International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2017; 5(5): 27-32

Received: 08-07-2017
Accepted: 09-08-2017

HB Torane
M.sc. (Ag.) student Department of Soil Science and Agril. Chemistry Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra India

MC Kasture
Asstt. Professor Department of Soil Science and Agril. Chemistry Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra India

VG Kokare
M.sc. (Ag.) student Department of Soil Science and Agril. Chemistry Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra India

PB Sanap
Asstt. Professor Department of Soil Science and Agril. Chemistry Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra India

Correspondence
PB Sanap
Asstt. Professor Department of Soil Science and Agril. Chemistry Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra India

Effect of bio-degradable coated fertilizer briquettes and their application time on growth, yield, and nutrient content on soil properties of cucumber in lateritic soil of konkan. Maharashtra

HB Torane, MC Kasture, VG Kokare and PB Sanap

Abstract
An investigation was carried out to study the "Effect of bio-degradable coated fertilizer briquettes and their application time on growth, yield, and nutrient content on soil properties of cucumber in lateritic soil of Konkan" was conducted during *Kharif* season 2013-2014 Vegetable Improvement Scheme, Wakawali Pangari Block, at Wakawali. The experiment was laid out in factorial randomized block design with twelve treatments replicated thrice. The result indicated that the split application of tar coated KAB, 1/3rd at sowing, 1/3rd at 30 DAS and 1/3rd at 60 DAS to cucumber variety Sheetal was found beneficial in enhancing cucumber fruit yield. The treatment combination C_3B_3 i.e Tar coated fertilizer briquettes three time application 1/3rd at sowing, 1/3rd at 30 DAS and 1/3rd at 60 DAS to cucumber variety Sheetal was found beneficial in enhancing cucumber fruit yield, girth of fruit, length of fruit and weight of fruit per vine, length of cucumber vine, nutrient content and soil properties.

Keywords: coated briquettes, cucumber, nutrient content, soil property, quality, yield

Introduction
Cucumber is one of the most important vegetable crop it has high place in diet as a rich source of carbohydrate, vitamins and minerals. It is one of the quickest vine vegetable crops. Nutrition is the limiting factor of plant growth and production. It is one of the most popular vegetables of the family Cucurbitaceae tender fruits. Hence it is being used in Ayurvedic preparations besides this, the whole fruit is used in cosmetic and soap industries. Slow release of fertilizers is one of the means of minimizing the fertilizer loss. This can be achieved by using different types of coating materials, like jaggary, wax and tar the slow release fertilizers are the newest and most effective technically advanced way of supplying mineral nutrients to crops. Literature was available for comparing three slow release Nitrogen fertilizers namely, urea-formaldehyde, phosphorus-coated urea and sulphur coated-urea. Nitrogen can be applied in a number of ways and with a number of different products, but recent discussions related to "sustainability" often turn toward N applied to the soil in slow-release formulations so that crops are "spoon fed" N during the growing season.
Nutrient losses due to leaching, volatilization and fixation and the activated risk of nitrate leaching after fertilizer addition to the soil may be reduced through the use of slow-release fertilizers. The release rate of a nutrient from the fertilizer must be slower than that from a fertilizer in which the nutrient is readily available for plant uptake.

Material and methods
The analytical work was done in the research laboratory of the Department of Soil Science and Agricultural Chemistry, College of Agriculture, Dapoli. The experiment was laid out in factorial randomized block design with twelve treatments replicated thrice. The soil under study was moderately acidic in nature (pH 5.77), low soluble salts (EC 0.33 dSm^{-1}), high organic carbon (15.6g kg^{-1}), low available N (272.8 kg ha^{-1}), low available P_2O_5 (11.87 kg ha^{-1}) and very high available K_2O (415.29 kg ha^{-1}). The treatment comprised of four different coating materials viz. C_0 (Non-coated KAB)C_1(Wax coated KAB),C_2(Jaggary coated KAB)andC_3 (Tar coated KAB) and three types of application time B_1 (Application of whole quantity of Briquettes at sowing time), B_2 (Application of ½ quantities of Briquettes at sowing

