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Impact of Bat Guano *Otonycteris hemprichii* Camd and Seaweed Extract on Some Growth and Yield Traits of Barakaseed *Nigella Sativa* L

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Abstract

Barakaseed was improved as medicinal plant using some agricultural processes. For example, organic farmyard manure was efficiently applied to enhance growth and yield. Therefore, a field experiment was conducted out during 2012/2013 season to investigate the impact of bat guano (0, 75, 125 and 175 kg.ha^{-1}), seaweed extract as kelpak (0, 1, 2, 3ml.l^{-1}) on some growth and yield traits. Two factors were arranged in a factorial experiment system in completely randomized block design with three replicates. Results revealed that application of bat guano at 175 kg. ha^{-1} was superior in enhancing plant height, fruit branch per plant, dry weight, capsules per plant, seeds per capsule, 1000 seed weight and seed yield of 66.93cm, 13.32 fruit branch. plant^{-1}, 44.75g. plant^{-1}, 14.12caps. plant^{-1}, 93.35seed. caps^{-1}, 5.64g and 943.0 kg. ha^{-1} than other levels, respectively. Seaweed (kelpak) at 3 ml.l^{-1} also significantly increased these traits of 61.64cm, 12.11fruit branch.plant^{-1}, 43.93g.plant^{-1}, 12.27caps.plant^{-1}, 82.90seed.caps^{-1}, 5.34g and 805.0kg.ha^{-1}, respectively. Moreover, the interactive combination of the highest level of bat guano with the highest level of kelpak (175Kg. ha^{-1}X3ml. l^{-1}) gave the highest seed yield of 1154.2 kg. ha^{-1}. It could be concluded that bat guano and kelpak efficiently improved some growth traits. Therefore, consequently increased seed yield. The improvement and increase were gradually occurred. Thus, it could be recommended to use bat guano as shifting source over to chemical fertilizer supported with foliar spraying of seaweed extract as kelpak.

