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Effect of Phosphorus Fertilizer on Brassica Napusl (B.N) Oil and Protein in Water Fed Cultivation in Different Groups of Soil Phosphor Fertility

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Abstract

To find out the effect of phosphorus fertilizer on the canola oil and proteintype 401 Hayola in water fed cultivation in different groups of soil phosphor fertility 16 tests have been conducted in 4 different areas and in each area 4 test in 4 groups of phosphor usable in soil (less than 3ppm, 3-6 ppm, 6-10ppm and more than 10 ppm) in complete random block design in 4 phosphorous treatment (0, 25, 50, 75, kgs in p_2 o_5 in each hectare). From triple super phosphate source in 4 repetition in the city of Behbahan, it has been conducted for two agricultural year of 2011-2012. Results obtain show that the phosphor fertilizer treatment in all soil fertility groups, it had no meaningful effect on the percentage of oil and protein. On the one hand there has been a meaningful and negative coordination between seed protein and percentage of oil (r=-0/53) and a strong and meaningful coordination between oil functioning and seed's functioning (r=0/79).

Keywords

Canola, Phosphorus, Oil, Protein

1. Introduction

Brassica Napusl (B.N) is among the oil producing plant and plays an important role in the human nutrition through extracted oil. It also plays an important role in the provision of animals and birds food [1]. This plant is very important due to its consisting 40% oil in the seed and 40% protein in its meal or oil cake [2-3]. High amount of oil in the CANOLA and also suitable fat acids composition of corrected type caused its dominance on the world market. Since more than 90% of the country's oil is being imported from other countries, therefore considering this plant is important [3]. Timely and proper uses of nutritious elements are the most important ways of increasing the seeds functioning, oil and improvement in the quality of CANOLA seeds [1-4]. CANOLA highly needs nutritious elements and most of agricultural fields which are used for production of this plant are in short of one or more nutritious elements for producing enough oil or protein [1-4]. Phosphate is one of the needed elements for CANOLA suitable and correct use of phosphate cause increase in the production of oil and protein in CANOLA proper use of fertilizer are among the good work in the agriculture which effects the productivity and quality of products. Phosphate feeding in CANOLA cultivation has important effect on the production of oil seeds, shortage of phosphate causes reduction of oil from 33 to 23 percent. Also excess use of phosphate reduction in the amount of CANOLA oil seed [5]. In their researches reported that phosphate fertilizer doesn't have important effect on the CANOLA oil seed [8]. Gupta and Das [9] reported that phosphate has no effect on the CANOLA oil seed or otherwise its effect is very less. Singh and Tomar [10] mentioned that phosphate does not have considering effect on the CANOLA oil seed and at the time of deciding regarding the use of phosphate fertilizer it is not necessary to consider the increase in the percentage of oil. Grant and Billy [11] mentioned that suitable amount of phosphate used can increase the percentage of oil and protein. Pinkerton [12] mentioned that the highest percentage of oil is obtained when the amount of soil's phosphate is average which is due to nitrogen and phosphate. MirzaKhani *et al* [13] in their research on the safflower reported that the percentage of oil in the seed is mainly

due to effect of plant's genotype and nutritious condition.

They reported that with the increase in the nutritious elements amounts the plant growth wo\ill increase and causes increase in the percentage of seed's protein and since protein percentage and oil percentage are opposite to each other, therefore it causes reduction in the seed's oil production. Holmes and Ansiley [6-7], Jessen [14], Wetter *et al.* [8] in their researches mentioned that phosphate fertilizer has less effect on the CANOLA seed's protein. Mejamdar and Sendhu [15] reported that phosphate fertilizer causes reduction of more than 1% in the protein seed of brown SARSAN. Finelison and colleagues [16] mentioned in some conditions phosphate fertilizer effect the nitrogen composition of CANOLA seed and the amount of FreeAmino Acids (Argenin & Prolin) will increase. But this effect is very less and totally the protein seed very less will be effected by the phosphate. Generally, the amount of CANOLA oil and protein will not be effected by phosphate fertilizers. Also, there are some reports regarding the negative coordination between oil and protein seeds of CANOLA Helmoz and Ansiley [6-7] ☹, Mojemdar and Sendhu [15] ☹, Wetter *et al.* [8] ☹, Mohammadi Nikipoor [17], also mentioned a negative and meaningful coordination between percentage of oil and protein. Ojagloo *et al.* [18] in their research on the Safflower plant noticed a negative and meaningful coordination between percentage of oil and protein seeds. Ghavaee *et al*. [19] about the CANOLA plant reported that with the use of sulfur the percentage of oil will decrease and they mentioned that the reason for it is negative coordination between oil and protein in oil seeds.