time and ½ quantity of at 30 days after sowing) andB_3 (Application of 1/3 quantity of Briquettes at sowing time, 1/3 quantity of Briquettes at 30 days after sowing and 1/3 quantity of Briquettes at 60 days after sowing). The dry matter yield and fruit yield was recorded plot were and calculated on hectare bases as per standard procedure. The nutrient content in wine sample was determined by following standard procedure plant sample were digested in diacid mixture (Nitric acid: perchloric acid in 9:4 ratio). The total nitrogen from wine sample was estimated by micro-Kjeldhal method (Tondon 1993). Whereas phosphorus and potassium from wine sample were by estimated by Vanado phosphomolybdate yellow colour method (piper method) and flame photometrically as prescribed by piper. The data recorded on each character were analyzed by the ANNOVA. Technique as described by Panse and Sukhatme (1967) [15]. The soils were analyzed by available N (Subbiah and Asija 1956) [19], available P (Bray's method Black 1965) and available K (Flame photometry Neutral normal ammonium acetate extractable Jackson 1973) [8].

Result and Discussion

Effect of bio-degradable coated fertilizer briquettes and their application time on plant growth character

Length of cucumber vine

From the data given in Table 1 it was revealed that the maximum length of cucumber vine 222.79, 416.03, 480.08 cm at 30, 60 and at harvest was recorded in the C_3 treatment. Regarding the application time of the different coated fertilizer briquettes, it was observed that the maximum length of cucumber vine 219.85, 413.61, 475.40 cm at 30, 60 and at harvest was recorded in the B_3 treatment. The highest length of cucumber vine 232.52, 418.22, 486.38 cm at 30, 60 and at harvest length of cucumber vine was recorded in C_3B_3 treatment combination in which the tar coated KAB was applied at 3 times. Due to this, the applied coated fertilizers in split doses in the growth period helped to fulfill the requirement of the crop which resulted in to the increase in the length of the vine. (Ramasubbareddy *et al*. 1980) reported that application of 80 kg N ha^{-1} through SCU showed highest plant height in musk melon. It was possible to deep place UB mechanically and achieves the agronomic efficiency that was obtained by hand placement of UB reported by Kadam (2001).

Girth and length of fruit

From the data, showed in Table 2 it was revealed that the maximum girth (3.97 cm) and length (17.51 cm) of cucumber fruit were observed in the C_3 treatment. Regarding the application time of coated fertilizer briquettes, it was observed that the maximum girth (3.89 cm) and length (17.25 cm) of cucumber fruit was recorded in B_3 treatment. The application of nutrients increased the girth of the various vegetable fruit crop and cucurbits. Narayanamma *et al*. (2009) [14], Hasan and Solaiman (2012) reported the similar results related to the girth of the various vegetable fruit crop and cucurbits. The enhancement in growth parameters could be due to the better and proper nourishment of the crop when fertilized through the briquette (Bulbule *et al.* 2008) [5, 6].

Weight of fruit $vine^{-1}$ of cucumber vine

The data pertaining to the effect of different coated fertilizer briquettes on weight of cucumber fruit is presented in Table 2It was revealed that in respect to the different coating materials, the maximum weight of cucumber fruit (170.44g) was recorded in the C_3 treatment. It was observed that the C_3B_3 treatment combination i.e. Tar coated KAB applied thrice recorded significantly highest weight of cucumber fruit (174.00 g) over rest of the treatment combinations. It might be due to the slow release of nutrients through the coated KAB for longer period i.e. 3 time application of briquettes. Bhattarai *et al*. (2010) [2]. Opined that the deep placement of fertilizer in briquette form significantly improves the yield and profitability in Cucumber. It might be due to application of balance nutrition through Godavari fertilizer used in the briquettes at various stages of crop whenever the crop required nutrition.

