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Effect of humic acid fortified briquettes on yield and soil properties of Brinjal (*Solanum melongena* L.) in lateritic soils of Konkan region

SH Gawde, MC Kasture, SB Dodake, VG Salvi and VG More

SH Gawde
Department of Soil Science and Agricultural Chemistry, College of Agriculture Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

MC Kasture
Department of Soil Science and Agricultural Chemistry, College of Agriculture Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

SB Dodake
Department of Soil Science and Agricultural Chemistry, College of Agriculture Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

VG Salvi
Department of Soil Science and Agricultural Chemistry, College of Agriculture Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

VG More
Department of Agronomy, College of Agriculture Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

Corresponding Author:
VG More
Department of Agronomy, College of Agriculture Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India

Abstract
Field experiment was conducted during the *rabi* season 2021-22 and 2022-23, respectively, at Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli to evaluate the response of Brinjal (*Solanum melongena* L.) to different humic acid fortified briquettes. Significant effects and higher values were recorded with respect to stover and fruit yield with the application of UB-10:26:26 fortified with potassium humic acid followed by application of UB-DAP and KAB. The soil pH was recorded higher with absolute control treatments. The soil major nutrients show a significant result with the application of fertilizer briquettes and humic acid.UB-10:26:26 and UB-DAP with application of potassium humic acid recorded highest value of available nitrogen, available phosphorus and available potassium in the year 2021-22 and 2022-23 at harvest.

Keywords: Brinjal, yield, nutrients, UB-DAP, UB-10:26:26 and Kokan Annapurna briquettes

Introduction
Brinjal has been known in India from ancient times. India is its centre of origin and diversity (Saravaiya *et al*. 2010) [15]. It is popular and principle fruit vegetable grown in India and other parts of tropical and subtropical world but in temperate regions, it is grown mainly during warm season (Rai, 1995) [14]. The low nutrient use efficiency of N and P is because of various reasons such as volatilization, denitrification, surface runoff, leaching losses for nitrogen and fixation in soil for phosphorus. Broadcast application of N as urea resulted in an average 10 times higher amounts of ammonium N in flood water compared to deep placement of urea briquette and NPK briquette (Kapoor *et al*. 2008) [6]. More or less similar situation exists in case of potassium. Deep placement of fertilizers (USG and NPK briquette) into the anaerobic soil zone is an effective method to reduce volatilization loss (Mikkelsen *et al*. 1978) [8]. Deep placement of USG at 8-10 cm depth of soil can save 30% N compared to Prilled Urea, increases absorption rate, improves soil health and ultimately increases rice yield (Savant *et al*. 1991) [16]. Moreover, deep placement method of fertilizer application is environment friendly and will not decrease the normal fertility of land (BRRI, 2010) [2]. There it would be better if all the three major plant nutrients are used in the briquette form.
Humic acid application along with recommended dose of fertilizers and organic manures plays a greater role in plant biochemical and physiological activities and soil fertility, consequently resulting in better growth and yield of crops (Kalaichelvi *et al*. 2006) [5] Humic acid attracts positive ions, forms chelates with micronutrients and releases them slowly when require by plants and act as chelating agents there by prevents formation of precipitation, fixation, leaching and oxidation of micronutrients in soil.(Pavani *et al*. 2022) [12].
Urea briquette/USG/UB-DAP briquette has less surface area as compared to prilled urea, therefore it dissolved slowly and maintains higher level of NO_3-N in soil up to maximum period of crop growth and found beneficial in transplanted rice crop under anaerobic condition (Prasad and De Datta, 1979) [13]. Due to high cost and low nutrient use efficiency the consumption of traditional fertilizers are minimized by 25-30% in the Konkan region where Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth has recommended the different formulation of briquettes which reduces the consumption, input cost of the fertilizers as well as increasing nutrient use efficiency, production and quality of the crop which is helpful for the farmers to get a good yield.

