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Wal (*Lablab purpureus* L.): An unexploited potential food legumes

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Abstract
The present study was conducted on the "Wal (*Lablab purpureus* L.): An unexploited potential food legumes" was carried out at the Department of Soil Science and Agril. Chemistry, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (M.S.), India. The seeds were studied for chemical parameters and results are obtained on that basis. Twenty five promising genotypes of lablab bean obtained from Department of Agril. Botany, College of Agriculture, Dapoli were used for the present investigation. The results of proximate analysis is concluded that, genotype DPLW15 was found to be beneficial for increasing the content of N, K, Ca, Mg, S and protein. Among the twenty five genotypes, the genotype DPLW15 and DPLW46 content high percentage of protein. While genotype DPLW46 observed to be high in fat, grain yield and protein yield as compared to all other genotypes. These genotypes appeared to be comparatively superior in respect of high grain yield and could therefore be encouraged for.

Keywords: Ash, carbohydrate, fibre, mineral composition, protein and wal

Introduction
Lablab bean, an important pulse crop also known as Dolichos bean, Hyacinth bean, Bonavist (sem), Chicharas, Chink, Pavta, Auri, Field bean, Lubia bean is grown throughout the country. In India, it is grown as a field crop in Madhya Pradesh, Maharashtra, Andhra Pradesh and Tamil Nadu. It is popularly known as 'Wal' in Konkan region accounting 80 per cent of total area under lablab bean in Maharashtra and is about 60,000 ha. (Sawant and Bendale, 2006) [12]. Legumes are considered to be a very important group of plant food stuff, particularly in developing world, as a cheap source of protein where animal protein is scarce. In addition to protein, they supply adequate concentration of minerals such as sodium, potassium, calcium, magnesium, phosphorus and iron, vitamins and carbohydrates. (Siddhuraju *et al.*, 2002) [14]. Being a cheap source of dietary protein, legumes are now successfully used in child feeding programmers and food and feed formulations. This crop is multipurpose mainly grown for its young pods, green and immature seeds for vegetable purpose while the dry seeds are used in many food preparations.
The proximate and mineral composition of lablab bean shows that the protein content ranged from 20.46 to 25.47 per cent, crude lipid 2.69 to 4.17 per cent, ash 3.97 to 4.48 per cent and carbohydrates 60.63 to 66.32 per cent. The energy level of the seed (1524.20 to 1604.34 kJ 100^{-1g} DM) was comparable with commonly consumed Indian pulses. (Kamatchi *et al.*, 2010) [8]. In this context, a detailed investigation of all plant resources available in legumes worldwide is the need of the hour. Most of the Indian legumes remain uninvestigated biochemically and nutritionally. In the present study the chemical composition of the twenty five different genotypes of *Lablab purpureus* have been investigated.

Materials and Methods
The seeds of 25 genotypes along with their parents of lablab bean were obtained from the Department of Agricultural Botany, Konkan Krishi Vidyapeeth, Dapoli at botany farm during *Rabi* season of the year 2009-10. The crop sown on 5th Dec, 2009 and harvested between 3rd March to 4th April 2010. The pod after harvesting were sundried, shelled and the grains were chemically analyzed.

Proximate Composition
The grain samples of all twenty five mutants and parent were cleaned, finely ground in an electric flour mill to pass through 60 mesh and 100 mesh sieve and used for chemical analyzed

for proximate principles using standard method (A.O.A.C., 1975). The moisture, crude fibre, carbohydrate and ash were estimated according to the standard methods described in the manual of laboratory Techniques (N.I.N., 1977) and expressed on fresh weight basis. The percentage crude protein was obtained by multiplying percentage nitrogen with the factor of 6.25. The mineral solution prepared by ashing method was used for determination of calcium and magnesium (Cheng and bray, 1951) [3], phosphorus (Jackson, 1958) [6], potassium on flame photometer and sulphur by Jambunathan and Singh (1981) [7]. Iron, copper, manganese and zinc in diacid extract were estimated on Atomic Absorption Spectrophotometer (AAS).