Effect of bio-degradable coated fertilizer briquettes and their application time on fruit, stover yield and quality of cucumber Fruit and stover yield

From the data, showed in Table 3 with respect to the coating materials, it was observed that the maximum fruit (21.46 q ha^{-1}) and stover yield (10.66q ha^{-1})of cucumber fruit was observed in the C_3treatment in which the tar coated KAB was applied. The application time of different coated fertilizers briquettes showed significant result and it was recorded that the maximum fruit (20.27 q ha^{-1}) and stover yield (10.21q ha^{-1})was recorded in the treatment B_3 in which the different coated fertilizer briquettes were applied 3 thrice. It was observed that the interaction effect showed significant results and the C_3B_3 treatment combination recorded significantly highest fruit (23.22 q ha^{-1}) over rest of all the treatment combinations. The yield q ha^{-1} was recorded in lateritic soils of Konkan is agreed with Sharma *et al*. (2012) [12]. It might be due to the slow release of nutrients through the tar coated KAB for longer time which helped to release nutrients whenever required by the plant. This was reflected in terms of yield. The briquette form of fertilizer recorded maximum yield of tomato than non-briquette form, reported by Durgude *et al*. (2008) [5, 6]. in rice.

Ascorbic acid content

The data showed in Table 4 in respect to the different coating materials, it was observed that the maximum ascorbic acid content (53.89 mg 100 ml^{-1}) in cucumber fruit was recorded in the C_3 treatment. Regarding the application time of the different coated fertilizer briquettes, it was observed that the maximum ascorbic acid of cucumber fruit (53.25mg100^{-1}g) was recorded in the B_3 treatment. The ascorbic acid content of cucumber fruit was varied from (49.00 to 56.67 mg 100^{-1}g) in all treatment combination. The ascorbic acid content of cucumber fruit was recorded highest (56.67 mg 100^{-1}g) in C_3B_3 treatment combination in which the tar coated KAB was applied at 3 times. The increased in ascorbic acid content might be ascribed due to better availability and uptake of required nutrient and also favorable condition resulted by the coated KAB briquettes which helps the synthesis of chlorophyll and increased ascorbic acid content. The results of Lalitha and Narayanamma (2011) [13] in ridge gourd and Asri *et al*. (2011) in cucumber are in accordance with the results of the present study.

Effect of bio-degradable coated fertilizer briquettes and their application time on Total N, P, K and Ascorbic acid content in cucumber fruit.

Total Nitrogen

It was revealed from the data given in Table 4 that the maximum nitrogen content of cucumber fruit i.e. (1.70 %) was recorded in the C_3treatment in which the tar coated KAB was applied thrice. Regarding the application time of coated

fertilizer briquettes, it was observed that the maximum nitrogen content of cucumber fruit (1.56 %) was recorded in the treatment B_2 in which the different coated fertilizers briquettes were applied 2 times. The interaction effect of different coated fertilizers briquettes with different application time showed significant result with respect to total nitrogen content of cucumber fruit. The maximum (1.71 %) total nitrogen was found in (C_3B_2) treatment combination. The nutrient content was recorded in the treatment in which tar coated KAB applied thrice i.e application at each stage of the vine which reflects in the concentration of the nutrients in the vine. Similar results were obtained by Narayanamma *et al*. (2009) [14] in bottle gourd.

Total Phosphorus

From the data shown in the Table 5 it was observed that the maximum phosphorus content of cucumber fruit i.e. (0.12 %) was observed in the C_1, C_2 and C_3 treatment in which the wax coated, jaggary coated and tar coated KAB was applied respectively. Regarding to the application time of different coated fertilizers briquettes, it was observed that the maximum phosphorus content of cucumber fruit (0.13 %) was recorded in the treatment B_2 in which the different coated fertilizers briquettes were applied 2. It was observed that the C_1B_2 treatment combinations i.e. wax coated KAB recorded significantly highest phosphorus content (0.14 %) of cucumber fruit over rest of all the treatment combinations. It might be due to the slow release of nutrients through the coated KAB for longer time i.e. 2 times. There results were in agreement with the finding obtained by Bagal (2009) [1] in rice.

Total Potassium

From the data showed in Table 5it was revealed that the maximum potassium of cucumber fruit i.e. (0.28 %) was recorded in the C_1 and C_3 treatment in which the wax and tar coated KAB was applied. Regarding the application time of coated fertilizer briquettes, the significant results were obtained with respect to potassium content of cucumber fruit. The highest total potassium (0.28 %) content was found or recorded in the treatment B_3 in which the different coated fertilizers briquettes were applied 3 times.