The practice of producing the Humic acid fortified briquettes is a necessary attempt to maintain a sustainable supply of nutrients in the soil which not only maintain the soil productivity but also improve and sustain the soil physical, chemical and biological properties. Humic acids (HA) are natural biostimulants and which will improve the growth of plants. The coating of fertilizers using organic acids will help in improving the fertilizer efficiency and also it will reduce the fertilizer losses. Paramasivan *et al*. (2015) [10] who studied the effect of Humic acid on yield, profitability and nutrient uptake in Brinjal reported that the Humic acid application has increased the yield, profitability and nutrient uptake in Brinjal.

Materials and Methods

The experiment was conducted in the Department of Agronomy, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri during *Rabi* season of (November to April) the year 2021-22 and 2022-23. The field experiment was laid out in Factorial Randomized Block Design (FRBD) comprising of fifteen treatment combinations replicated thrice during *Rabi* season of 2021-22 and 2022-23 at Research Farm of Agronomy Department, College of Agriculture, Dapoli. The treatment details were as Absolute Control (T_1), Absolute Control+ Na-Humic Acid (T_2), Absolute Control+ K-Humic Acid (T_3), Straight Fertilizers+ Control(T_4), Straight Fertilizers+ Na-Humic Acid (T_5), Straight Fertilizers+ K-Humic Acid (T_6), Konkan Annapurna Briquettes (KAB)+Control (T_7), Konkan Annapurna Briquettes (KAB)+Na-Humic Acid (fortified) (T_8),Konkan Annapurna Briquettes (KAB)+K-Humic Acid (fortified) (T_9),UB-10:26:26 + Control (T_{10}),UB-10:26:26 + Na-Humic Acid (fortified) (T_{11}),UB-10:26:26 + K-Humic Acid(fortified) (T_{12}), UB-DAP + Control (T_{13}), UB-DAP + Na-Humic Acid (fortified) (T_{14}),UB-DAP + K-Humic Acid (fortified) (T_{15}). The briquettes were prepared as per the ratio of fertilizers combination required to be used as per the respective treatment details with the help of "Kranti briquetter" machine. Nitrogen @150 kg ha^{-1} was applied in three splits *viz*, first dose of 1/3 was applied at transplanting, second 1/3 dose at 30 days after transplanting and third 1/3 dose at 60 days after transplanting. Phosphorus at 50 kg ha^{-1} and potassium at 50 kg ha^{-1} were applied in single dose at the time of transplanting in the corresponding treatments. In case of treatment T_7, T_8 and T_9 fertilizer briquettes *viz*., Konkan Annapurna Briquettes, Konkan Annapurna Briquettes (KAB)+ Na-Humic Acid Fortified and Konkan Annapurna Briquettes (KAB)+ K-Humic Acid Fortified respectively, in treatment T_{10}, T_{11}, T_{12} fertilizer briquettes *viz*., UB-10:26:26, UB-10:26:26 + Na-Humic Acid Fortified, UB-10:26:26 + K-Humic Acid Fortified respectively and in treatment T_{13},T_{14},T_{15} fertilizer briquettes *viz*., UB-DAP, UB-DAP + Na-Humic Acid Fortified and UB-DAP + K-Humic Acid Fortified briquettes were applied at time of transplanting, after 30 days after transplanting and 60 days after transplanting.

Details of field experiment

The field experiment was conducted on typical lateritic soils under the Very High Rainfall Lateritic Zone (VRL) of the Konkan region of the Ratnagiri district. In order to know the initial soil fertility status, a representative surface soil sample (0-22.5 cm depth) was collected, processed and analyzed for different physico-chemical properties (Table 1). The experimental soil was sandy loam in the texture, moderately acidic in reaction and having low electrical conductivity, very high in organic carbon, low in available nitrogen and available phosphorus and high in available potassium. In general, physico - chemical properties of soil of the experimental field showed a typical lateritic soil of the Konkan region. Brinjal (*Solanum melongena* L.) var. Konkan Prabha was taken as a test crop during *Rabi* season of the year 2021-22 and 2022 -2023, with a spacing of 60 X 60 cm. It was grown successfully in *Rabi* season under Konkan conditions.

