International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(2): 1899-1901

Received: 16-01-2019
Accepted: 20-02-2019

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Correlation coefficient studies between different Physico-chemical characteristics of fruits of *Terminalia bellirica* (Roxb).

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Abstract
Terminalia bellirica (Roxb) is one of the multipurpose medicinal tree species. The fruits of the species are used in many medicines and are a important constituent of "Triphala". The dried fruits of the species constitute the Ayurvedic drug commonly known as drug "Bahera" and are an important constituent of many Ayurvedic Medicines. The correlation study between the physic-chemical are very use full in under sanding the selection procedure for tree improvement programme. In the present investigation relationship between different physic-chemical characteristics correlation of fruits of *Terminalia bellirica*. The correlation studies revealed that there 4 was highly significant and positive correlation between weight of fruit pulp with weight of fresh fruit (0.927) while T.S.S. Exhibited significant and negative correlation with non reducing sugar (-0.506).

Keywords: Medicinal tree, chemical, Bahera, T.S.S

1. Introduction
The expression of a particular character is an aggregate of complex contribution of so many other characters. In tree improvement programme, a clear understanding of the nature and degree of association among different traits is of great importance because the choice of one character can favour the appearance or disappearance of the other. Correlation, an important statistical tool, helps in determining such associations among different factors under consideration.

Terminalia bellirica Roxb. Commonly known as bahera. Belongs family combretaceae. The trade name Bahera is based on the Indian name bahera is based on the Indian name of the tree. The word Bellirica is taken from the scientific name of the tree and distinguishes this myrobalan from the other one (Chebulic myrobalan) (Jain 2007). It is a large deciduous tree, attaining a height of 40m. And a girth of 1.8 to 3.0m. , or more, usually with a straight tall bole; large trees are often buttressed at the base. Bark bluish or ashuy greym with numerous fine longitudinal cracks, yellow inside, leaves broadly elliptical, 4-8 in long clustered at the ends of the branches. Wood yellowish grey, hard, not durable, but lasts fairly well under water, used for planking, packing cases, boats, and other purposes. The fruits are used for tanning, but are interior to those of Terminalia chebula (Troup, 1921) [6].

Terminalia bellirica Rosb. Plant contain the different chemical constituent in different parts such as stem bark contains arjungenin and its glycosides, belleric acid, bellericosides. Fruits contair hexahydroxy diphenic acid ester, B-sitosterol, gallic acid, ellagic acidethyl gallate, galloyl glucose, chebulagic acid, mannitol, glucose, galaclose, and rhamnose (Yoganarasimhan 2000) [8].

Fruits are useful in cough, asthma, bronchitis, dropsy, dyspepsia cardic disorders, skin diseases, leprosy, ulcer and myocardial depressive activity. Ripe fruits used as astringent in combination / with chebulic myrobalan (Terminalia chebula) and phyllantus emblica as the famous triphala drug of Ayurveda, fruits are also useful in eye discases and scorpion sting (Nadkarni, 1976) [3]. The Seeds are useful in thirst, vomiting, bronchitis, covneul ulcer, reliveness (Maiti 2005)

2. Material and Methods
The present investigation was conducted with the objective to identify the fruit bearing trees of Terminalia bellirica and to study the variability of physic-chemical characteristics in

Terminalla bellirica fruits. An extensive survey was carried out during 2011-12 and the mature fruit bearing trees of Terminalla bellirica was identified at different places of Akola and Amravati District namely Kapsi, Patur, Chinchkhed, Tivasa, Mahan, Nimbhorn, Bharshitakali, Januna, Bormali, Khatakali, Kelpani and Dhargarh. The identified trees were marked with yellow paint and from these marked trees; fruits were collected for the evaluation of physic-chemical characters of fruits of Terminalia bellirica was conducted at Department of Forestry, Post Graduate Institute, Dr. P.D.K.V., Akola. Experimental work related to chemical analysis was undertaken in the laboratory of Department of Agricultural Chemistry and Soil Science, Post Graduate Institute, Dr. P.D.K.V., Akola.