Nutrient content in cucumber leaves

Total nitrogen

From the data shown in the Table 6in respect to the different coating materials applied on the KAB, it was observed that the maximum nitrogen content of cucumber leaves i.e. 1.26, 0.66, and 0.38% at 30, 60 and at harvest, respectively was recorded in the C_3 treatment in which the tar coated KAB was applied thrice. Regarding the application time of the different coated fertilizer briquettes, it was observed that the maximum nitrogen content of cucumber leaves 1.25, 0.65, 0.37% at 30, 60 and at harvest was recorded in the B_3 treatment. The interaction effect showed significant result with respect to nitrogen content in cucumber leaves. The highest nitrogen content of cucumber laves 1.28, 0.69, 0.38% at 30, 60 and at harvest was recorded in C_3B_3 treatment combination in which the tar coated KAB was applied at 3 times. However, due to application of coated fertilizer briquettes in split doses, the supplementation of nitrogen to the crop were fulfilled the requirements due to which crop returned in the form of yield.

Total phosphorus

From the data shown in the Table 7 the maximum phosphorus content of cucumber leaves 0.84, 0.19, 0.17% at 30, 60 and at harvest was recorded in the C_3 treatment in which the tar coated KAB was applied thrice. The application time of the briquettes showed highest phosphorus 0.18, 0.18 % at 60 and at harvest. The interaction effect of different coated fertilizer briquettes with different application time showed maximum phosphorus 0.27, in C_0B_3 and C_3B_3 at 30 and 0.23 at 60 DAS.

Total potassium

From the data shown in the Table 8 the treatment C_3 in which the Tar coated KAB was applied recorded -maximum potassium content of cucumber leaves 1.68, 0.67, 0.35% at 30, 60 and at harvest. Regarding the application time of the different coated fertilizer briquettes, it was observed that the maximum potassium content of cucumber leaves 1.60, 0.67, 0.35% at 30, 60 and at harvest was recorded in the B_2 and B_3 at 30 and 60 DAS treatments. The interaction effect showed the maximum potassium of cucumber leaves 1.74% in C_3B_3 treatment combination in which the tar coated KAB was applied at 3 times. The results obtained might be due to the slow release of the potassium through the tar coated KAB throughout the life cycle of the cucumber. The results obtained were found in accordance with Junejo *et al*. (2010) [11]. and Bulbule and Gajbhiye (2013) [4].

Effect of bio-degradable coated fertilizer briquettes and their application time on chemical properties of soil pH

The pH of the experimental soil influenced significantly due to the different coating materials on the KAB. It was observed that the tar coated KAB was applied i.e. C_3 treatment recorded the maximum pH at harvest as (5.86). Regarding the application time it was observed that the maximum pH of soil (5.85) was recorded in the B_3 treatment. The study reported that there was slight increase in the pH of experimental soil by using sulphur coating urea. The results obtained in this study were found in accordance with Chang *et al*. (2007) [20].

Electrical conductivity

It was revealed that the highest electrical conductivity of soil (0.35 dSm^{-1}) was recorded in the C_3treatment at harvest. Regarding the application time it was observed that the maximum electrical conductivity of soil (0.35 dS m^{-1})at harvest was recorded in the B_2 and B_3 treatment in which the different coated fertilizer briquettes were applied two and three times. The interaction effect showed non-significant results with respect to EC of soil at all stages. Jagadeeswaran *et al*. (2005) [9] and Junejo *et al.* (2012) [10] reported the similar results.

Organic carbon

The organic carbon of soil in relation to the different coated fertilizer briquettes was recorded maximum organic carbon (1.87 g kg^{-1}) at harvest in the C_3 treatment in which the tar coated KAB was applied thrice. Regarding the application time it was observed that the highest organic carbon of soil (1.82gkg^{-1}) at harvest was recorded in the B_3 treatment. In general, it was observed that the organic carbon content was found higher in the soil in which the tar coated KAB was applied. It might be due to the disintegration of the tar, coating material in the soil which would reflect in the increasing trend in the soil. Similar results were reported by Bharathi *et al.* (2011).