Introduction

Barakaseed *Nigella sativa* L. (Black Cumin) is belongs to ranunuclaceae family which is a small annual spice herb that considered one of most interested medicinal plants that widely cultivated in Muslim countries due to holy speech of prophet Mohammed, Allah bless and peace on him, ((use this black seed because it is a whole curing of all diseases except death)). From another hand, it is used in folkloric medicine for treatment of various diseases as asthma, flatulence, polio, kidney stones, abdominal disorders (El-Sayed et al., 2000, Morikawa et al., 2004), diarrhea, jaundice, helminthiasis and paralysis (Burtis and Bucar, 2000, Ashraf et al., 2006). Moreover, this herb was investigated as antioxidant (Burtis and Bucar, 2000, Sultan et al., 2009), antibacterial (Alhaj et al., 2008), analgesic and anti-inflammatory drug (Hajhashemi et al., 2004) which these properties could be due to its content of secondary compounds. Where barakaseed is rich in essential oil (Burtis and Bucar, 2000, Hajhashemi et al., 2004, Alhaj et al., 2008), sterol (Cheikh-Rouhou), lipids and glycolipids (Nickavar et al., 2003, Ramadan and Morsel, 2003, Ramadan and Morsel, 2002) and diterpene alkaloids (Morikawa et al., 2004) and triterpene saponin (Mehta et al., 2009). Recently, the cultivation of aromatic and medicinal plants had widely extended. The shift over to this pattern of agriculture is due to low economic yield of traditional crops as corn, cotton, rice, sunflower, sesame and wheat as compared to raising of growth inputs in the forms of fertilizers, cultivars seeds and pesticides. Furthermore, progressive demands of medicinal herbs as switching over to allopathic medicine. These justifiers have motivated growers to sow plants those had healthy and curing activity in extended areas (Ashraf et al., 2006). Thus, one of these plants is barakaseed that took an attention by Arab farmers. Consequently, to sustain cultivation of barakaseed, many agriculture practices had applied. Some of them were geometrical (sowing distances and spacing), physical and environmental (planting dates, harvest dates, seeding rates, growth day-degrees, locations and years), breeding (selection and hybridization) and chemical growth inputs (fertilizers, plant growth regulators and pesticides). Thus, Talafih et al. (2007) suggested that the most contributed traits to economic and biomass yield of barakaseed are the plant height and 1000 seed weight. Where these two traits were significantly affected by planting at December and seeding rate of 25 kg seeds.ha^{-1}, in addition, these two traits should be regarded by breeders. It is famous that chemically industrial fertilizers enhance plant growth processes via the involved nitrogen in protein synthesis and induced the meristmatic activity. Furthermore, mineral-P is necessary to synthesize the energy compounds and phosphoproteins, application of nitrogen with high doses results in lowering the activities of phosphoenolpyruvate carboxylase (PEP) and ribulose-1,5-bisphosphate carboxylase via decreasing the photosynthetic rate (Greef, 1994). In respect to these points, seaweed was used to increase root growth then increase uptake of nutrients. For example, kelpak raised number and weight of seed and number of pods of *Phaseolus vulgaris* L. (Kocira et al., 2013), on okra *Abelmoscus esculentus* (L.) Moench, Papenfus et al. (2013) found that kelpak significantly increased and effectively improved seedling growth traits that stressed to P and N. from other two studies, it had found that the spraying of *Festulolium braunii* and cocksfoot *Dactylis glomerata* L. regrowths by kelpak was more effective on development and formation of their biomass (Sosnowski et al., 2013; Sosnowski et al., 2013).Therefore, in recent four decades many researchers focused on the production of medicinal and aromatic plants using chemical-free agriculture pattern with high quality and safety. This pattern of cultivation is called organic farming which organic manures are prepared from liquid or solid dung of animals as sheep, cattle, camel, horses, poultry and bats those significantly used to meet nutrients requirements for various crops (El-Sherif and Sarwat, 2007). In relation to bat guano, it could be considered that bat guano as better alternative organic fertilizer compared to other organic fertilizers (Mentler et al., 2002), who stated that bat guano and chicken manure significantly increased grain yield and biomass of maize. In greenhouse, Greer and Driver (2000) revealed that bat guano and some aquatic organisms as algae and fish waste had nutritional contents that were similar to mineral fertilizers exploited in greenhouse cultivation. Similarly Bhat et al. (2013) showed that the soil application of organic fertilizers was significantly effective, whereas desert bat guano followed earth juice products. The availability of bat guano manures is retarded due to some determinants as cave location which bat lived in, quantity of guano, bat species and age of guano. However, there is imperfect knowledge on application of bat guano for producing crops (Sridhar et al., 2006) which guano of cave bat *Hipposideros speoris* had been analyzed by whom and so indicated that feces was contained high organic matter, carbon, nitrogen and phosphate. Consequently, the amendment of soil with guano at 20:1 gave highest shoot length, total dry matter, nitrogen content and nitrogen uptake in finger millet and black gram. From another study, Shetty et al., (2013) revealed that location affected on nutrients content in guano of *Megaderma lyra* which Varanga guano was higher in its nitrogen content than Yennehole guano. However, Yennehole guano was better to improve plant growth of *Vigna radiate* L. than Varanga guano. These two studies on bat guano had concluded that amended the soil with small quantity of bat guano could induce plant growth and raise crop production. From this point, it was marked that Iraqi farmers applied very low quantity of bat guano into soil of vegetative crops as tomato and eggplant with teaspoon (farm observations). Where Almehemdi and Alobaidy (2013) analyzed the Iraqi bat *Otonycteris hemprichii* Camd guano and so they found many nutrients such as Ca, Cl, HCO3, K, Mg, and SO4. In the course of this our farm observations, this study was conducted to investigate the effect of bat guano and kelpak (seaweed extract) on some growth and yield traits of barakaseed in Iraq conditions.

Material And Methods

Experimental field: study was conducted during winter season of 2013 at Experiment Station College of agriculture / university of Tikrit (gypsiferous soil). Field was prepared by ploughing using rodivator. Soil sample was taken before tillage to determine some chemical and physical properties which are represented in table (1).

