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## Character association of quality characters with yield in potato (*Solanum tuberosum* L.)

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#### Abstract

Twenty six genotypes of potato were evaluated for knowing correlation for yield and five quality characters during *Khariief* 2008 at the Experimental Farm of Division of Vegetable Science, SKUAST-K, Shalimar. Studies on genotypic and phenotypic correlations revealed positive and significant correlation of tuber yield plant<sup>-1</sup> with specific gravity ( $r_g=0.478$ ,  $r_p=0.464$ ) and dry matter content ( $r_g=0.396$ ) thereby suggesting that any increase in these characters would bring enhancement in the most complex characters i.e., tuber yield. Tuber yield plant<sup>-1</sup> exhibited non-significant positive correlation with total soluble solids (TSS) and vitamin C and significant negative correlation with protein content ( $r_g=-0.456$ ,  $r_p=-0.411$ )

**Keywords:** Potato, Olericulture, genotypic, phenotypic

#### Introduction

Potato is the most important and useful member of the family Solonaceae. It has been recognized as a wholesome food and one of the richest sources of energy in most countries of the world. It is one of the efficient starch producing plants and yields more carbohydrates per unit area and time, is rich in protein, minerals, vitamins and high quality dietary fibre.

Quality is the composite of attributes among units of a product and has significance in determining the degree of acceptability of the unit by the buyer. In India breeders generally focus on higher yield, disease resistance, herbicide resistance, drought and salinity tolerance and to some extent quality. Only the physical aspect of quality i.e. shape, size, texture, colour and tenderness are given due consideration in the breeding programmes. However, there is little emphasis on biochemical quality which includes protein, vitamin, sugar, dry matter etc. The increasing quality consciousness in the developing countries will demand more emphasis on quality in future breeding programmes.

#### Materials and Methods

The present study on correlation was conducted to elucidate the interrelationship among different quality traits and tuber yield in potato. The material comprised 26 genotypes of potato which were grown in Randomised Block Design with three replications at the Experimental fields of the Division of Olericulture, SKUAST-K Shalimar, Srinagar, during *Khariief* 2008. Each experimental plot consisted of five rows of each genotype in each replication at a spacing of 60 x 20 cm. The experimental field was well prepared and recommended cultural practices were followed to ensure a healthy crop growth. The genotypic and phenotypic correlations were computed as suggested by Al-Jibouri *et al.* (1958) <sup>[1]</sup>.

#### Results and Discussion

Significant differences existed among the genotypes for all the traits under study, which indicated scope for further genetic studies. Genotypic correlation coefficients were higher than the corresponding phenotypic correlation coefficients, thereby indicating a strong inherent association between various traits and the masking effect of environment in the total expression of genotypes. The important trait, tuber yield plant<sup>-1</sup> exhibited significant positive correlation with specific gravity ( $r_g=0.478$ ,  $r_p=0.464$ ) and dry matter content ( $r_g=0.396$ ) thereby suggesting that any increase in these characters would bring enhancement in the most complex characters i.e., tuber yield. The positive significant correlation between yield and dry matter and specific gravity might be due to the reason that as the dry matter and specific gravity go high, the tuber weight is also high and hence the tuber yield is more. Tuber yield plant<sup>-1</sup> exhibited non-significant positive correlation with total soluble solids (TSS) and vitamin C and significant negative correlation with protein content ( $r_g=-0.456$ ,  $r_p=-0.411$ )

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(Table 1). There is a definite metabolic correlation between the content of carbohydrates and the protein present. Every plant requires a specific quantum of energy for performing the metabolic activities for which the energy is provided by carbohydrates and proteins which may be converted to other substrates when the plant system needs it. So, keeping in view

the specific amount of energy needed by the plant, the total amount of carbohydrates (i.e. yield) may decrease, if the amount of proteins increases. The above results are in conformity with the findings of Rasul *et al.* (1995) [4], Pandey *et al.* (2005) [3] and Desai and Jaimini (1998) [2].

**Table 1:** Genotypic (upper values) and phenotypic (lower values) correlation coefficient between various quality characters and yield in potato (*Solanum tuberosum* L.)

S. No.	Character	Specific gravity	TSS (°B)	Vitamin C (mg 100g <sup>-1</sup> )	Dry matter (%)	Protein content (%)	Yield (g plant <sup>-1</sup> )
1.	Specific gravity	--	0.329	0.226	0.928**	-0.546**	0.478*
			0.298	0.182	0.891**	-0.578**	0.464*
2.	TSS (°B)		--	0.157	0.429*	-0.140	0.268
				0.146	0.394*	-0.127	0.257
3.	Vitamin C (mg 100g <sup>-1</sup> )			--	0.265	-0.041	0.099
					0.197	-0.039	0.079
4.	Dry matter (%)				--	-0.427*	0.396*
						-0.404*	0.384
5.	Protein content (%)					--	-0.456*
							-0.411*
6.	Yield (g plant <sup>-1</sup> )						--

\*, \*\* Significant at 5 % and 1 % respectively.

### Summary

Twenty six genotypes of potato were evaluated for knowing correlation for yield and five quality traits during *Khariief* 2008 at the Experimental Farm of Division of Olericulture, SKUAST-K, Shalimar. Studies on genotypic and phenotypic correlations revealed positive and significant correlation of tuber yield plant<sup>-1</sup> with specific gravity and dry matter content.

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