2. Materials and Methods

Test has been conducted in the city of Behbahan in the south east of Khozistan province with the longitude of 50° 12′ east and latitude of 30 °36′ north with the height of 320 meters from the sea level. Behbahn is an area with semi deserted climate and located in STEPPE hot climate. Mean rain fall and 10 years temperature average equal to 313/5 millimeters and 25 degree centigrade.

To find out the effect of phosphate fertilizer on the CANOLA oil and protein in the water fed cultivation in different groups of phosphate fertility soil, 16 test in 4 areas have been conducted. In each area, 4 tests in 4 phophate group usable in the the soil (less than 3ppm, between 3-6 ppm, between 6-10 ppm, and more than 10ppm) in the form of complete random block design in 4 phosphate fertilizer treatment (0, 25, 50, 75, kg in P_2O_5 hectare) from the triple super phosphate source in 4 repetitions have been conducted which means that a test has been done in each group of soil fertility according to the amount of phosphate usable in the form of complete random block designs in 4 phosphorous fertilizer treatment in 4 repetitions. The space between 4 areas is equal to 35-50 kilometers and space between field and each area is between 3-5 centimeters. Therefore, each test consisted of 16 terraces. Each terrace with the length of 5 meters with 8 cultivated line at the space of 30 centimeters and the space between bushes are 5 meters, also the between each terrace 1.5 meter from each side and repetition spaces were also 1.5 meter. The date of cultivation was coincidence with the first rain fall in autumn in the area. Hoyola 401 was used in the test. The method of cultivation was in serial and the amount of seeds used was 8 kilograms in hectare. In all, the treatments 60 kg/ha pure nitrogen (1/2 base + ½ at the time of shooting) from the urea sources and 50 kilogram in hectare K_2O for sulfate potassium were used as bases. Removal after saddles ripening was at the level of (4*1.5 meters or 6 m^2) in each terrace and the seed's functioning with 10% moisture was determined and calculated in each hectare. Seed and strew samples were sent to the library for test regarding oil, protein and phosphate content. Protein was measured with the KEJALDAL method and oil was measured with the method of SOKSELE.

In this research, MSTAT.C software was used for statistical analysis. Means comparison have been done according to LSD test. Variance analysis for two agricultural year of 2011-2012 has been surveyed according to variance analysis.

3. Result and discussion

3.1 Percentage and Function of Oil

Results obtained from complex variance analysis showed less than 3 ppm for two agricultural year phosphate fertility group absorbable in soil. The effect of phosphate fertilizer treatment and mutual effect (phosphate fertilizer * fertility group) on the percentage of oil and CANOLA oil function is not meaningful. But the mutual effect (areas * fertility group) on the oil functioning is meaningful (Table 1). Also according to results from Table 5 of LSD test, there is not a meaningful difference between phosphate fertilizer treatment with witness treatment regarding oil and oil functioning and therefore in phosphate fertilizer treatment percentage of oil in relation to witness is little, but does not have meaningful effect. In phosphate fertility 3-6 ppm according to results from Table 2 effect of phosphate fertilizer and mutual effect (phosphate fertilizer * fertility group) on the oil functioning is meaningful. Results obtained from Table 6 showed that there is not a meaningful difference between phosphate fertilizer treatment and witness trmeatent. Also in phosphate fertility group 6-10 ppm the effect of phosphate fertilizer and mutual effect (phosphate fertilizer * fertility group) wasn't meaningful, but mutual effect (areas * fertility group) on the oil functioning is meaningful. On one hand, according to LSD test, there was not a meaningful difference between phosphate fertilizer treatment and witness treatment (Tables 3 & 7). In soil phosphate fertility group of more than 10 ppm results obtained from Table 4 show that the phos-