Table 1. Some chemical and physical properties of study soil.

Soil properties	Value
texture	Sandy clayey loam
Soil separations	
Sand%	60
Clay%	20
Silt%	20
O.M.%	1.5
Gypsum $g.kg^{-1}$	7.5
pH	7.55
EC $ds.l^{-1}$	3.31
Porosity%	56
Calcite $g.kg^{-1}$	4.06
CEC $cmol.kg^{-1}$	5.5

Table 2. proprieties of Seaweed extract*

Components		**Additives**	
Protein	0.2%	Food grad day	0.01g
Carbohydrates	1.2%	Formalin	1.34g
Ashes	2.6%	Mono ammonium phosphate	26.86g
Moisture	96.0%	Nipacide A sodium	0.50g
Amino Asids		**Macro/Micro Nutrients**	
Alanine	150 mg		
Valine	70 mg	Nitrogen	0.28%
Glycine	70 mg	Phosphorus	0.72%
Isoleucine	40 mg	Potassium	0.42%
Leucine	72 mg	Sodium	0.11%
Proline	92 mg	Calcium	0.01%
Threonine	84 mg		
Serine	140 mg		
Betheunine	25 mg	Boron	3.2 mg
Hydroxyproline	27 mg	Copper	1.8 mg
Phenylalanine	60 mg	Iron	1.2 mg
Aspaitic Acid	31 mg	Magnesium	56.4 mg
Glutamice Acid	35 mg	Manganese	0.8 mg
Tyrosine	60 mg	Zinc	0.9 mg
Omithine	63 mg		
Lysine	80 mg		
Agrinine	48 mg		
Groth Stimulant Activity		**Physical Properties**	
		State	liquid
Auxin - like biological activity	10.7 mg	Viscosity	24 cps
		Specific gravity	1.03
		PH	4.6
Cytokinin – like biological activity	0.03 mg	Solubility	99%
		Boiling point	100 c
		Surface tension (dynes/ cm)	
		Adnancing	57.55
		Receding	59.82

*(http:// www. Kelpak.com)

The experiment was arranged in termed of factorial experiment using RCBD with three replicates to study two factors those are bat guano with 0, 75, 125 and 175 kg.h^{-1} and seaweed extract(kelpak, KPK) with 0, 1, 2, 3 ml.l^{-1}. Each treatment was applied in experiment area of 12 m-1. The spacing distance between plant and another was 20 cm and between row and another was 50 cm. one meter was unused between each two units. Consequently, each unit was fertilized with urea of 80 kg.h^{-1}, trisuper phosphate of 60 kg.h^{-1} and potassium sulphate of 80 kg.h^{-1} which the phosphate and potash fertilizers were added before sowing. While, urea was applied 45 day after sowing. Where, the seeds were sown in 20/ 11/ 2013. Kelpak was sprayed using hand sprayer which plants were sprayed till completely wetted. The spraying was parted in twice; the first was done 4 weeks after germination. While the second was applied at flowering. Surfactant was added into extract solution of 0.15 cm^{3}.l^{-1}, whereas the spraying quantity was 100 l.h^{-1}(Abu-Dhahi et al., 2001). Irrigation and weed control was done as it necessary.

Guano of Bat *Otonycteris hemprichii* Camd was collected from cave located in Albaghdady town (city belong to Anbar province) 250 km North West of Baghdad. That cave is near to Euphrates river that bat was lived there. Table 2 represented the chemical analysis of bat guano as indicated by Almehemdi and Alobaidy (2013).

Table 3. Some chemical properties of bat guano from Iraq

Bat guano property	value
Ca (ppm)	0.3
Cl (ppm)	0.4
HCO3 (ppm)	0.45
CO3 (ppm)	Null
K (ppm)	23.208
Mg (ppm)	1.5
Na (ppm)	33.486
SO4 (ppm)	741.86
EC(µS.L^{-1})	133.7
pH	7.14

The data parameters that were recorded are on plant height, fruit branches per plant, dry weight, capsules per

plant, seeds per capsules, 1000 seeds weight and seed yield.
These data were analyzed using GENSTAT 10.3. Means were compared according to LSD ($P< 0.05$).