Available nitrogen

The highest available nitrogen in soil (374.98 kg ha^{-1}) at harvest was recorded in the C_3 treatment. Regarding the application time it was observed that the maximum available

nitrogen of soil (366.81 kg ha^{-1}) at harvest was recorded in the B_3treatment. Similar results were found by Shinde (2011) [18]. with application of UB-Godavari briquettes, Urea-DAP briquettes and Urea-SSP-Suphala briquettes significantly enhanced available nitrogen content of soil.

Available phosphorus

The highest available phosphorus of soil 19.27 kg ha^{-1} at harvest was recorded in the C_3 treatment. Regarding the application time of the different coated fertilizer briquettes, it was observed that the maximum available phosphorus of soil 19.69 kg ha^{-1} at harvest was recorded in the B_3 treatment. Shinde (2011) [18] reported an application of Urea-DAP and Urea-Godavari briquettes resulted into significant increase in available phosphorus content over the recommended dose of fertilizer. An increase in available phosphorus with the application of briquettes to rice crop was reported by Durgude *et al.* (2008) [5, 6]. Bagal (2009) [1] and Fallah *et al*. (2013) [7].

Available potassium

The highest available potassium of soil 374.91 kg ha^{-1} was recorded in the C_3 treatment in which the tar coated KAB was applied thrice. Regarding the application time of the different coated fertilizer briquettes, it was observed that the maximum available potassium of soil 364.26 kg ha^{-1}at harvest was recorded in the B_3 treatment. It was observed that the highest available potassium of soil (383.31 kg ha^{-1}) was recorded by C_3B_3 treatment combination.

Table 1: Effect of bio-degradable coated fertilizer briquettes and their application time on length of cucumber vine

Treatments	Length of vine (cm)														
	30 Days					60 Days					At harvest				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	214.85	214.39	217.30	218.01	216.14	408.20	411.20	409.55	415.66	411.15	463.00	474.40	468.36	477.17	470.76
B_2	214.33	215.27	218.12	217.85	216. 40	407.17	413.31	409.29	414.21	411.00	468.71	477.99	472.50	476.70	473.97
B_3	215.20	213.88	217.81	232.52	219.85	409.00	412.22	414.99	418.22	413.61	471.60	477.55	466.46	486.38	475.40
Mean	214.80	214.51	217.74	222.79		408.12	412.24	411.28	416.03		467.77	476.68	469.11	480.08	
	C	B	C x B			C	B	C x B			C	B	C x B		
S.E.±	1.28	1.10	2.21			0.70	0.69	1.38			0.92	0.80	1.60		
C.D(P=0.05)	3.22	3.22	6.45			2.09	2.09	4.05			2.34	2.34	4.68		

Table 2: Effect of bio-degradable coated fertilizer briquettes and their application time on girth of fruit, length of fruit and weight of fruit per vine

Treatments															
	Girth of fruit (cm)					Length of fruit (cm)					Weight of fruit vine^{-1}(g)				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	3.67	3.74	3.60	3.83	3.71	16.64	16.27	17.22	16.53	16.67	164.33	165.33	163.33	165.67	164.67
B_2	3.81	3.86	3.77	4.02	3.86	16.41	17.14	16.48	17.42	16.86	162.67	168.67	163.67	171.67	166.67
B_3	3.73	3.98	3.78	4.06	3.89	16.90	16.71	16.82	18.58	17.25	163.00	164.67	167.33	174.00	167.25
Mean	3.73	3.86	3.71	3.97		16.65	16.71	16.84	17.51		163.33	166.22	164.78	170.44	
	C	B	C x B			C	B	C x B			C	B	C x B		
S.E.±	0.05	0.04	0.08			0.18	0.15	0.30			0.97	0.84	1.68		
C.D(P=0.05)	0.12	0.12	NS			0.44	0.44	0.89			2.46	NS	4.91		

Table 3: Effect of bio-degradable coated fertilizer briquettes and their application time on number of fruits vine-1 fruit and stover yield of cucumber

Treatments										
	Yield (q ha^{-1})					Stover yield (q ha^{-1})				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	17.85	18.74	17.67	19.49	18.44	8.47	10.03	9.44	10.50	9.61
B_2	17.20	17.56	19.50	21.68	18.98	8.90	10.30	9.63	10.67	9.88
B_3	18.17	19.90	19.80	23.22	20.27	9.37	10.63	10.03	10.80	10.21
Mean	17.74	18.73	18.99	21.46		8.91	10.32	9.70	10.66	
	C	B	C x B			C	B	C x B		
S.E.±	0.35	0.30	0.61			0.09	0.08	0.16		
C.D(P=0.05)	0.89	0.89	1.77			0.23	0.23	NS		