phate fertilizer treatment and mutual effect(phosphate fertilizer * fertility group) do not have meaningful effect on the percentage of oil and its functioning. But the mutual effect (areas * fertility group) has meaningful effect on the oil functioning. Also according to Table 8, there is not any difference between phosphate fertilizer treatment and witness treatment. And in some fertilizer treatment the amount of oil in relation to witness treatment is less. Considering the test results it can be said that even though phosphorous fertilizer does not have much effect on the CANOLA oil percentage, but in soil with less or very less absorbable phosphate, suitable use of phosphate fertilizer can cause improvement in the condition of CANOLA oil and oil functioning. Boss [5] reported that phosphorous treatment to the CANOLA causes important effect on the oil seed and in high shortage of phoaphate the amount of oil reduces from 33% to 23%. Holmes and Ainsley [6-7], ☹ Wetter *et al* [8], ☹ Gupta and Das [9] mentioned that the phosphate fertilizer does not have considerable effect on the CANOLA seed. Singhand Tomar [10] said that while deciding about phosphate fertilizer there is no reason to think of the percentage of oil. Of course in the soils which are poor in phosphate, use of enough phosphate is effective in the amount of oil and its functioning. Sajed *et al.* [20] in a research on the medicine plant of paper seed pumpkins percentage reported that phosphate fertilizer does not have meaningful effect on the seed oil amount.

3.2 Protein Percentage

from the results obtained from complex variance analysis for two agricultural year in soil fertility group of less than 3 ppm on the percentage of protein show that the effect of phosphate fertilizer treatment and also the mutual effect (phosphate fertilizer * fertility group) is not meaningful (Table 1). On the one hand, according to results obtained from Table [5] and LSD test there isn't a meaningful difference between phosphate fertilizer treatment with witness treatment regarding the percentage of protein. Even though protein percentage in fertilizing treatment is little more than witness treatment but the difference is not meaningful. In phosphate fertility group 3-6 ppm according to the results obtained from Table 2, the effect of phosphate fertilizer and mutual effect (phosphate fertilizer * fertility group) on the percentage of protein is not meaningful. Also, the average comparison of phosphate fertilizer treatment with witness treatment according to LSD test is not different (Table 6). Results obtained from the compound variance analysis in two agricultural year in fertility group of 6-10 ppm has been shown regarding the percentage of protein. The effect of phosphate fertilizer and mutual effect (fertilizer * fertility group) in this group had no meaningful effect on the percentage of protein. On the one hand, according to LSD test regarding average comparisons of phosphate treatments with witness treatment there is not a meaningful difference regarding the percentage of protein and all are located in one group (Tables 3 & 7). In phosphate fertility group of more than 10 ppm the results obtained from Table 4 show that the effect of phosphate fertilizer treatment and mutual effect (phosphate fertilizer * fertility group) does not have meaningful effect on the percentage of protein. Also, according to the result from Table 8 and LSD test, there is no difference between phosphate fertilizer treatment with average witness treatment. According to the results obtained from test it can be said that the amount of CANOLA seed protein less effected by phosphate fertilizer. Holms and Ainsley [6-7] ☹, Jessen [14] ☹, Wetter *et al*. [8] reported that phosphate fertilizer has a little effect on the CANOLA seed's protein. Mejumdar and Sendho [15] in a research on the brown SARSON reported that phosphate fertilizer cause reduction of more than 1% on the seed's protein.