Table 1: Initial physico-chemical properties of the experimental field

Sr. No.	Parameters	Content 2021-22
A	**Physical properties**	
	Mechanical Analysis	
	a) Sand (%)	55.25
	b) Silt (%)	25
	c) Clay (%)	19.75
	d) Texture class	Sandy loam
	1. Particle density (Mg m^{-3})	2.64
	2. Bulk density (Mg m^{-3})	1.35
B	**Chemical properties**	
	pH (1:2.5)	5.72
	Electrical conductivity (dSm^{-1})	0.13
	Organic carbon (g kg^{-1})	12.48
	Macronutrients	
	Available N (kg ha^{-1})	206.97
	Available P_2O_5 (kg ha^{-1})	5.83
	Available K_2O (kg ha^{-1})	204.88

Yield attributing characters

Average yield per plot (kg)

The mature brinjal fruits were collected after each picking and weighed immediately from each plot. Fruits were weighed after all pickings and recorded and it was total up and expressed as fruit yield in Kg per plot. In addition to this brinjal yield t ha^{-1} was also worked out

Collection and preparation of soil samples

The surface soil samples (0 - 22.5cm) were collected from each treatment plot after harvest. The soil samples were air dried in shade, grinded in wooden mortar with wooden pestle and sieved through 2 mm sieve and also through 0.5 mm sieve for special determination like organic carbon. After processing, the soil samples were kept in plastic bags and stored in properly labeled corrugated boxes and used for determination of various physico-chemical properties of soil in the laboratory by following the standard analytical methods.All the observations regarding the yield attributes and soil parameters were recorded at appropriate stages. Similarly, the data recorded at different crop growth stages during investigation period was statistically analyzed as per procedure given by Panse and Sukhatme (1985) [9].

Results and Discussion

Effect on yield: The data on yield was presented in (Table.2 and Table 3.) and revealed that significantly higher stover yield (0.46 t ha^{-1} and 0.85 t ha^{-1} in the year 2021-22and 20.22-23, respectively) was recorded with the application of UB-10:26:26 which was at par with application of UB-DAP (0.42 t ha^{-1}) and KAB (0.44 t ha^{-1})in the year 2021-22 and it was significantly superior with rest of the treatments in the year 2022-23.The application of potassium humic acid showed a higher stover yield (0.42 t ha^{-1} and 0.69 t ha^{-1}in the year 2021-22 and 2022-23, respectively). The application of UB-10:26:26 fortified with potassium humic acid showed the highest stover yield (0.53 t ha^{-1}) which was at par with the application of plane UB-10:26:26 (0.49t ha^{-1}) and Konkan Annapurna Briquettes (0.47t ha^{-1}) in the year 2021-22. Similarly, in the year 2022-23, the application of UB-10:26:26 fortified with potassium humic acid gains the higher stover yield (0.93t ha^{-1}) which was significantly superior with all other treatment combinations. The highest fruit yield (29.83t ha^{-1} and 30.32t ha^{-1}) was found in the application of application of UB-10:26:26 which was significantly superior in all other treatments of fertilizer applications in both the years *i.e*. 2021-22 and 2022-23.The application of potassium humic acid was found to had highest fruit yield (25.14 t $ha^{-1}$and 25.37 t ha^{-1}in the year 2021-22 and 2022-23 respectively) which was significantly at par (24.24 t $ha^{-1}$and 24.36 tha^{-1} in the year 2021-22 and 2022-23 respectively) with no humic acid application. The highest fruit yield (31.37 t$ha^{-1}$and 32.87tha^{-1}) was found in treatment UB-10:26:26 fortified with potassium humic acid which was at par with application of UB-10:26:26 with no humic acid application (30.37tha^{-1}), UB-10:26:26 fortified with sodium humic acid (27.75tha^{-1}) and UB-DAP fortified with potassium humic acid (28.2tha^{-1}) in the year 2021-22 and UB-10:26:26 with no humic acid application (30.00tha^{-1}) in the year 2022-23.