Results and Discussion

Plant height (cm):

The effect of bat guano and kelpak levels and their interaction combinations are revealed in table (3). Addition of bat guano had significantly effect on plant height of barakaseed (bless seed) which the highest level of 175 Kg BG.ha^{-1} gave the tallest plants of 66.93cm. The level 125 Kg BG.ha^{-1} had the second rank of 63.57cm, and then the level 75 Kg BG.ha^{-1} had the third one of 58.48cm. The stimulant effect of bat guano might be attributed to its higher content of nutrients as nitrogen and phosphorus (Shetty et al., 2013; Sridhar et al., 2006) those concluded that the amended soil with little quantity of bat guano could promote plant growth traits as plant height and nitrogen content and nitrogen uptake via sufficient N supply which N results in increase in PEP and RuBSCo activities thereby the rate of photosynthetically chemo physiological processes. Moreover, it improves hydro-mechanical properties of soil.

Data in the same table also showed that spraying the plants with seaweed extract (kelpak) had significant differences among averages which the spraying the plants with 3ml KPK.l^{-1} achieved tallest plants of 61.64 cm. while the level 2ml KPK.l^{-1} located in the second rank of 59.94 cm. the level 1ml KPK.l^{-1} had third one of 57.8 cm. it was observed that application of seaweed extract such as kelpak promoted root and plant growth via uptake of nutrients as root was improved which this effect was occurred due to plant growth regulators such as cytokinins and auxins in addition to the polyamines such as putrescine and spermine that promoting effects are occurred at low concentrations (Papenfus et al., 2013) who stated that the polyamines involved in kelpak had synergistic action with other plant growth regulators especially auxin.

Table 4 . Effect of bat guano and seaweed extract on plant height (cm) of barakaseed

Bat guano Kg.ha^{-1}	Seaweed extract(kelpak, ml.l^{-1})				means	LSD 0.05
	0	1	2	3		
0	40.81	43.22	46.18	49.22	44.86	0.36
75	56.19	58.17	59.32	60.23	58.48	
125	59.36	62.92	65.41	66.58	63.57	
175	61.42	66.87	68.87	70.53	66.93	
LSD 0.05	Ns					
Means	54.45	57.80	59.94	61.64		
LSD 0.05	0.36					

It observed that interactions combination between the highest two levels from the two factors i.e. the combination between 175 Kg BG.h^{-1} and 3ml KPK.l^{-1} gave the tallest plants of 70.53cm.

Number of fruit branches (branch.plant^{-1}):

In terms of fruit branches, bat guano levels significantly affect number of fruit branches of barakaseed as revealed in table (4), which was ranked as 175 > 125> 75 Kg BG.ha^{-1} of 13.32> 12.37> 11.44 branch.plant^{-1}, descendingly. It could be considered that bat guano effects was positive which could be due to its interested role support plants with necessary nutrients (Shetty et al., 2013; Sridhar et al., 2006), those nutrients had involved in metabolism as photosynthesis and respiration. Thus, it leads to synthesize the carbohydrates (El-Sherif and Sarwat, 2007) reflecting the fruit branches per plant. In this regard, the physiological and biochemical effects are supported via total content of macro and micro-nutrients in stem and branches which hence in this study wasn't mentioned.

Number of fruit branches per plant increase was also noticed as seaweed (kelpak) was sprayed which the highest level (3ml KPK.l^{-1}) gave highest number of branches per plant of 12.11 branch.plant^{-1} followed by 2ml KPK.l^{-1} of 11.93 and 1ml.l^{-1} of 11.35 branch.plant^{-1}. It has been indicated that chemical analysis of kelpak combined from plant growth regulators like cytokinins and auxins in addition to the polyamines that act as refreshing agent to nutrients deficits in nutrients-stressed plants (Papenfus et al., 2013).

