = 0.795**) with total sugar per cent.

2. Correlation of chemical parameters of Guava cv. L- 49 fruits and along with other fruit quality attributes:

Correlation coefficients amongst chemical parameters of Guava cv. L- 49 fruits and fruit physical parameter are presented in table 2. The total soluble solids content of guava cv. L-49 orchards showed significantly and positive correlations (r = 0.721**) with TSS: acid ratio and also with ascorbic acid (r = 0.543*). Acidity per cent showed significant and positive correlations (r = 0.563*) with fruit weight, weight of seed (g) per fruit (r = 0.744*) and alsowith Pulp weight (r = 0.554*). The TSS: acid ratio showed significant and positive correlations (r = 0.721**) with TSS content and (r = 0.552*) with reducing sugar content. Ascorbic acid showed significant and positive correlation (r = 0.543*) with TSS content. Total sugar content showed significant and positive correlation (r = 0.795*) with non- reducing sugars. Reducing sugar showed significant and positive correlation (r = 0.552 *) with TSS: acid ratio whereas non- reducing showed significant and positive correlation (r = 0.795**) with total sugar while it had negative and significant correlation (r = -0.618*) with sensory quality.

3. Correlation of chemical parameters of Guava cv. L- 49 fruits with soil quality properties:

Correlation coefficients amongst chemical parameters of Guava cv. L- 49 fruits and soil quality properties are presented in table 3. The total soluble solids content of guava cv. L-49 orchards showed significantly and positive correlations (r = 0.721**) with TSS: Acid ratio, (r = 0.543*) with ascorbic acid, (r = 0.660*) with organic carbon, (r = 0.735**) with N_2 content and (r = 0.537*) with Cu content while it had negative and significant correlation (r = - 0.559*) with Mn content.The acidity per cent showed non- significant correlations with all other treatments.The TSS: acid ratio showed significant and positive corrections (r = 0.721**) with TSS content, (r = 0.552*) with reducing sugar and (r = 0.694**) with N_2 content. Ascorbic acid showed significant and positive correlations (r = 0.543*) with TSS content, (r = 0.732**) with organic carbon, (r = 0.678) with N_2 content and also exhibited positive correlation (r = 0.538*) with Zn content.Total sugar content showed significant and positive correlations (r = 0.795) with Non- reducing sugars and also exhibited positive correlation (r = 0.584*) with N_2 content while it had negative and significant correlation (r = - 0.555*) with Fe content. Reducing sugar showed significant and positive correlations (r = 0.552*) with TSS: acid ratio and bore positive correlation (r = 0.622*) with N_2 content while it had negative and significant correlation (r = - 0.709**) with Fe content. Non- reducing sugar showed significant and positive correlation (r = 0.795**) with total sugar percentage.

REFERENCES

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Table 1. Correlation among chemical parameters of guava cv. L- 49 fruits and along with leaf parameters

	TSS	Acidity (%)	TSS: Acid ratio	Ascorbic acid	Total sugar	Reducing sugar	Non-reducing sugar	Leaf length	Leaf width	Petiole length	Leaf perimeter
TSS Acidity (%)	1 -.085	1									
TSS: Acid ratio	.721**	-.281	1								
Ascorbic acid	.543*	.142	.300	1							
Total sugar	.245	.073	.462	.192	1						
Reducing sugar	.522	-.160	.552*	.157	.409	1					
Non- reducing sugar	-.101	.276	.074	.152	.795**	-.194	1				
Leaf length	.408	.653*	.142	.611*	-.015	.235	-.084	1			
Leaf width	.804**	.274	.329	.450	-.107	.279	-.269	.613*	1		
Petiole length	.337	.160	.354	.459	.252	.455	.059	.438	.313	1	
Leaf perimeter	.682**	.073	.291	.528	-.027	.467	-.361	.576*	.652*	.366	1

* Denotes significant at 1 per cent level of significance
** Denotes significant at 5 per cent level of significance

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Table 2. Correlation among chemical parameters of guava cv. L- 49 fruits and along with fruit quality parameters.