3.3 Coordination between Function, Oil and Protein of CANOLA Seed

Results obtained from Table 9 show that there is a meaningful and negative coordination between percentage of oil and percentage of protein(r=- 0/53**). May be the reason for it is the use of nitrogen fertilizer in all the fertility groups, since nitrogen causes increase in the amount of seed's protein and the direct effect of protein cause reduction in the seed's oil. Coordination between percentage of oil and oil's function is very weak and meaningful ($r=0/06^{ns}$), but there is a strong and meaningful coordination between oil function and seed's function (r= 0/79**), therefore maybe the best way to obtain increase in the oil is seed's function in a unit level. Billy and Grant [11] ☹, Holms and Ainsley [6-7] ☹, Mejumdar and Sandhu [15]. Wetter *et al.* [8] have also given reports on the reduction of percentage of oil and increase in the protein of CANOLA plant. Finlay Son *et al*. [16] mentioned that in some of the conditions phosphate fertilizer has effect on the seeds with nitrogen compositions specially free Amino (Argenin and Prolin) and may be the seed's protein increases a little. Mohammadi Nikpour [17] also in a report on the Safflower reported a negative and meaningful relation between percentage of oil and percentage of protein. Ojaghloo *et al.* [18] in a research with the aim of producing relation between percentage of protein and percentage of oil reported that use of nitrogen can cause increase in the protein and reduction in the oil of seed. Therefore, for extraction of oil more than nitrogen safflower element should be kept in balance for the use. MirzaKhani *et al.* [13] reported that use of difference amount of nitrogen and phosphate fertilizer cause meaningful difference through creating better nutritioun condition for the plant safflower in production of seed function and with regard to coordination it is very meaningful and positive (r= 0/88**) which is presented between the seed function and oil function and therefore it can be said that any treatment which causes more seed function, increases the oil function. Gavahi *et al.* [19] reported that application of 120 kilograms of sulfur in hectare with the average of 38/6% oil in relation to its non application with 31/60% oil cause ¾% CANOLA seed oil reduction. The reason

for this is negative coordination between oil percentage and percentage of protein in the oil seeds since sulfur's presence in Amino Acids construction causes increase in the percentage of seed's protein.

Table 1. Compound variance analysis quality properties canola in fertility group soil absorption phosphorus under<3ppm

Change sources	Degree freedom	Mean squares		
		Oil yiled	Oil percentage	Protein percentage
Year	1	12832813/8 **	145/8 *	347/86 *
Repetition×Year	6	9721/68 **	3/04 *	5/17 *
Area(A)	3	4522549/47 **	ns3/78	ns6/43
Year× Area	3	3457218/12 **	ns2/43	ns4/13
Error(A)	18	24043/08	4/43	7/53
Soil Phosphorus Fertility Groups(B)	3	549229/44 **	ns3/38	ns4/05
Fertility Groups× Area	3	753470/64 **	ns3/03	ns5/15
Area × Fertility Groups	9	286385/61 **	ns1/14	ns1/94
Year × Area × Fertility Groups	9	588706/08 **	ns1/01	ns1/72
Error(B)	72	24211/32	1/18	2/01
Phosphorus Fertilizer Treatment (C)	3	ns192385/5	ns1/03	ns1/75
Phosphorus Fertilizer Treatment ×Year	3	ns250101/15	ns1/03	ns1/75
Area ×Phosphorus Fertilizer	9	ns206841	ns0/83	ns1/41
Area ×Phosphorus Fertilizer ×Year	9	ns268893/3	ns1/08	ns1/84
ErrorC_1	36	280896	1/12	1/92
Fertility Groups ×Phosphorus Fertilizer	9	ns207951	ns0/83	ns1/41
Phosphorus Fertilizer×Fertility Groups × Year	9	ns270336/3	ns1/08	ns1/84
Area ×Group × Phosphorus Fertilizer	27	ns57366	ns0/30	ns0/51
Area ×Group × Phosphorus Fertilizer ×Year	27	ns149151/6	ns0/60	ns1/02
Error C_2	108	93632	0/37	0/64
(CV %)		13/65	8/45	8/23