Table 5 . Effect of bat guano and seaweed extract on fruit branches per plant of barakaseed

Bat guano Kg.ha^{-1}	Seaweed extract(kelpak, ml.l^{-1})				means	LSD 0.05
	0	1	2	3		
0	8.15	8.73	9.14	9.28	8.83	0.15
75	10.85	10.97	11.87	12.06	11.44	
125	11.10	12.49	12.97	12.97	12.37	
175	12.15	13.22	13.78	14.15	13.32	
LSD 0.05	Ns					
Means	10.56	11.35	11.93	12.11		
LSD 0.05	0.15					

The interactive combinations of bat guano and kelpak treatments hadn't significantly affect on fruit branches per plant. But the combination of 175 Kg BG.h^{-1}X 3ml KPK.l^{-1} gave numerically the highest number of fruit branches per plant of 14.15 branches. plant^{-1}

Dry weight (g.plant^{-1}):

This growth parameter of barakaseed was affected by different two factors levels are referred in table (5). In respect of this parameter, it could be considered that bat guano application was significantly active to increase plant dry weight which bat guano (175 Kg.ha^{-1}) was superior in increase dry weight of barakaseed of 44.75 g.plant^{-1} followed by bat guano (125 Kg.ha^{-1}) of 41.82 g.plant^{-1}, and the level 75 Kg bg.ha^{-1} of 39.06 g.plant^{-1} ended by control of 35.46 g.plant^{-1}. From previous mentioned growth parameter, it reveals that the investigated bat guano treatments possessed the capacity to stimulate barakaseed plant growth which beneficial effect is caused by nutritional value of the bat guano (Shetty et al., 2013; Sridhar et al., 2006), thereby increase plant height and fruit branches per plant.

Kelpak application had similar effect trend on dry weight of barakaseed which maximum increment in dry weight was gotten from level 3ml.l^{-1} of 43.93 g.plant^{-1} followed by level 2ml.l^{-1} of 41.88 g.plant^{-1} and level 1ml.l^{-1} of 38.80 g.plant^{-1}finished by control of 36.48 g.plant^{-1}. Thus the superior effect was derived from kelpak 3ml.l^{-1} application. Consequently, this positive influence is in responded primarily to the potentiality of the added kelpak to increase plant height and branches per plant as in tables 3 and 4 via increase of nutrients absorption by raising root growth due to kelpak content of plant growth regulators and the polyamines (Papenfus et al., 2013), reflecting in enhancement leaf greenness index, leaf blade length, chlorophyll pigments, dry matter yield (Sosnowski et al., 2013; Sosnowski et al., 2013), and from this study the plant height and fruit branches per plant.

Table 6 . Effect of bat guano and seaweed extract on dry weight (g) of barakaseed

Bat guano Kg.ha^{-1}	Seaweed extract(kelpak, ml.l^{-1})				means	LSD 0.05
	0	1	2	3		
0	32.15	35.40	36.33	37.94	35.46	2.07
75	36.18	38.09	40.03	41.95	39.06	
125	38.38	39.87	43.82	45.25	41.82	
175	39.21	41.85	47.32	50.60	44.75	
LSD 0.05	Ns					
Means	36.48	38.80	41.88	43.93		
LSD 0.05	2.07					

The interaction combinations of bat guano with kelpak levels are non significantly changed with various combinations. The interactive combination of bat guano (175Kg. h^{-1}) with kelpak (3mml.l^{-1}) gave the highest dry weight of barakaseed of 50.60 g. plant^{-1}. While the control (0X0) had the lowest one of 32.15 g. plant^{-1}.

Capsule per plant (Caps.plant^{-1}):

Results presented in table (6) pointed out that bat guano treatments significantly increase number of capsules per plant with increase of levels in comparison to the control. Bat guano(175 Kg.ha^{-1}) was significantly superior to increase capsules per plant of 14.12 Caps.plant^{-1} followed by level 125 Kg BG.ha^{-1}of 10.72 Caps.plant^{-1} and level 75 Kg BG.ha^{-1}of 9.84 Caps.plant^{-1}. This positive results are obtained from the function of bat guano to promote barakaseed growth via enhance plant height, fruit branches per plant and dry weight. Thus, in turn to increase yield components as capsules per plant.