Result and Discussion

Proximate Composition

The data on proximate composition presented in table 1 showed a large genetic variability for the content of moisture (7.33% to 13.63%), protein (18.02 % to 28.7%), fat (0.87% to 1.36%), crude fibre (3.48% to 4.73%), ash (3.23% to 4.11%) and carbohydrate (54.16% to 61.32%). Out of these high moisture observed in DPLW63 (13.63%) which was observed to be significantly inferior to rest of the genotypes. The moisture content in DPLW57 (7.33 %) genotype observed to be lowest which is significantly superior to rest of the genotypes. Among the genotypes DPLW15 recorded significantly higher protein (24.11%) content as compared to the rest of genotypes. However, DPLW46 found at par with DPLW11, DPLW58, DPLW48, DPLW61, DPLW43, DPLW30 and DPLW15 while the genotype DPLW44 (0.87%) observed lower fat content than all other genotypes. Among all the genotypes DPLW30 (4.73%) genotype was significantly superior in fibre to other genotypes except DPLW48 (4.56%), DPLW46 (4.46%) and DPLW58 (4.46%) which were at par. The ash content in DPLW48 (4.11%) genotype was found to be significantly superior over the rest of the genotype except DPLW15 (3.96%). While the significantly lowest ash content in genotype DPLW10 (3.23%) was recorded which was at par with DPLW63 (3.32%) and DPLW44 (3.38%). Genotype DPLW33 (61.32%) is significantly superior in carbohydrate content to other genotype except DPLW44 (61.05%). In general, the values obtained for proximate principles in twenty-five genotypes, in the present study were normal and comparable with the values reported by Shivshankar *et al*. (1989), Deka and Sarkar (1990) [5] and Parab (1990) and the several workers.

Table 1: Proximate composition of lablab bean genotype

S. No	Genotype	Moisture (%)	Protein (%)	Fat (%)	Fibre (%)	Ash (%)	Carbohydrate (%)
1.	DPLW10	8.37	24.19	0.90	4.14	3.23	59.08
2.	DPLW11	8.09	27.13	1.32	4.25	3.94	55.21
3.	DPLW12	8.49	23.63	0.97	4.21	3.57	59.12
4.	DPLW13	8.11	24.15	0.99	3.86	3.62	59.21
5.	DPLW15	7.70	28.70	1.22	4.16	3.96	54.16
6.	DPLW17	8.81	23.63	0.98	3.97	3.67	59.28
7.	DPLW18	9.32	22.40	1.08	4.17	3.78	59.27
8.	DPLW29	8.08	23.98	0.94	4.13	3.63	59.27
9.	DPLW30	7.92	26.43	1.23	4.73	3.55	56.23
10.	DPLW31	8.79	24.43	0.95	3.97	3.83	58.04
11.	DPLW32	8.28	23.63	1.22	3.93	3.57	59.38
12.	DPLW33	10.42	20.30	1.08	3.48	3.40	61.32
13.	DPLW35	8.57	24.68	0.98	3.87	3.67	58.23
14.	DPLW41	8.37	24.85	0.96	3.89	3.78	58.00
15.	DPLW43	7.60	24.15	1.25	4.17	3.49	59.34
16.	DPLW44	12.94	18.20	0.87	3.56	3.38	61.05
17.	DPLW45	8.63	25.55	0.97	3.98	3.52	57.70
18.	DPLW46	7.35	27.48	1.36	4.46	3.91	55.45
19.	DPLW48	7.50	26.25	1.29	4.56	4.11	56.29
20.	DPLW51	9.45	22.58	0.92	4.28	3.59	59.18
21.	DPLW54	9.75	22.23	1.16	4.26	3.62	58.98
22.	DPLW57	7.33	24.50	1.00	4.36	3.68	59.10
23.	DPLW58	7.68	26.60	1.32	4.46	3.78	56.17
24.	DPLW61	8.03	25.20	1.28	3.56	3.72	58.21
25.	DPLW63	13.63	18.02	0.91	3.68	3.32	60.45
S.E.		0.05	0.12	0.05	0.10	0.05	0.10
C.D. (p =0.05)		0.15	0.34	0.15	0.29	0.15	0.27