Brinjal generally requires heavy manuring for its potential production. However, the use of expensive commercial fertilizers as per the crop requirement of the crop was not much affordable to the farmers. Therefore, the application of fertilizers combined with humic acid was the newer cost effective method in nutrient management for maintaining its sustainable production and productivity. By the interaction of mineral fertilizers and humic acids, the plant ability to form a larger number of meristmatic cells and increase their size, which was positively reflected on the vegetative growth of the plant resulting from the increased formation of proteins and nucleic acids in broccoli crop. Increasing the growth indicators due to humic acid application attributed to its effect on various vital processes such as respiration, photosynthesis and protein formation, as well as containing mineral compounds such as phenols and amino acids, and increases the absorption of nutrients in saline soils.

Table 2: Effect of humic acid fortified briquettes on stover yield (t ha^{-1})

Treatments	2021-22				2022-23			
	H_0	H_1	H_2	Mean	H_0	H_1	H_2	Mean
B_0	0.26	0.29	0.29	0.28	0.21	0.29	0.39	0.30
B_1	0.35	0.38	0.40	0.38	0.59	0.54	0.64	0.59
B_2	0.47	0.42	0.42	0.44	0.69	0.62	0.67	0.66
B_3	0.49	0.34	0.53	0.46	0.80	0.82	0.93	0.85
B_4	0.40	0.41	0.45	0.42	0.78	0.76	0.81	0.78
Mean	0.39	0.37	0.42	0.39	0.61	0.61	0.69	0.63
	B	H	BxH		B	H	BxH	
S.Em±	0.01	0.01	0.02		0.01	0.008	0.018	
C.D@5%	0.04	0.03	0.07		0.03	0.023	0.052	

Table 3: Effect of humic acid fortified briquettes on fruit yield (t ha^{-1})

Treatments	2021-22				2022-23			
	H_0	H_1	H_2	Mean	H_0	H_1	H_2	Mean
B_0	14.10	14.26	17.67	15.34	14.48	14.85	17.83	15.72
B_1	24.82	23.73	25.13	24.56	25.04	24.31	25.39	24.91
B_2	27.21	21.43	23.34	23.99	26.36	22.11	23.89	24.12
B_3	30.37	27.75	31.37	29.83	30.00	28.08	32.87	30.32
B_4	24.71	25.23	28.2	26.05	25.90	25.57	26.87	26.11
Mean	24.24	22.48	25.14	23.95	24.36	22.98	25.37	24.23
	B	H	BxH		B	H	BxH	
S.Em±	0.69	0.53	1.20		0.58	0.45	1.02	
C.D@5%	2.01	1.56	3.49		1.70	1.32	2.95	

Effect on soil properties

pH and EC: Application of different fertilizer briquettes along with the different types of humic acid and the interaction of fertilizers briquettes with humic acid show a significant effect on soil pH at harvest in the year 2021-22 and 2022-23(Table 4). The highest pH (5.58 and 5.94) was recorded in the treatment of absolute control, it was at par with application of Konkan Annapurna Briquettes (KAB), UB-10:26:26, UB-DAP and application of straight fertilizers and KAB in the year 2021-22 and 2022-23,respectively.The application of humic acid and the interaction of treatments did not found any significance on soil pH.

All the factors showed a non-significant results and the EC values indicate that these soils had least soluble salts (Table 5). The lateritic soils had are devoid of soluble salts as reported by number of workers (Kokare, 2013 and Torane, 2014) [7, 18]. The humic acid act as chelating agent which binds the excess salts and maintain conductivity to a low level. Similar results were obtained by Aydin *et al.* (2012) [1] and Elbashier *et al*. (2017) [4].