Table 2. Compound variance analysis, functioning and functioning component canola in phosphorus fertility group soil absorption in group between 3-6 ppm

Change sources	Degree freedom	Mean squares		
		Oil yiled	Oil percentage	Protein percentage
Year	1	7000/14**	322/18**	13/44**
Repetition ×Year	6	ns146/16	ns21/52	0/169 *
Area(A)	3	ns182/18	ns11/52	0/26 *
Year× Area	3	ns116/65	ns55/86	ns0/16
Error(A)	18	212/68	18/38	0/052
Soil Phosphorus Fertility Groups(B)	3	ns114/01	183/60**	1/09**
Fertility Groups× Area	3	ns145/25	ns13/05	0/252*
Area × Fertility Groups	9	ns54/66	ns13/12	ns0/084
Year × Area × Fertility Groups	9	ns48/19	ns16/98	ns0/179
Error(B)	72	56/75	17/57*	0/724
Phosphorus Fertilizer Treatment (C)	3	ns49/56	ns17/46	ns0/99
Phosphorus Fertilizer Treatment ×Year	3	ns48/20	ns17/28	ns0/97
Area × Phosphorus Fertilizer	9	ns39/86	ns14/21	ns0/80
Area × Phosphorus Fertilizer ×Year	9	ns51/83	ns18/50	ns1/03
ErrorC_1	36	54/14	20/63	1/134
Fertility Groups ×Phosphorus Fertilizer	9	ns40/09	ns14/21	0/79ns
Phosphorus Fertilizer×Fertility Groups × Year	9	ns52/1	ns18/51	ns1/03
Area × Group × Phosphorus Fertilizer	27	ns14/58	ns5/38	ns0/30
Area × Group × Phosphorus Fertilizer ×Year	27	ns29/00	ns10/32	ns0/57
Error C_2	108	18/05	6/88	0/38
(CV %)		21/4	17/04	8/64

Table 3. Compound variance analysis quality properties canola in fertility group soil absorption phosphorus 6-10 ppm

Change sources	Degree freedom	Mean squares		
		Oil yiled	Oil percentage	Protein percentage
Year	1	13217798/2 **	126/85 *	257/8 *
Repetition ×Year	6	10013/33 **	2/64 *	5/38 *
Area(A)	3	4658225/95 **	ns3/29	ns 6/69
Year× Area	3	3560934/66 **	ns2/11	ns4/29
Error(A)	18	24764/37	3/85	7/83
Soil Phosphorus Fertility Groups(B)	3	565706/3 **	ns2/07	ns4/21
Fertility Groups× Area	3	776074/76 **	ns 2/64	ns5/36
Area × Fertility Groups	9	294977/18 **	ns 0/99	ns2/02
Year × Area × Fertility Groups	9	606367/26 **	ns 0/88	ns1/79
Error(B)	72	24937/66	1/03	2/09
Phosphorus Fertilizer Treatment (C)	3	ns198157/06	ns0/90	ns1/82
Phosphorus Fertilizer Treatment ×Year	3	ns257604/18	ns0/90	ns1/82
Area × Phosphorus Fertilizer	9	ns213046/23	ns0/72	ns1/47
Area × Phosphorus Fertilizer ×Year	9	ns276960/1	ns0/94	ns1/91
ErrorC_1	36	289322/9	0/97	1/99
Fertility Groups ×Phosphorus Fertilizer	9	ns214189/53	ns0/72	ns1/47
Phosphorus Fertilizer×Fertility Groups × Year	9	ns278446/49	ns0/94	ns1/91
Area × Group × Phosphorus Fertilizer	27	ns59086/98	ns0/26	ns0/53
Area × Group × Phosphorus Fertilizer ×Year	27	ns153626/15	ns0/52	ns1/06
Error C_2	108	96440/96	0/32	0/67
(CV %)		14/06	7/6	8/56