Table 4: Effect of bio-degradable coated fertilizer briquettes and their application time on ascorbic acid total N content in cucumber fruit

Treatments	Ascorbic acid (mg 100^{-1} g)					Total nitrogen (%)				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	51.00	51.00	49.00	51.67	50.67	1.34	1.37	1.54	1.69	1.48
B_2	51.33	51.67	50.67	53.33	51.75	1.34	1.62	1.57	1.71	1.56
B_3	50.67	53.33	52.33	56.67	53.25	1.31	1.45	1.66	1.70	1.53
Mean	51.00	52.00	50.67	53.89		1.33	1.48	1.59	1.70	
	C	B	C x B			C	B	C x B		
S.E.±	0.31	0.27	0.54			0.015	0.013	0.026		
C.D(P=0.05)	0.79	0.79	1.58			0.038	0.038	0.076		

Table 5: Effect of bio-degradable coated fertilizer briquettes and their application time on total P and K content in cucumber fruit

Treatments	Total phosphorus (%)					Total potassium (%)				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	0.03	0.12	0.12	0.13	0.10	0.23	0.24	0.26	0.26	0.25
B_2	0.12	0.14	0.13	0.13	0.13	0.26	0.31	0.24	0.29	0.27
B_3	0.12	0.10	0.11	0.12	0.11	0.25	0.29	0.28	0.30	0.28
Mean	0.09	0.12	0.12	0.12		0.25	0.28	0.26	0.28	
	C	B	C x B			C	B	C x B		
S.E.±	0.009	0.007	0.015			0.006	0.005	0.010		
C.D(P=0.05)	0.022	0.022	0.043			0.015	0.015	NS		

Table 6: Effect of bio-degradable coated fertilizer briquettes and their application time on total nitrogen content in cucumber leaves

Treatments	Total nitrogen (%)														
	30 Days					60 Days					At harvest				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	1.23	1.23	1.23	1.25	1.23	0.57	0.59	0.62	0.63	0.60	0.35	0.35	0.36	0.37	0.36
B_2	1.24	1.24	1.23	1.26	1.24	0.60	0.66	0.65	0.66	0.64	0.35	0.36	0.35	0.37	0.36
B_3	1.24	1.24	1.25	1.28	1.25	0.62	0.63	0.64	0.69	0.65	0.37	0.37	0.36	0.38	0.37
Mean	1.24	1.24	1.24	1.26		0.60	0.63	0.63	0.66		0.36	0.36	0.36	0.38	
	C	B	C x B			C	B	C x B			C	B	C x B		
S.E.±	0.003	0.002	0.005			0.005	0.004	0.009			0.002	0.002	0.010		
C.D(P=0.05)	0.007	0.007	0.013			0.013	0.013	0.026			0.006	0.006	NS		

Table 7: Effect of bio-degradable coated fertilizer briquettes and their application time on total phosphorus content in cucumber leaves

Treatments	Total phosphorus (%)														
	30 Days					60 Days					At harvest				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	0.69	0.75	0.79	0.82	0.76	0.11	0.18	0.22	0.12	0.16	0.10	0.18	0.15	0.15	0.14
B_2	0.75	0.73	0.71	0.83	0.75	0.14	0.20	0.19	0.12	0.17	0.12	0.15	0.19	0.14	0.15
B_3	0.75	0.75	0.71	0.87	0.77	0.27	0.15	0.16	0.15	0.18	0.17	0.15	0.16	0.23	0.18
Mean	0.73	0.74	0.74	0.84		0.18	0.17	0.19	0.13		0.13	0.16	0.17	0.17	
	C	B	C x B			C	B	C x B			C	B	C x B		
S.E.±	0.026	0.022	0.045			0.003	0.003	0.006			0.007	0.006	0.012		
C.D(P=0.05)	0.065	NS	NS			0.008	0.008	0.017			0.018	0.018	0.035		