The data obtained for these traits were statistically analyzed by using randomized block design and completely randomized design in three replicates for each treatment as described by Panse and Sukhatme (1967) [4] and Chandel (1984) and subjected for correlation coefficient analysis as per the method suggested by Panse and Sukhatme (1978) [4] and Gupta (1984). The significances at 5 and 1 per cent level of significance were tested as per the formula given by Gosset (1908)

3. Results and Discussion

The values for simple correlation coefficient between twelve physico-Chemical characters of Terminalla Bellirica fruits are presented in Table 11. The present correlation coefficients study was worked out for all the 12 character combinations. Out of 66 combination of simple correlation. 16 combinations were found to be positive and significant and 1 combination was negative and significant. Out of 16 positive and significant correlations all 16 combinations were observed to be significant at 1 per cent level of probability and 1 combination was negative and significant at 5 per cent level of probability. Rest of the relations was found to be non-significant.

Table 1: Correlation coefficients among different pairs of characters in *Terminalia Bellirica (Roxb.)* Fruit.

	Wt. Of fresh fruit (g)	Diameter of fruit (cm)	Length of fruit (cm)	Wt. of fruit pulp (g)	Moisture content of fruit(%)	Wt. of dry fruit (g)	Wt. of seed (g)	TSS (%)	Acidity(%)	Total Sugar(%)	Reducing sugar(%)	Non Reducing sugar(%)
Wt. Of fresh fruit (g)	1											
Wt. Of fresh fruit (g)	0.855**	1										
Wt.of fresh fruit (g)	0.729**	0.694**	1									
Wt.of fresh fruit (g)	0.927**	0.805**	0.742**	1								
Wt.of fresh fruit (g)	-0.048	-0.203	-0.086	-0.121	1							
Wt.of fresh fruit (g)	0.910**	0.853**	0.714**	0.794**	-0.386	1						
Wt.of fresh fruit (g)	0.807**	0.686**	0.629**	0.705**	-0.212	0.833**	1					
Wt.of fresh fruit (g)	0.215	0.200	0.293	0.186	-0.223	0.238	0.293	1				
Wt.of fresh fruit (g)	0.172	0.159	-0.123	-0.036	-0.284	0.218	0.219	0.0347	1			
Wt.of fresh fruit (g)	-0.249	-0.014	-0.174	-0.200	0.025	-0.251	-0.340	-0.215	0.179	1		
Wt.of fresh fruit (g)	-0.096	0.128	0.117	-0.060	0.066	-0.128	-0.207	0.203	0.212	0.726	1	
Wt.of fresh fruit (g)	-0.144	-0.120	-0.320	-0.076	0.078	-0.202	-0.206	-0.506*	0.012	0.602**	-0.044	1

Highly significant and positive correlation coefficient were obtained between weight of fresh fruit with weight of fruit pulp (0.927), weight of fresh fruit with weight of dry fruit (0.910), weight of fresh fruit with diameter of fruit (0.855), weight of dry fruit with diameter of fruit (0.853), weight of seed with weight of dry fruit (0.833), weight of seed with weight of fresh fruit (0.807), weight of fruit pulp with diameter (0.805), weight of dry fruit with weight of fruit pulp (0.794), weight of fruit pulp with length of fruit (0.742), length of fruit with weight of fresh fruit (0.729), weight of dry fruit with length of fruit (0.714) and weight of seed with weight of fruit pulp (0.705), length of fruit with diameter (0.694), weight of seed with diameter of fruit (0.686) and weigh of seed with length of fruit (0.629) and non reducing

sugar with total sugar (0.602) while TSS exhibited significant negative correlation with non reducing sugar (-0.506).

Similar types of correlation study between physical and chemical properties of jamun fruits were reported by Srivastava *et al.* (2012) [7]. The correlation study are very useful in understanding variability exist in tempest to physical and chemical characters of fruits. Pradeep kumar (2006) [5] reported positive and significant correlation between weights of fruit pulp with length of fruit.

Terminalia Bellirica species exhibited very high range of variation which could very well be exploited for identifying promising trees and can also be used in developing chonal orchards.

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