Phytochemical Diversity Among the Different Variants of Climber *Clitoria ternatea* L. and *C. Biflora* Found in Amravati Region

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Abstract:

Clitoria is one of the popular medicinal climber occurred in Amravati district with its different variants. It belongs to papilionaceae family. The presented work here is specially related with phytochemical [Vitamins (B2, C) and Minerals (Na, K, Ca)] diversity among *Clitoria ternatea*L. variants (A-white petalloid, B- blue petalloid and C-double petalloid flower) and *C. biflora* (D-wild).Among all four genotype C (double petalloid) leaves contains higher riboflavin content (10.44mg/100g), whereas, leaves of *C. biflora* (genotype D) contain ~ half amount 5mg/100g of riboflavin. A good amount of ascorbic acid was recorded from roots of *C. biflora* genotypes D (52.00g/100g).Genotype C (double petalloid) showed highest amount of Na (9mg/100g) in seeds, whereas Aand D genotypes showed 2.5mg/100g and lowest sodium content 1mg/100g had been recorded from genotype D (wild). The highest amount of potassium has been recorded in seeds of *C. biflora* genotype D (71mg/100g). Whereas, leaves, stems and roots of *C. biflora* contains 52, 66 and 29mg/100g potassium respectively. The Ca content in genotype B (blue petalloid) show highest amount of calcium were recorded from leaves (96mg/100g), stems (18mg/100g), roots and seeds contained 60mg/100g.

Key words:

Clitoria ternatea, climber, white, blue and double petalloid, wild, phytochemical.

Introduction:

Climbing plants are one of the most interesting group but a much neglected group of plant. But, these neglected groups of plants contribute largely to the charm of our landscape by the manner by which they climb over trees, hedgerows or rocks (Agarwal, 2013). Some climbers play vital role in medicine and agriculture, and many climbers combinely serve both the purposes. The eco taxonomic diversity of vitacean climbing plants was studied by Tippat and Pachkhede (2013). Herbal medicines are prepared from variety of plant parts like leaves, stems, roots, barks, seeds and so on. They usually contain many bioactive compounds and are used primarily for treating mild or chronic ailments. The four genotypes/variants of the *Clitoria* used for study were broadly categorized and coded on the basis of well distinguishing character i.e. flower colour, size, number of petals and their habitat (Yeotkar*et al.*, 2011).

The quantitative estimation is an important parameter to study the total amount of phyto-constituents present in different parts of the plants. The major parameters are vitamins, micro and macro minerals which is necessary and essential a major part in human nutrition and health (Yeotkar, 2013).

Result and discussion:

1. Vitamins

A. Riboflavin (vit.B2)

Among all four genotype C (double petalloid) leaves contains higher riboflavin content (10.44mg/100g), whereas, leaves of *C. biflora* (genotype D) contain ~ half amount 5mg/100g of riboflavin. In case of *Clitoria* genotype B (Single petalloid) had highest 13.11mg/100g riboflavin in roots and *Clitoria* genotype A (white single petalloid) contains 4.80mg/100g riboflavin in seeds (Table 1; Fig.1).

According to National Research Council, the daily riboflavin requirement is require to body size, metabolic rate and rate of growth. The Recommended Dietary Allowance (RDA) is 1.6mg for the adult male and 1.2mg for the female. Higher intake is advised during pregnancy and lactation requirements are 1.5mg and 1.7mg respectively (Table 5.1). There is no toxicity of riboflavin (Dunne, 1990).

B. Ascorbic acid (vit. C)

Comparative data showed that good amount of ascorbic acid was recorded from roots of *C. biflora* genotypes D (52.00g/100g) (Table 2; Fig.2).Vitamin C converts the inactive form of folic acid to the active form, folinic acid and may have a role in calcium metabolism (Dunne, 1990). It is used as preservative and antioxidant (Khadabadi *et al.*, 2011).

2. Minerals estimation

A. Sodium (Na)

Variation in the amount of sodium has been recorded in seeds of *Clitoria* genotypes. Genotype C (double petalloid) showed highest amount of Na (9mg/100g) in seeds, whereas Aand D genotypes showed 2.5mg/100g and lowest sodium content 1mg/100g had been recorded from genotype D (wild).

Good amount of the sodium has been recorded from roots of genotype B, C and D genotypes of *Clitoria*, whereas least content 4mg/100g was recorded from the roots of genotype A (white petalloid). Less variation of the sodium concentration has been noticed from the leaves and stems of genotype A, B, C and D of *Clitoria* (Table 3; Fig.3).

B. Potassium (K)

Comparative results of the potassium among the *Clitoria* genotypes showed highest amount of potassium has been recorded in seeds of *C. biflora* genotype D (71mg/100g). Whereas, leaves, stems and roots of *C. biflora* contains 52, 66 and 29mg/100g potassium respectively.