Table 8: Effect of bio-degradable coated fertilizer briquettes and their application time on total potassium content in cucumber leaves

Treatments	Total potassium (%)														
	30 Days					60 Days					At harvest				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	1.43	1.48	1.63	1.65	1.55	0.61	0.62	0.64	0.66	0.63	0.32	0.33	0.33	0.34	0.33
B_2	1.45	1.66	1.64	1.66	1.60	0.63	0.66	0.64	0.65	0.64	0.33	0.35	0.34	0.35	0.34
B_3	1.45	1.65	1.55	1.74	1.60	0.64	0.67	0.66	0.71	0.67	0.34	0.34	0.34	0.36	0.35
Mean	1.45	1.59	1.61	1.68		0.62	0.65	0.65	0.67		0.33	0.34	0.34	0.35	
	C	B	C x B			C	B	C x B			C	B	C x B		
S.E.±	0.007	0.006	0.013			0.006	0.006	0.011			0.004	0.003	0.007		
C.D(P=0.05)	0.018	0.018	0.036			0.016	0.016	NS			0.010	0.010	NS		

Table 9: Effect of bio-degradable coated fertilizer briquettes and their application time on soil pH, EC and Organic carbon after harvest

Treatments															
	pH at harvest					EC (dSm^{-1})at harvest					Organic carbon (%)at harvest				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	5.80	5.81	5.83	5.85	5.83	0.33	0.35	0.35	0.34	0.34	1.63	1.75	1.65	1.83	1.71
B_2	5.81	5.83	5.84	5.85	5.83	0.34	0.35	0.35	0.36	0.35	1.65	1.81	1.77	1.85	1.77
B_3	5.83	5.84	5.85	5.86	5.85	0.35	0.36	0.35	0.36	0.35	1.70	1.83	1.80	1.93	1.82
Mean	5.81	5.83	5.84	5.86		0.34	0.35	0.35	0.35		1.66	1.80	1.74	1.87	
	C	B	C x B			C	B	C x B			C	B	C x B		
S.E.±	0.005	0.004	0.009			0.002	0.002	0.004			0.010	0.009	0.017		
C.D(P=0.05)	0.013	0.013	NS			0.006	0.006	NS			0.025	0.025	NS		

Table 10: Effect of bio-degradable coated fertilizer briquettes and their application time N, P_2O_5 and K_2O of soil after harvest

Treatments															
	Available nitrogen (kg ha^{-1}) at harvest					Available phosphorus (kg ha^{-1}) at harvest					Available potassium (kg ha^{-1}) at harvest				
	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean	C_0	C_1	C_2	C_3	Mean
B_1	356.13	358.59	360.47	370.64	361.46	14.41	16.92	17.42	17.59	16.59	347.29	358.37	351.49	365.03	355.55
B_2	357.46	362.54	363.25	376.89	365.04	17.76	16.75	17.42	19.10	17.76	351.17	342.03	332.67	376.39	350.56

B_3	357.93	366.33	365.56	377.41	366.81	19.10	19.94	18.60	21.11	19.69	354.28	376.22	343.21	383.31	364.26
Mean	357.17	362.49	363.09	374.98		17.09	17.87	17.81	19.27		350.91	358.87	342.46	374.91	

	C	B	C x B	C	B	C x B	C	B	C x B
S.E.±	0.83	0.72	1.44	0.52	0.45	0.91	3.24	2.81	5.61
C.D(P=0.05)	2.10	2.10	NS	1.32	1.32	NS	8.19	8.19	16.38

Conclusion

Amongst the three types of coated briquettes, the tar coated briquettes application was found to be superior for to not only increases cucumber fruit yield but also nutrient content in cucumber vine when applied in three times @1/3 quantity of briquettes at sowing time, 1/3 quantity of briquettes at 30 days after sowing and 1/3 quantity of briquettes at 60 days after sowing @ 5 briquettes per plant at an interval of 30 days after sowing.