Table 7. Effect of bat guano and seaweed extract on capsule per plant of barakaseed

Bat guano $Kg.ha^{-1}$	Seaweed extract(kelpak, $ml.l^{-1}$)				means	LSD 0.05
	0	1	2	3		
0	8.47	8.91	9.16	9.35	8.97	1.03
75	9.46	9.72	9.96	10.22	9.84	
125	10.16	10.53	10.86	11.33	10.72	
175	10.61	11.93	15.75	18.17	14.12	
LSD 0.05	Ns					
Means	9.67	10.28	11.43	12.27		
LSD 0.05	1.03					

From table (6) significant enhancement was gotten in the capsules per plant in responded to kelpak application. Where the application of kelpak ($3ml.l^{-1}$) possessed the highest number of capsules per plant of 12.27 Caps. $plant^{-1}$ followed by kelpak ($2ml.l^{-1}$) of 11.43 $Caps.plant^{-1}$ and kelpak ($1ml.l^{-1}$) of 10.28 $Caps.plant^{-1}$ as compared to control of 9.67 $Caps.plant^{-1}$. These results had similar trend as impacted by bat guano. Therefore, it is due to enhancement of fruit branches per plant and dry weight by kelpak which reflected in yield components. However, capsules per plant may be influenced by fruit branches per plant more than other traits. Kelpak may partition and transport biochemicals from synthesis source to sink due to its content of plant growth regulators and the polyamines which in recent many researchers pointed that kelpak had synergistic effects on overall plant growth due to cytokinins, auxins, putrescine and spermine (Kocira et al., 2013; Papenfus et al., 2013; Sosnowski et al., 2013; Sosnowski et al., 2013).
Furthermore, the interaction combinations among bat guano and kelpak treatments are presented in table (6). These results indicated that these combinations non significantly effected on capsules per plant which the interactive combination of bat guano (175 $Kg.h^{-1}$) with kelpak ($3ml.l^{-1}$) was superior in raising number of capsules per plant of 18.17 $Caps.plant^{-1}$. While control gave the lowest one of 8.47 $Caps.plant^{-1}$.

Seeds per capsule ($seed.caps^{-1}$):
Seeds numbers per capsule are the function of capsule length and seed density. It could be seen from Table 7 that the number of seeds per capsule was affected by varying of bat guano levels which this effect was significant. Thus, the highest number of seeds per capsule was achieved with 175 Kg $BG.ha^{-1}$ of 93.35 seed. $Caps^{-1}$ followed by 125 Kg $BG.ha^{-1}$ of 83.18 seed. $Caps^{-1}$ and 75 Kg $BG.ha^{-1}$ of 74.85 seed. $Caps^{-1}$. Moreover, it was observed that the control had the lowest one of 63.04 seed. $Caps^{-1}$. These significant differences were probably in related to enhance the growth traits as plant height, branches per plant and dry weight by bat guano treatments which these properties could be considered as source that supply nutrients to yield components like seeds per capsules.

Table 8. effect of bat guano and seaweed extract on seeds per capsule of barakaseed

Bat guano $Kg.ha^{-1}$	Seaweed extract(kelpak, $ml.l^{-1}$)				means	LSD 0.05
	0	1	2	3		
0	60.91	61.62	63.82	65.83	63.04	1.21
75	68.42	73.83	77.54	79.61	74.85	
125	78.90	80.26	85.72	87.83	83.18	
175	86.44	93.25	95.39	98.32	93.35	
LSD 0.05	2.42					
Means	73.67	77.24	80.62	82.90		
LSD 0.05	1.21					