Clitoria genotype C recorded good amount of potassium in leaves (39mg/100g), stems (46mg/100g), roots (49mg/100g) and seeds (60mg/100g). Genotype A and B can be distinguished from genotype C and D, contains very less amount in stems (4.5mg/100g, roots (3mg/100g) and seeds (7mg/100g), except leaves (52mg/100g) of genotype A and genotype B contained 5mg/100g in leaves, 7mg/100g in stems, 4mg/100g in roots and 7mg/100g in seeds (Table 4; Fig.4) Potassium has reported to be involved in maximum increase in nutrient uptake by virtue of more photosynthesis resulting in more chlorophyll formation with an increased leaf area (Belorkar *et al.*, 1992).

C. Calcium (Ca)

Comparative results among the *Clitoria* genotypes, genotype B (blue petalloid) show highest amount of calcium were recorded from leaves (96mg/100g), stems (18mg/100g), roots and seeds contained 60mg/100g. In genotype C (double petalloid) did not detect calcium in seeds.

In estimation results other genotypes of *Clitoria* the variation in amount of calcium in decreasing order was recorded in stem of C (40mg/100g) > stem of A (20 mg/100g) > stem of B and roots of C (18mg/100g) > seeds of C (13mg/100g) > seeds of A (12mg/100g) > leaves of D (10mg/100g) > leaves of C (9mg/100g) > stems and seeds of D (3mg/100g) > roots of D (2mg/100g) > roots of A (1mg/100g) (Table 4.19; Fig. 5). The high calcium concentration in the *C. ternatea* showed that it can be exploited as a significant source of calcium brewed as herbal drink (The wealth of India, 2004).

Table 1-Observation table for concentration of Riboflavin (mg/100g) in genotypes of *Clitoria.*

Genotype codes	Riboflavin (mg/100g)			
	Leaves	Stems	Roots	Seeds
A	0.75	1.20	0.67	4.80
B	0.15	2.14	13.11	0.57
C	10.44	0.17	0.22	1.15
D	5.00	1.14	0.22	0.60

Table 2: Observation table for concentration of ascorbic acid (mg/100g) in genotypes of *Clitoria.*

Genotype codes	Ascorbic acid (mg/100g)			
	Leaves	Stems	Roots	Seeds
A	25.2	28.0	12.8	46.0
B	27.2	17.2	10.8	44.8
C	24.0	3.6	4.4	32.0
D	8.8	2.8	52.0	18.0

Table 3: Mineral concentrations of sodium (Na), potassium (K) and calcium (Ca) in *Clitoria* genotypes.

G. Codes	Plant parts	Macro-minerals concentration in mg/100g		
		Sodium (Na)	Potassium (K)	Calcium (Ca)
A	Leaves	3.0	52	4.0
	Stems	3.0	4.5	20
	Roots	4.0	3.0	1.0
	Seeds	2.5	7.0	12
B	Leaves	3.0	5.0	96
	Stems	3.0	7.0	18
	Roots	7.5	4.0	60
	Seeds	1.0	7.0	60
C	Leaves	4.0	39	9.0
	Stems	8.5	46	40
	Roots	8.5	49	18
	Seeds	9.0	60	13
D	Leaves	6.5	52	10
	Stems	8.0	66	3.0
	Roots	7.0	29	2.0
	Seeds	2.5	71	3.0