Mineral Composition

The data on primary and secondary mineral composition presented in Table 2 showed a large genetic variability for the content of phosphorus (317 to 428.00 mg 100^{-g}), potassium (577 to 867.33 mg 100^{-g}), calcium (94 to 132 mg 100^{-g}), magnesium (127.33 to 214 mg 100^{-g}), and sulphur (164 to 195.66 mg 100^{-g}). The phosphorus content in DPLW46 was significantly higher *i.e.* 428 mg per 100 g of seed flour than the other genotypes except DPLW15 (427.67mg^{-100g}) and DPLW48 (426.33 mg^{-100g}) which were at par with genotype DPLW46. The potassium content in DPLW15 (867.33 mg^{-100g}) genotype was significantly higher than all other genotypes and at par with DPLW13 (866.00 mg^{-100g}), DPLW46 (865.33 mg^{-100g}), and DPLW17 (865.00 mg^{-100g}). The calcium content in genotype DPLW15 (132 mg^{-100g}) was significantly higher than all other genotypes. On other hand the genotype DPLW33, DPLW44 (95 mg^{-100g}) and DPLW63 (94 mg^{-100g}) were significantly lower and at par with each

other than all other genotype. The maximum content of magnesium was seen in DPLW15 (214mg^{-100g}) which was at par with DPLW46 (213.67 mg^{-100g}). The genotype DPLW15 (195.66 mg^{-100g}) has significantly higher sulphur content in its grain as compared to other remaining genotypes. The genotype DPLW63 (164 mg^{-100g}) has significantly lowest sulphur content than the other genotypes except DPLW57 (164.33 mg$^{-100g)}$ and DPLW44 (164.66 mg^{-100g}), which are at par with the DPLW63. These values for primary and secondary nutrient content agreed well with Rao *et al.* (1978) [11], Borhade (1984) [2], Kamatchi *et al*. (2010) [8]. The data on micro nutrient composition presented in Table 3 showed a large genetic variability for the content of Iron (1.72 to 9.36 mg 100^{-g}), Manganease (0.44 to 0.84 mg 100^{-g}), Zinc (0.43 to 0.81mg 100^{-g}) and Copper (0.17 to 0.40 mg 100^{-g}).The genotype DPLW10 (9.36 mg^{-100g}) was significantly higher iron content than all other genotypes except DPLW15 (9.17 mg^{-100g}) which is at par with DPLW10.The manganese content in genotypes DPLW10 (0.84 mg^{-100g}) was significantly superior to all the genotypes and DPLW29, DPLW30, DPLW15 and DPLW48 were at par. zinc content in genotype DPLW35 (0.81 mg^{-100g}) was significantly superior to the rest of the genotypes. The genotype DPLW15 (0.40 mg^{-100g}) showed significantly higher copper content except DPLW57, DPLW48, DPLW17, DPLW18, DPLW30, DPLW43, DPLW12 were at par to the genotype DPLW15.Considering all the four micronutrients together, the genotype DPLW10 to be superior to other genotypes in respect of iron and manganese content whereas genotype DPLW15 and DPLW35 appeared to be superior in respect of copper and zinc respectively. The similar ranges of these micronutrients content were also reported by several workers [Kay (1975), Shivashankar *et al*. (1989), Deka and Sarkar (1990), Chetia *et al*. (2004), Kamatchi *et al*. (2010)] [9, 13, 5, 4, 8] for lablab bean agree well with nutrient content in present investigation.