Seeds per capsule were gradually varied with the gradual change in spraying level of kelpak (table 7). Therefore, it could be concluded that spraying the kelpak possesses similar pattern which gradually effected on seeds per capsule with raising of kelpak levels as bat guano levels. So, it was noticed that the spraying barakaseed plants with 3ml $KPK.l^{-1}$ gave the highest number of seeds per capsule of 82.90 seed. $Caps^{-1}$ and then kelpak ($2ml.l^{-1}$) gave the second value of seeds per capsule of 80.62 seed. $Caps^{-1}$ and kelpak ($1ml.l^{-1}$) of 77.24 seed. $Caps^{-1}$. The lowest value 73.67 seed. $Caps^{-1}$ was obtained from control. The superiority of augmented levels of kelpak could have been because of improving the plant height, branches per plant, dry weight and capsules per plant whereby induction of biochemicals which transport to reproductive organs. Thus it reflects in yield components. Where Kocira et al. (2013) stated that application of kelpak with 0.4% had increased the number and weight of seeds which other researchers had interpreted this beneficial effects of kelpak in respected to its composition of polyamines that is synergistically acting with other constituent of this seaweed extract which is auxin (Papenfus et al., 2013; Sosnowski et al., 2013; Sosnowski et al., 2013).

From the same table above, as compared to the interaction combination of control, the interactive combination of bat guano (175 Kg. h^{-1}) with kelpak (3ml.l^{-1}) caused a significant increase in the seeds per capsule of 98.32 seed. $Caps^{-1}$ followed by interactive combination of bat guano (175 Kg. h^{-1}) with kelpak (2ml.l-1) of 95.39 seed. $Caps^{-1}$. This could have been resulted from the synergistic effect of interaction of bat guano with kelpak application to improve plant height, fruit branches per plant, dry weight and capsules per plant and then in turn to yield components thereby the synergistic action of some biochemicals in kelpak with nutrients of bat guano that released into soil solution and then they are absorbed by roots to transport into effect regions which Papenfus et al. (2013) suggested that application of seaweed concentrate (kelpak) replaced and overcame the deficit of nutrients such P and N, might be due to the increase of uptake of these minerals from decomposed bat guano in soil solution.

Thousand seed weight (g.1000 $seed^{-1}$):

As shown in Table8, there weren't significant differences among applied bat guano quantities. However, the highest value was obtained from application 175 kg.ha^{-1} of bat guano that gave of 5.64 g. 1000 $seed^{-1}$ and lowest one was 4.14 g. 1000 $seed^{-1}$achieved thereby the non application treatment (control).

Table 9. Effect of bat guano and seaweed extract on thousand seed weight of barakaseed

Bat guano Kg.ha^{-1}	Seaweed extract(kelpak, ml.l^{-1})				means	LSD 0.05
	0	1	2	3		
0	3.98	4.08	4.21	4.30	4.14	ns
75	4.94	5.08	5.39	5.49	5.23	
125	5.09	5.49	5.50	5.52	5.40	
175	5.10	5.59	5.84	6.05	5.64	
LSD 0.05	Ns					
Means	4.78	5.06	5.24	5.34		
LSD 0.05	Ns					

A distinct non significance was marked from above table that the spraying the plants of barakaseed with seaweed extract (kelpak). But the spraying the plants with 3ml.l-1 gave the highest number of 5.34 g. 1000 $seed^{-1}$. Whilst control treatment had smallest one of 4.78 g. 1000 $seed^{-1}$. The interactive combinations of treatments were also non significant.
From table, there is a numerical difference that is due to the weight of individual seed which contributes to increase seed yield.

Seed yield (Kg.ha^{-1}):

Table 9 showed the effect of bat guano, kelpak and their interaction on seed yield of barakaseed. Thus, as mentioned traits that effected by bat guano levels, the seed yield was gradually increased with augment of bat guano which bat guano (175 Kg.ha^{-1}) gave the highest seed yield of 943.0 Kg.ha^{-1} followed by bat guano (125 Kg.ha^{-1}) of 783.9 Kg.ha^{-1} and bat guano (75 Kg.ha^{-1}) of 580.6 Kg.ha^{-1} as compared to control of 452.1 Kg.ha^{-1}. It is worthy that the most interested two traits that significantly took place in yield of barakaseed were plant height and 1000 seed weight (Talafih et al., 2007) which these two traits were significantly improved by bat guano application. However, the other traits also were enhanced as bat guano applied which could be contributed to yield too.