	TSS	Acidity (%)	TSS: Acid ratio	Ascorbic acid	Total sugar	Reducing sugar	Non-reducing sugar	Fruit weight	Fruit length	Fruit diameter	Sensory quality	No. of seed per fruit	Weight of seeds	Pulp weight	Seed: pulp ratio	Seed cavity
TSS	1															
Acidity (%)	-.085	1														
TSS: Acid ratio	.721**	-.281	1													
Ascorbic acid	.543*	.142	.300	1												
Total sugar	.245	.073	.462	.192	1											
Reducing sugar	.522	-.160	.552*	.157	.409	1										
Non-reducing sugar	-.101	.276	.074	.152	.795**	-.194	1									
Fruit weight	.068	.563*	-.346	.010	-.175	-.111	-.100	1								
Fruit length	.155	.050	-.081	.190	-.030	.124	-.140	.665**	1							
Fruit diameter	-.183	.013	-.456	.049	-.404	-.230	-.313	.698**	.739**	1						
Sensory quality	-.061	-.027	-.253	-.433	-.509	.019	-.618*	.382	.065	.393	1					
No. of seed per fruit	.379	.555*	-.035	.392	.384	.387	.194	.543*	.440	.193	-.026	1				
Weight of seed	.085	.744**	-.324	.109	.110	.024	.125	.702**	.357	.305	.210	.836**	1			
Pulp weight	.067	.554*	-.344	.008	-.181	-.114	-.105	.999**	.667**	.702**	.384	.532	.689**	1		
Seed: pulp ratio	-.040	-.293	.023	-.102	-.357	-.257	-.230	.259	.289	-.333	.153	-.509	-.493	.275	1	
Seed cavity	.297	.093	.028	.514	-.199	.150	-.248	.032	.088	-.038	-.306	.219	.030	.032	-.087	1

* Denotes significant at 1 per cent level of significance
** Denotes significant at 5 per cent level of significance

Table 3. Correlation among chemical parameters of guava cv. L- 49 fruits and along with soil properties

	TSS	Acidity (%)	TSS: Acid ratio	Ascorbic acid	Total sugar	Reducing sugar	Non-reducing sugar	pH	EC	OC	N	P	K	Zn	Mn	Fe	Cu
TSS Acidity (%)	1 -.085	1															
TSS: Acid ratio	.721**	-.281	1														
Ascorbic acid	.543*	.142	.300	1													
Total sugar	.245	.073	.462	.192	1												
Reducing sugar	.522	-.160	.552*	.157	.409	1											
Non-reducing sugar	-.101	.276	.074	.152	.795**	-.194	1										
pH	-.023	.404	.139	.414	.095	-.239	.307	1									
EC	-.210	.200	-.257	-.298	-.136	.122	-.266	-.262	1								
OC	.660*	.131	.346	.732**	.318	.290	.138	.175	.048	1							
N	.735**	-.007	.694**	.678**	.584*	.622*	.239	.310	-.171	.622*	1						
P	.414	-.366	.303	.470	-.258	-.003	-.318	.009	.056	.451	.185	1					
K	.359	-.142	.365	.282	.354	.458	.078	-.076	.156	.177	.681**	-.061	1				
Zn	.335	-.048	.199	.538*	.427	.336	.245	.298	-.367	.542*	.594*	-.046	.232	1			
Mn	-.559*	-.354	-.341	-.334	-.190	-.285	-.067	-.351	.263	-.333	-.593*	.172	-.258	-.320	1		
Fe	-.263	-.037	-.299	-.029	-.555*	-.709**	-.114	.208	-.082	-.303	-.393	.259	-.115	-.441	.383	1	
Cu	-.537*	-..040	.481	.488	-.205	.146	-.347	-.029	-.099	.347	.192	.721**	-.094	-.107	-.016	.059	1

* Denotes significant at 1 per cent level of significance
** Denotes significant at 5 per cent level of significance