Table 4: Effect of Humic Acid fortified briquettes on soil pH (1:2.5) at harvest of Brinjal

Treatments	2021-22				2022-23			
	H_0	H_1	H_2	Mean	H_0	H_1	H_2	Mean
B_0	5.7	6.12	5.75	5.58	6.14	5.82	5.86	5.94
B_1	5.67	5.85	5.13	5.55	5.93	5.91	5.95	5.93
B_2	5.50	5.47	5.46	5.48	5.87	5.78	5.79	5.81
B_3	5.2	5.11	5.42	5.24	5.73	5.53	5.78	5.68
B_4	5.32	5.47	5.62	5.47	5.77	5.55	5.71	5.67
Mean	5.49	5.60	5.48	5.46	5.89	5.72	5.82	5.80
	B	H	BxH		B	H	BxH	
S.E.±	0.10	0.08	0.18		0.06	0.04	0.10	
C.D.@ 5%	0.30	NS	NS		0.18	NS	NS	

Table 5: Effect of Humic Acid fortified briquettes on Electrical Conductivity (dSm^{-1}) at harvest of Brinjal

Treatments	2021-22				2022-23			
	H_0	H_1	H_2	Mean	H_0	H_1	H_2	Mean
B_0	0.15	0.25	0.27	0.22	0.23	0.11	0.27	0.20
B_1	0.37	0.35	0.33	0.35	0.15	0.26	0.26	0.22
B_2	0.31	0.33	0.38	0.34	0.27	0.36	0.39	0.35
B_3	0.23	0.27	0.29	0.27	0.25	0.42	0.40	0.24
B_4	0.21	0.33	0.28	0.25	0.26	0.23	0.24	0.24
Mean	0.25	0.25	0.31	0.28	0.23	0.27	0.31	0.25
	B	H	BxH		B	H	BxH	
S.E.±	0.03	0.02	0.05		0.04	0.03	0.07	
C.D.@ 5%	NS	NS	NS		NS	NS	NS	

Soil Organic Carbon

The soil organic carbon content (Table 6) was significantly affected by the different briquettes applications. The higher organic carbon content (15.75 g kg^{-1} and 11.52 g kg^{-1} in the year 2021-22 and 2022-23, respectively) was found in absolute control treatment which was significantly superior then rest of all treatments and at par with application of Konkan Annapurna Briquettes and UB-10:26:26 in the year 2021-22 and 2022-23, respectively. The humic acid applications showed a significant effect on organic carbon content in the first year of study, the higher organic carbon content (15.55 g kg^{-1}) was found in application of potassium humic acid. In the next year the humic acid application showed a non -significant effect on soil organic carbon. The interactions of treatments also recorded a non- significant effect on soil organic carbon.

As the plant grows they take up nutrients from soil and uptake reduces the organic carbon content in the soil over time. The application of humic acid had generally a non-significant effect on the soil organic carbon as the humic acids are relatively stable forms of organic carbon highly resistant to microbial decay compare to other organic fractions. Humic acids are relatively stable form of organic carbon which are highly resistant to microbial decay.

Their was a drastic reduction in the organic carbon content during the year 2022-23 as compare to previous year. Because before the initiation of first trial in *rabi* 2021-22 the experiment site was kept fallow in *kharif* season in year 2021-22 but before initiation of second trial in *rabi* 2022-23, rice has been taken as a *kharif* crop in the year 2022-23so due to anaerobic decomposition of organic carbon (OC) in submerged rice paddies was coupled to the reduction of alternative soil electron acceptors, primarily Fe^{3+}. During reductive dissolution of Fe^{3+} from pedogenic oxides, previously adsorbed native soil organic carbon (SOC) could be released into solution. Incorporation of crop residues could hence indirectly, i.e. through the stimulation of microbially mediated Fe^{3+} reduction, promote the loss of native SOC via enhanced dissolution and subsequent mineralisation to CO_2 and CH_4. (Deroo *et al.* 2021) [3].