Table10. Effect of bat guano and seaweed extract on seed yield of barakaseed

Bat guano Kg.ha^{-1}	Seaweed extract(kelpak, ml.l^{-1})				means	LSD 0.05
	0	1	2	3		
0	441.7	446.5	447.9	472.2	452.1	19.5
75	438.9	570.7	617.5	695.3	580.6	
125	557.5	794.1	885.7	898.2	783.9	
175	677.8	952.4	987.7	1154.2	943.0	
LSD 0.05	29.01					
Means	529.0	690.9	734.7	805.0		
LSD 0.05	19.5					

It is evident from data in table 7 that seed yield of barakaseed was significantly increased in responded to spray graduated kelpak treatments as compared to control. Spraying kelpak with 3 ml.l^{-1} significantly raised seed yield

of 805.0 $Kg.ha^{-1}$ followed by kelpak ($2ml.l^{-1}$) of 734.7 $Kg.ha^{-1}$, kelpak ($1ml.l^{-1}$) of 690.9 $Kg.ha^{-1}$ in comparison to control of 529.0 $Kg.ha^{-1}$. The pat trend as above, therefore, it could be justified from this study per se that the plant height and in part individual seed weight are the most two traits that contribute to increase seed yield, in spite of improving of other traits by kelpak spraying. It also might due to chemicals that presented in kelpak such as plant growth regulators which stimulate somatic tissues and improve the development of vegetative biomass (Sosnowski et al., 2013; Sosnowski et al., 2013). From another hand the growth regulator may effect on transition of metabolites from synthesis organs to be stored in sink regions as seeds.
The interaction among the two factors levels was significant as it is indicated in table 9. The combination of bat guano (175 $Kg.h^{-1}$) with kelpak ($3ml.l^{-1}$) gave the biggest seed yield of 1154.2 $Kg.ha^{-1}$. While the combination of control (0X0) gave the lowest one of 441.7 $Kg.ha^{-1}$. It may be there is an integrated action between supplementing soil with bat guano and application of kelpak. Where bat guano represented as source of nutrients that absorbed via developed roots thereby the influence of kelpak which this growth regulator enhanced root and plant growth and then maximized the absorption of released nutrients in the soil in final improved the yield (Papenfus et al., 2013).
Generally, nutrients can be supplied from organic manure which amends changed hydrogen potential, conserves soil solution from heavy metals and salts. It also enhances water holding and cation exchange capacity. Moreover, it improves the structure, stability and penetration of soil especially in clayey soils. Furthermore, it was well known that organic fertilizers had the same impacts on macro and micronutrients in the soils. From this point, bat guano was not sufficiently studied. In final, the application of organic materials is to reduce chemical nutrients. From another hand these materials increase soil fertility via release nutrients into its solution. One of these materials is the seaweed extract (kelpak). Thus, its promoting root and vegetative systems in respect to plant growth regulators such as cytokinins and auxins which had been proposed that these regulators cause enhance growth of plants that subjected to nutrients stress. Polyamines were also involved to improve the plants that forced to nutrients deficiency.

Conclusion

Tikrit is considered as agricultural district. Therefore, their population based on cultivation of many crops, especially those contained active compound because of being possessed pharmaceuticals manufacturing factory. Therefore, increase of crop yield is essential main in this region. To accomplish this vital aspect, Bat guano manure and seaweed extract (kelpak) were used. Thus these organic fertilizers were very effective to trigger its action on plant growth and yield. The effectiveness was gradually occurred. Moreover, the promontory effects were induced at small quantity. However, the highest quantity was the best to produce the highest yield. The trend effect of seaweed extract (kelpak) was in similar to bat guano's. Soil application of bat guano might enhance soil plot of study content of organic matter. Further research on organic fertilizer formulations is necessary to manufacture these formulations and test on on-farm trials to confirm yield and growth results.

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