Table 2: Primary and secondary nutrient composition of lablab bean genotype

S. No	Genotype	mg 100^{-g}				
		P	K	Ca	Mg	S
1.	DPLW10	358.00	679.00	105.00	180.67	185.33
2.	DPLW11	421.67	840.33	124.00	200.00	193.00
3.	DPLW12	354.33	751.33	98.00	187.33	181.33
4.	DPLW13	338.00	866.00	101.00	172.00	191.67
5.	DPLW15	427.67	867.33	132.00	214.00	195.66
6.	DPLW17	337.00	865.00	103.00	188.00	169.00
7.	DPLW18	344.00	631.00	101.00	181.00	173.00
8.	DPLW29	350.00	720.00	105.00	182.00	189.00
9.	DPLW30	406.33	737.67	125.00	199.00	188.67
10.	DPLW31	363.00	681.33	112.00	180.00	188.67
11.	DPLW32	374.67	690.33	99.00	172.00	185.33
12.	DPLW33	318.67	592.00	95.00	156.00	167.33
13.	DPLW35	363.67	655.33	112.33	168.00	186.00
14.	DPLW41	376.00	696.33	104.00	173.00	177.00
15.	DPLW43	377.00	655.67	104.00	140.00	180.00
16.	DPLW44	318.33	577.67	95.00	128.00	164.66
17.	DPLW45	327.00	795.00	113.33	161.00	182.33
18.	DPLW46	428.00	865.33	118.00	213.67	191.67
19.	DPLW48	426.33	826.00	118.33	201.00	189.00
20.	DPLW51	325.67	743.00	107.00	127.66	169.00
21.	DPLW54	342.00	679.00	105.00	163.00	171.00
22.	DPLW57	338.00	665.00	99.00	180.67	164.33
23.	DPLW58	407.67	823.00	119.00	212.00	193.67
24.	DPLW61	359.67	791.00	113.00	186.00	174.33
25.	DPLW63	317.00	577.00	94.00	127.33	163.00
S.E.		0.86	1.21	0.41	0.52	0.63
C.D. (P =0.05)		2.43	3.43	1.15	1.47	1.80

Table 3: Micro nutrient composition of lablab bean genotype

S. No	Genotype	mg 100^{-g}			
		Fe	Mn	Zn	Cu
1.	DPLW10	9.36	0.84	0.72	0.32
2.	DPLW11	3.06	0.69	0.67	0.32
3.	DPLW12	4.76	0.65	0.68	0.33
4.	DPLW13	2.53	0.44	0.62	0.31
5.	DPLW15	9.17	0.76	0.66	0.40
6.	DPLW17	3.22	0.56	0.55	0.34
7.	DPLW18	1.72	0.68	0.60	0.31
8.	DPLW29	2.82	0.62	0.61	0.32
9.	DPLW30	3.23	0.77	0.73	0.33
10.	DPLW31	4.55	0.66	0.52	0.31
11.	DPLW32	2.82	0.66	0.67	0.31
12.	DPLW33	2.34	0.62	0.50	0.27
13.	DPLW35	3.08	0.64	0.81	0.26
14.	DPLW41	2.77	0.65	0.64	0.32

15.	DPLW43	2.78	0.64	0.57	0.33
16.	DPLW44	2.50	0.44	0.57	0.27
17.	DPLW45	2.81	0.63	0.60	0.34
18.	DPLW46	4.90	0.77	0.64	0.35
19.	DPLW48	4.74	0.73	0.62	0.34
20.	DPLW51	3.03	0.65	0.61	0.30
21.	DPLW54	2.45	0.63	0.62	0.32
22.	DPLW57	3.44	0.61	0.59	0.35
23.	DPLW58	4.13	0.65	0.59	0.31
24.	DPLW61	2.85	0.61	0.56	0.25
25.	DPLW63	2.26	0.59	0.43	0.17
S.E.		0.07	0.04	0.02	0.03
C.D =0.05)		0.22	0.11	0.07	0.08

Conclusion

The results of chemical analysis observed in lablab bean it is concluded that, genotype DPLW15 was found to be beneficial for increasing the content of N, K, Ca, Mg, S and minerals. Among the twenty five genotypes, the genotype DPLW15 and DPLW46 content high percentage of protein. While genotype DPLW46 observed to be high in fat, grain yield and protein yield as compared to all other genotypes. These genotypes appeared to be comparatively superior in respect of high grain yield and could therefore be encouraged for cultivation.

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