Table 4. Compound variance analysis quality properties canola in fertility group soil absorption phosphorus over>10 ppm

Change sources	Degree freedom	Mean squares		
		Oil yiled	Oil percentage	Protein percentage
Year	1	17067642/4 **	137/05 *	265/21 *
Repetition ×Year	6	12929/8 **	2/86 *	5/53 *
Area(A)	3	6014990/8 **	ns3/55	ns 6/88
Year× Area	3	4598100/1 **	ns2/28	ns4/42
Error(A)	18	31977/30	4/16	8/06
Soil Phosphorus Fertility Groups(B)	3	730475/2 **	ns2/24	ns4/33
Fertility Groups× Area	3	1002115/95 **	ns 2/85	ns5/51
Area × Fertility Groups	9	380892/86 **	ns 1/07	ns2/08
Year × Area × Fertility Groups	9	782979/09 **	ns 0/95	ns1/84
Error(B)	72	32201/05	1/11	2/15
Phosphorus Fertilizer Treatment (C)	3	ns255872/71	ns0/97	ns1/87
Phosphorus Fertilizer Treatment × Year	3	ns332634/5	ns0/97	ns1/87
Area × Phosphorus Fertilizer	9	ns275098/5	ns0/78	ns1/51
Area × Phosphorus Fertilizer ×Year	9	ns357628/09	ns1/02	ns1/97
ErrorC_1	36	373591/68	1/05	2/105/90
Fertility Groups ×Phosphorus Fertilizer	9	ns276574/83	ns0/78	ns1/51
Phosphorus Fertilizer×Fertility Groups × Year	9	ns359547/28	ns1/02	ns1/97
Area × Group × Phosphorus Fertilizer	27	ns76296/78	ns0/28	ns0/55
Area × Group × Phosphorus Fertilizer ×Year	27	ns198371/63	ns0/56	ns1/09
Error C_2	108	124530/56	0/35	0/68
(CV %)		18/15	7/94	8/81

Table 5. The mean comparison two year, number of saddle bags, number of seeds in the saddlebags, weight of each 1000 seeds, seeds functioning, in phosphorus deferment treatments, in regions with fertility (<3ppm) for applied test (L.S.D)

Phosphorus Fertilizer Treatment kg / ha	Region1	Region2	Region3	Region4	Regions mean
	Number of sheath				
0	a28	a30	a29	a29	a29
25	a28	a36	a33	a29	a36
50	a44	a44	a41	a41	a40
75	a39	a39	a39	a40	a38
	Number of sheath				
0	a26	a32	a32	a31	a30
25	a25	a24	a28	a27	a26
50	a24	a27	a27	a26	a26
75	a21	a27	a26	a24	a25
	Weight of each 1000 seeds (gr)				
0	a2/55	a2/44	a2/54	a2/5	a2/51
25	a2/47	a2/58	a2/5	a2/54	a2/52
50	a2/35	a2/44	a2/4	a2/39	a2/40
75	a2/43	a2/5	a2/3	a2/45	a2/42
	Seeds functioning (kg/ha)				
0	a455/25	a337/25	a524	a523	a460
25	a333/5	a499	a461/5	a378	a418
50	a373	a396/5	a442/25	a410/25	a405/5
75	a367/75	a464/25	a428/75	a466	a432

***The effect treatment no significant for properties no mention amount (L.S.D)**

Table 6. The mean comparison two year, oil percentage, protein percentage, oil yield in different treatment phosphorus in area for fertility (3-6 ppm) for benefit of test (L.S.D)

Phosphorus Fertilizer Treatment kg / ha	Region1	Region2	Region3	Region4	Regions mean
	Oil percentage				
0	a44	a44	a44	a44/2	a44
25	a44/5	a44/4	a44	a44/5	a44/4
50	a47	a47	a46	a47	a46/5
75	a48	a48	a48/3	a48	a48/2
	Protein percentage				
0	a24/25	a24/2	a24/3	a24/2	a24/2
25	a24/45	a24/5	a24/4	a25	a24/6
50	a24/5	a24/4	a24/5	a24/5	a24/5
75	a25	a25/2	a25	a25/4	a25/2
	Protein percentage				
0	a182/6	a212	a194/2	a195	a196
25	a118/26	a213	a155	a156/4	a161
50	a122	a185	a156	a159/4	a155/6
75	a202	a276	a225	a224	a232