Table 6: Effect of Humic Acid fortified briquettes on Organic Carbon content (g kg^{-1}) at harvest of Brinjal

Treatments	2021-22				2022-23			
	H_0	H_1	H_2	Mean	H_0	H_1	H_2	Mean
B_0	15.27	15.73	16.25	15.75	11.44	11.63	11.50	11.52
B_1	13.52	14.23	15.86	14.53	8.58	9.42	12.22	10.07
B_2	13.91	13.52	15.21	14.21	10.72	11.31	11.11	11.05
B_3	14.06	13.91	15.21	14.39	10.27	12.09	10.53	10.96
B_4	13.84	14.56	15.24	14.54	11.37	9.23	9.88	10.16
Mean	14.12	14.39	15.55	14.68	10.47	10.73	11.05	10.75
	B	H	BxH		B	H	BxH	
S.E.±	0.32	0.28	0.63		0.26	0.20	0.46	
C.D.@ 5%	1.05	0.82	NS		0.77	NS	1.34	

Soil major nutrients

Soil available nitrogen

The application of different fertilizer briquettes and different type of humic acids showed a significant effect on the soil available nitrogen (Table 7.). Significantly higher available nitrogen (290.95 kg ha^{-1} and 259.59 kg ha^{-1}) was found in application of UB-DAP and UB-10:26:26 in the year 2021-22 and 2022-23, respectively which was at par with application of all fertilizer briquettes. The application of potassium humic acid showed the higher available nitrogen (292.06 kg ha^{-1}) in the year 2021-22 whereas it was found higher with the no humic acid application (243.77 kg ha^{-1}) in the year 2022-23 which was at par with application of potassium humic acid.

The application of UB-10:26:26 and UB-DAP maintained the available nitrogen in soil sufficiently at higher level even after harvest of brinjal indicating slow and steady release of nitrogen which was essential for sustaining soil fertility and productivity. The UB-10:26:26 and UB-DAP briquettes had high soil available nitrogen values as the balanced nutrient application of primary nutrients regulate the physiological stage and nutrient uptake efficiency of crop. Similar results in respect of available nitrogen were reported by Salvi (2007). The potassium humate was favorable for soil parameters of chemical soil properties of sandy soil which reflects on increase soil fertility. Similar results were reviewed by Parmasivan *et al.* (2015) [11].

Table 7: Effect of Humic Acid fortified briquettes on Available Nitrogen (kg ha^{-1}) at harvest of Brinjal

Treatments	2021-22				2022-23			
	H_0	H_1	H_2	Mean	H_0	H_1	H_2	Mean
B_0	202.79	228.92	248.78	226.83	193.38	190.25	185.02	189.55
B_1	285.37	250.88	297.92	278.05	236.24	211.15	237.29	228.23
B_2	267.50	275.96	283.28	275.61	251.92	255.06	263.42	256.80
B_3	258.19	277.01	318.82	284.67	277.01	217.42	284.33	259.59
B_4	289.55	271.78	311.50	290.95	260.28	224.74	234.15	239.72
Mean	260.70	260.91	292.06	271.22	243.77	219.72	240.84	234.79
	B	H	BxH		B	H	BxH	
S.E.±	6.14	4.75	10.63		9.01	6.98	15.61	
C.D.@ 5%	18.42	14.25	NS		26.10	20.22	NS	

Soil available phosphorus

There was significant difference between the various briquettes application for available phosphorus content of soil (Table 8). The application of UB-DAP and UB-10:26:26 showed higher availability of phosphorus (14.27 kg ha^{-1} and 15.04 kg ha^{-1} in the year 2021-22 and 2022-23, respectively). The application of potassium humic acid recorded higher availability of phosphorus (12.85 kg $ha^{-1}$and 13.13 kg ha^{-1}in the year 2021-22 and 2022-23,respectively)which was at par with no humic acid application treatments in the first year of study. The interaction of treatments was non-significant.