Reference

1. Bagal. Efficacy of formulations of briquettes containing nitrogen, phosphorus, potassium, zinc and UB-DAP on yield, nutrient uptake by rice (*Oryza sativa*) and on soil properties. M. Sc. (Agri.) Thesis submitted to Dr. B. S. K. K. V., Dapoli. India (M. S). (Unpublished). 2009.
2. Bhattarai SP, Palada MC, Midmore DJ, D Wu, Salas R. On farm evaluations of fertilizer Briquettes and low cost drip irrigation for small holder vegetable production in Cambodia Ind. Eng. Chem. Res. 2010; 44(7):2288-2291.
3. Black CA. Method of Soil Analysis Part-II. Am. Agron. Inc. Madison Wisconsin, U.S.A. 1965, 1040-41, 1374-75.
4. Bulbule AV, Gajbhiye PN. Response of upland rice (*Oryza sativa*) to briquettes containing NPK. Crop Research Hissar. 2013; 45(1/3):24-28.
5. Bulbule AV, Durgude AG, Patil YJ, Patil VS. Effect of fertilizer management through urea - DAP briquettes on low land rice. Asian J. Soil Sci. 2008; 3(1):1-3.
6. Durgude AG, Bulbule AV, Patil YJ, Patil VS. Effect of fertilizer management through urea - DAP briquettes on low land rice. Asian J. Soil Sci. 2008; 3(1):1-3.
7. Fallah S, Ghalavand A, Raiesi F. Soil chemical properties and growth and nutrient uptake of maize grown with different combinations of broiler litter and chemical fertilizer in a calcareous soil. Communications in Soil Sci. and Plant Analysis. 2013; 44(21):3120-3136.
8. Jackson ML. Soil chemical analysis. Prentice Hall of India Pvt. Ltd. New Delhi. 1973, 134-182.
9. Jagadeeswaran R, Murugappan V, Govindaswamy M. Effect of Slow Release NPK Fertilizer Sources on the Nutrient use Efficiency in Turmeric (*Curcuma longa L.*). World J. Agric. Sci. 2005; 1(1):65-69.
10. Junejo Nasima, Khanif MY, Dharejo KA, Hazandy Abdul-Hamid, Arifin Abdu. Evaluation of coated urea for ammonia volatilization loss, nitrogen mineralization and micro site pH in selected soil series. African J. Biotech. 2012; 11(2):366-378.
11. Junejo Nasima, Khanif MY, Hanfi MM, Wan ZWY, Dharejo KA. Maize response to biodegradable polymer and urease inhibitor coated urea. International J. of Agriculture and Biology. 2010; 12(5):773-776.
12. Kadam JR, Sahane JS. Efficient use of NPK fertilizer briquettes on the yield and quality of crops. Indian Sugar. 2001; 51(2):115-118.
13. Lalitha, Kameswari P, Narayanamma M. Influenced of integrated nutrient management in ridge gourd. J. Res. Angrau. 2011; 39(3):16-20.
14. Narayanamma M, Lalitha Kameswari P, Radha Rani K, Anitha V. Effect of integrated nutrient management in bottle gourd. Orissa J. Horti. 2009; 37(1):4-8.
15. Panse VG, Sukhatme PV. Statistical methods for agricultural workers, ICAR, New Delhi. 1967.
16. Ramasubbareddy G, Ramasehaiah K, Sivashankara Rao V, Yogeswara Rao Y. Efficiency of slow released N fertilizers for Rice in black soil. Indian J. Agron. 1980; 25(1):129-131.
17. Sharma Jag Paul, Puja Rattan, Sanjeev Kumar. Response of vegetable crops to use of integrated nutrient management practices. SABBJ. Food and Agric. Sci. 2012; 2(1):15-19.
18. Shinde. Effect of nutrient management with and without paclobutarozol on growth, yield and nutrient uptake by groundnut var. Konkan Gourav in lateritic Soils of Konkan. M. Sc. (Agri.) Thesis submitted to Dr. B. S. K. K. V., Dapoli. India (M. S). (Unpublished), 2011.
19. Subbiah BV, Asija GL. A rapid procedure for the estimation of available Nitrogen in Soil. Curr. Sci. 1956; 25(8):259-260.
20. Zhang Chang Ai, Zhang Min, Li Su Zhen. Effects of sulfur-coating left from using SCU on cole growth and soil chemical properties. Acta Pedologica Sinica. 2007; 44(1):113-121.