★The effect treatment no significant for properties no mention amount (L.S.D)

Table 7. The mean comparison two year, oil percentage, protein percentage, oil yield in different treatment phosphorus in area for fertility (6-10ppm) for benefit of test (L.S.D)

Phosphorus Fertilizer Treatment kg / ha	Region1	Region2	Region3	Region4	Regions mean
	Oil percentage				
0	a29	a29	a28/7	a29/3	a29
25	a44	a44	a42/75	a44/25	a43/75
50	a33	a33	a36/6	a32/7	a33
75	a31	a31	a30/6	a30/84	a31
	Protein percentage				
0	a25/2	a25	a25	a25	a25
25	a25/2	a25/3	a25/2	a25/4	a25/3
50	a26	a26	a25/7	a26/3	a26
75	a26/25	a26/4	a26/5	a26	a26/3
	Oil yield (kg/ha)				
0	a130	a159	a203/5	a194	a172
25	a134	a250/5	a236/5	a246	a217
50	a101	a174	a172	a165/4	a153
75	a148	a154	a156/6	a162/4	a155/3

***The effect treatment no significant for properties no mention amount (L.S.D)**

Table 8. The mean comparison two year, oil percentage, protein percentage, oil yield in different treatment phosphorus in area for fertility (over 10ppm) for benefit of test (L.S.D)

Phosphorus Fertilizer Treatment kg / ha	Region1	Region2	Region3	Region4	Regions mean
	Oil percentage				
0	a39	a39	a39	a39	a39
25	a42/5	a42	a43	a42	a42/4
50	a30	a30	a30	a30	a30
75	a36	a36	a36	a36	a36
	Protein percentage				
0	a25/3	a25/4	a25	a25	a25/2
25	a26/3	a26/2	a26/3	a26	a26/2
50	a27/3	a27/2	a26/4	a27	a27
75	a27/4	a27/6	a27/3	a27/2	a27/4
	Oil yield (kg/ha)				
0	a185/4	a206	a233	a255	a220
25	a171	a186/3	a197	a204	a190
50	a205/5	a228	a255/4	a217	a226/5
75	a298/2	a250	a264	a249	a265

★**The effect treatment no significant for properties no mention amount (L.S.D)**

Table 9. Coordination between attributes investigation

Attributes	(1)					
Straw.ph(1)	1	(2)				
Seed.ph(2)	0/72**	1	(3)			
Seed. Yield(3)	0/56**	0/60**	1	(4)		
Oil.percentag(4)	-0/54**	-0/35**	-0/53**	1	(5)	
Oil yield(5)	0/28*	0/45**	0/79**	ns0/06	1	(6)
Protein percentage(6)	0/84**	0/90**	0/60**	-0/53**	0/34**	1

ns, **, *, respectively, non significant, significant in probability surfaces one and five percentage.

4. Result

Phosphate fertilizer does not have meaningful effect on the percentage of oil, but in soils with high amount of phos-

phate it is a little absorbable. Proper use of fertilizer causes improvement in the CANOLA oil production and the oil function. Phosphate fertilizer does not have meaningful effect on the percentage of CANOLA protein in all groups of phosphorous fertility soil. The amount of CANOLA protein is effected by phosphate fertilizer very little. There is a negative coordination between percentage of oil and percentage of protein in B. N. seed and with reduction in the percentage of oil, the percentage of protein increases. Coordination between oil percentage and oil function is weak and non meaningful but there is a strong and meaningful coordination between oil function and seed function. Therefore maybe the best way for increasing the oil production is seed function in each unit level.

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