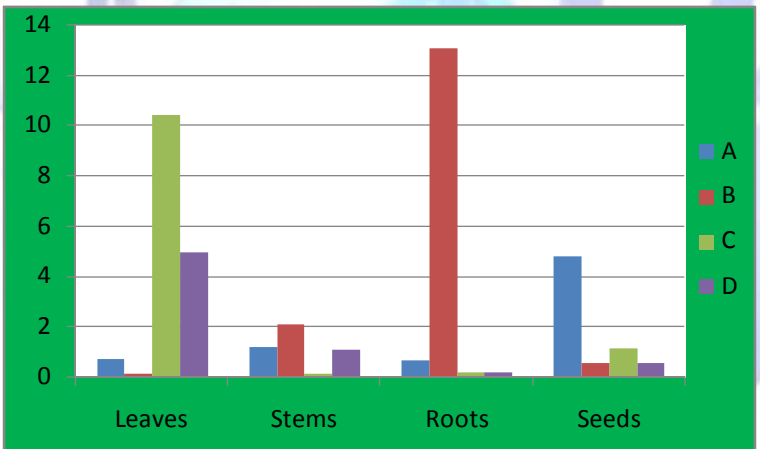

Figure 1- Comparative B2 content in four genotypes of Clitoria

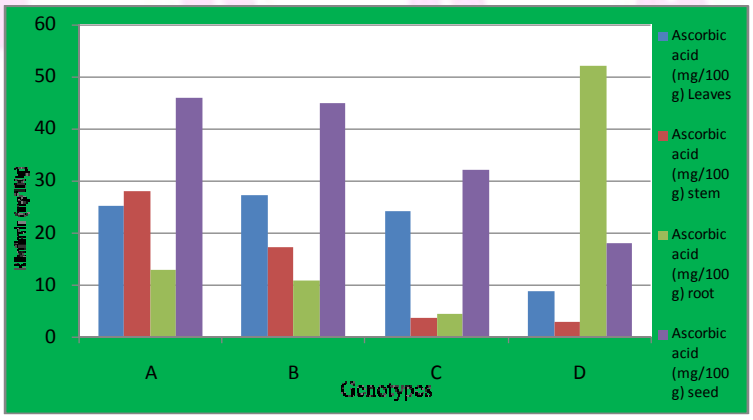

Figure 2- Comparative vit. C content in different parts of four *Citoria*

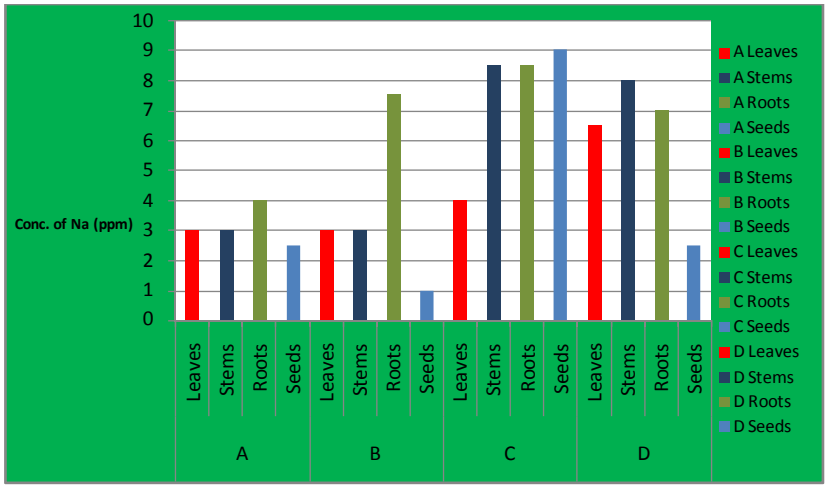

Figure 3- Comparative Na content in four genotypes of *Clitoria*

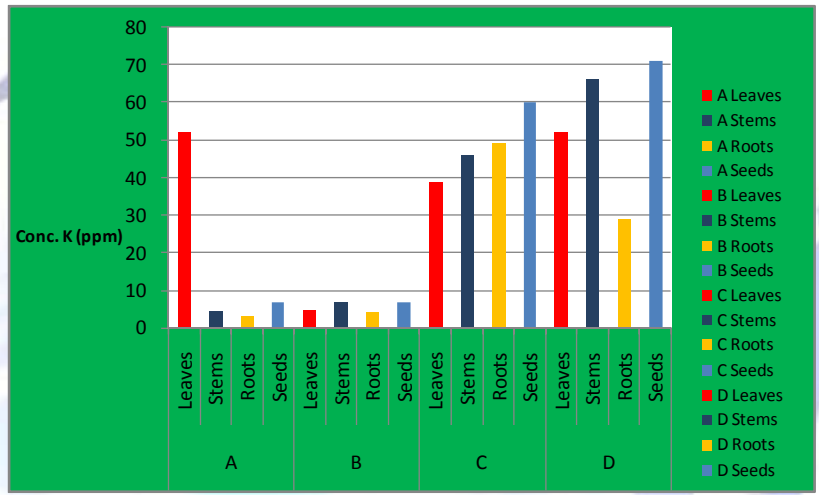

Figure 4-Comparative K content in four genotypes of *Clitoria.*

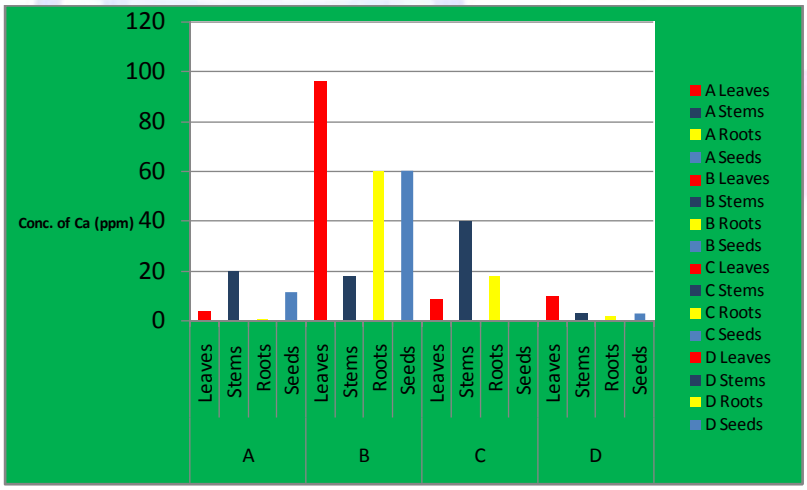

Figure 5: Comparative Ca content in four genotypes of*Clitoria.*

Conclusion:

The conclusion drawn on the basis of phytochemical analysis though the plants look same morphologically the investigated variants had great diversity in point of view of vitamins and minerals contents studied.

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