The initial value of soil available phosphorus was 5.83 kg ha^{-1}which was increased at further growth stages of the crop as the increase in available phosphorus might be due to the rapid mineralization and solubilization of native insoluble phosphorus by organic acid recorded as a result of decomposition. The highest values of available phosphorus were obtained in UB-DAP, it might be due to presence of hight phosphorus content. Similar findings were observed by Kokare (2013) [7]

The humic acid fortified briquettes showed good results in phosphorus availability it might be due to the addition of humic acid to the soil, which dissloves the phosphorus fixed in soil. The fixed form of insoluble phosphates, such as tricalcium phosphates and flourapatite make slow contributing phosphorus fertilizers to the soil. Similar results were reviewed by Paramasivan (2015) [11]

Table 8: Effect of Humic Acid fortified briquettes on Available P_2O_5 (kg ha^{-1}) at harvest of Brinjal

Treatments	2021-22				2022-23			
	H_0	H_1	H_2	Mean	H_0	H_1	H_2	Mean
B_0	5.83	7.56	9.48	7.62	5.18	7.12	7.77	6.69
B_1	13.60	11.36	12.52	12.50	12.74	11.01	12.96	12.24
B_2	13.39	12.09	12.74	12.74	13.60	13.39	14.25	13.75
B_3	13.80	11.66	12.09	12.85	14.68	14.90	15.55	15.04
B_4	12.99	13.39	16.41	14.27	14.25	13.82	15.12	14.40
Mean	11.92	11.21	12.85	11.99	12.09	12.05	13.13	12.42
	B	H		BxH	B	H		BxH
S.E.±	0.55	0.42		0.95	0.37	1.09		0.65
C.D.@ 5%	1.60	1.24		NS	0.29	0.84		NS

Soil available potassium

The fertilizer briquettes and humic acid applications showed a significant difference in available potassium values (Table 9). The higher available potassium (330.32 kg ha^{-1} and 314.36 kg ha^{-1} in the year 2021-22 and 2022-23, respectively) was recorded in application of UB-10:26:26 which was significantly superior with all other treatment combinations. The application of potassium humic acid showed the higher available potassium (283.48 kg ha^{-1} and 275.64 kg ha^{-1}in the year 2021-22 and 2022-23, respectively) which was at par with sodium humic acid (278.01 kg ha^{-1}) in the year 2021-22 and significantly superior in the next year of study. The interaction of treatments i.e.UB-10:26:26 fortified with potassium humic acid recorded highest potassium value (329.72 kg ha^{-1}) in the year 2022-23.

The available potassium was highest in the application of UB-10:26:26 as more amount of potassium was supplied through the UB-10:26:26 as when it was compare with other fertilizer briquettes or straight fertilizer treatments. So as in the application of potassium humic acid it provides more potassium content as the available potassium content was high in all the stages of crop growth in the application of potassium humic acid application. In the interaction effect the UB-10:26:26 briquettes fortified with potassium humic acid had highest available potassium content. Similar results were obtained by Tapkeer (2015) [17].

Table 9: Effect of Humic Acid fortified briquettes on Available K_2O (kg ha^{-1}) at harvest of Brinjal

Treatments	2021-22				2022-23			
	H_0	H_1	H_2	Mean	H_0	H_1	H_2	Mean
B_0	205.18	217.72	225.00	215.97	141.56	188.16	192.19	173.97
B_1	236.22	294.47	290.85	273.84	245.50	276.41	285.37	269.09
B_2	270.14	273.61	267.68	270.48	273.28	275.52	296.12	281.64
B_3	319.97	326.49	344.51	330.32	296.17	317.18	329.72	314.36
B_4	262.97	277.78	289.35	276.70	233.60	249.08	274.79	252.49
Mean	258.89	278.01	283.48	273.46	238.02	261.27	275.64	258.31
	B	H		BxH	B	H		BxH
S.E.±	7.11	5.51		12.32	5.48	4.25		9.50
C.D.@ 5%	20.60	15.96		NS	15.89	12.31		27.53

Conclusion

The study on the humic acid fortified briquettes on yield and soil properties of brinjal (*Solanum melongena* L.) in lateritic soils of Konkan region, concluded that, the application of UB-10:26:26 fortified with potassium humic acid recorded the stover and fruit yield. The major nutrients show high availability with the application of UB-10:26:26 and potassium humic acid followed by UB-DAP.

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