Table S1. The influence of different straw treatments on soil nutrients.

Time	Treatments	OM (g/kg)	AN (g/kg)	AP (g/kg)	AK (g/kg)	TN (g/kg)	TP (g/kg)	TK (g/kg)
1st-30	5422	55.31±1.74b	378.93±1.87a	122.82±0.82b	2558.54±16.67a	-	-	-
	5422Bt1	55.77±1.86b	350.93±8.14b	135.14±1.79a	2420.34±17.13b	-	-	-
	5422CBCL	68.1±1.4a	311.73±4.94c	122.37±2.38b	2427.77±34.31b	-	-	-
1st-60	5422	61.48±0.44b	263.2±3.23ab	133.34±0.18a	2435.55±8.49ab	-	-	-
	5422Bt1	60.99±1.09b	278.13±16.27a	134.48±0.48a	2390.94±1.35b	-	-	-
	5422CBCL	64.74±0.84a	237.07±6.73b	130.48±0.82b	2485.22±42.13a	-	-	-
1st-120	5422	72.87±0.86a	222.13±4.94a	132.92±0.85b	2486.23±40.28a	2.08±0.05a	0.96±0.02a	21.63±0.38a
	5422Bt1	63.36±1.4c	235.2±3.23a	153.69±1.91a	2295.32±88.44a	2.2±0.03a	0.97±0.01a	22.38±0.77a
	5422CBCL	67.2±0.13b	196±6.47b	127.62±0.34c	2471.03±9.15a	2.18±0.07a	0.94±0.02a	23.08±0.53a
2nd-30	5422	65.74±1.18b	408.8±3.23b	187.44±2.68c	4337.56±19.9a	-	-	-
	5422Bt1	67.13±0.56b	425.6±3.23a	213.66±0.25a	4157.12±54.23b	-	-	-
	5422CBCL	76.64±0.83a	377.07±4.94c	203.81±2.95b	4291.6±19.82a	-	-	-
2nd-60	5422	68.57±1.01a	244.53±6.73b	163.79±0.55b	4443.99±30.61a	-	-	-
	5422Bt1	62.69±0.64b	296.8±3.23a	178.01±2.97a	4573.75±56.64a	-	-	-
	5422CBCL	62.46±1.26b	294.93±4.94a	160.46±4.51b	4472.04±58.3a	-	-	-
2nd-120	5422	66.74±1.37a	274.4±3.23a	152.3±4.42b	4404.46±30.15b	2.27±0.06a	1.17±0.01a	24.47±1.01a
	5422Bt1	60.52±0.28b	272.53±8.14a	162.44±0.48a	4584.56±55.53a	2.46±0.1a	1.14±0.03a	23.64±0.57a
	5422CBCL	60.91±1.14b	240.8±3.23b	142.08±2.1c	4342.96±56.78b	2.64±0.21a	1.15±0.03a	23.49±0.48a
3rd-30	5422	81.77±0.37b	252±3.23b	193.89±1.16a	5849.97±33.78b	-	-	-
	5422Bt1	83.67±1.05b	304.27±15.95a	194.24±4.56a	6380.47±83.66a	-	-	-
	5422CBCL	88.49±0.85a	263.2±5.6b	191.86±2.62a	5719.55±55.25b	-	-	-
3rd-60	5422	84.27±5.67a	212.8±3.23b	207.08±1.64a	5810.44±43.18a	-	-	-
	5422Bt1	76.25±0.8a	244.53±4.94a	185.32±6.33b	6108.13±76.21a	-	-	-
	5422CBCL	77.25±2.44a	233.33±4.94a	179.22±2b	6131.1±138.06a	-	-	-
3rd-120	5422	87.67±2.74a	207.2±3.23a	202.8±0.3a	5887.82±16.23b	2.84±0.02a	1.29±0.02a	24.69±0.33a
	5422Bt1	73.8±3.56b	182.93±3.73b	183.98±1.26b	6151.71±58.87a	2.99±0.1a	1.28±0.01a	25.03±0.46a
	5422CBCL	87.09±2.85a	201.6±3.23a	186.93±4.04b	6141.92±58.9a	2.95±0.08a	1.32±0.01a	25.39±0.51a
4th-30	5422	103.49±4.65a	1447.29±124.61ab	236.05±4b	7253.83±204.49a	-	-	-
	5422Bt1	99.75±9.63a	1610.25±96.24a	313.17±15.51a	7032.67±122.99a	-	-	-
	5422CBCL	81.36±2.88a	1137.32±132.95b	225.07±6.94b	7432.07±108.17a	-	-	-
4th-60	5422	102.76±2.32b	1253.56±136.32a	239.58±2.31b	6752.67±66.05b	-	-	-
	5422Bt1	120.13±3.85a	1696.86±58.3a	321.79±5.25a	7355.9±145.38a	-	-	-
	5422CBCL	100.12±6.86b	1328.77±162.6a	237.23±14.57b	7060.7±62.79ab	-	-	-

4th-120	5422	86.94±5.9b	603.99±16.55b	255.13±0.86a	7167.57±24.65a	2.86±0.02c	1.55±0.01a	27.02±0.59a
	5422Bt1	113.61±4.88a	1740.17±76.47a	265.07±4.62a	7079.13±189.57a	3.91±0.06a	1.52±0.02a	25.53±1.53a
	5422CBCL	60.19±5.35c	1099.71±286.29b	227.03±3.72b	7344.07±44.41a	3.18±0.15b	1.51±0.04a	27.22±0.38a
5th-30	5422	154.27±3.45a	1768.66±115.53a	264.59±3.27ab	8015.5±90.83b	-	-	-
	5422Bt1	113.39±2.83b	1587.46±55.28ab	269.33±4.93a	8518.03±216.18a	-	-	-
	5422CBCL	105.24±0.7b	1498.57±23.38b	246.4±9.22b	8508.9±34.22a	-	-	-
5th-60	5422	105.29±6.09b	1433.62±252.01a	284.06±2.37a	8068.97±141.58b	-	-	-
	5422Bt1	127.52±4.19a	1783.47±55.35a	284.18±2.69a	8463.97±25.94ab	-	-	-
	5422CBCL	111.16±1.75b	1277.49±81.78a	262.41±2.37b	8607.2±160.57a	-	-	-
5th-120	5422	103.79±6.23a	2034.19±87.72a	275.86±1.12b	8370.17±18.87b	3.12±0.22b	1.55±0.03ab	26.79±0.32ab
	5422Bt1	117.73±4.82a	2104.84±151.13a	290.97±4.44a	8643.97±101.36ab	4.26±0.09a	1.51±0.03b	26.22±0.64b
	5422CBCL	78.24±2.59b	588.03±267.14b	261.26±5.1c	8804.5±101.89a	4.08±0.15a	1.63±0.01a	28.21±0.11a

Abbreviations: OM- organic matter, AN- available nitrogen, AP- available phosphorus, AK- available potassium, TN- total nitrogen, TP- total phosphorus, TK- total potassium; Different letters (a, b and c) indicate significant differences between different treatments according to one-way ANOVA (Duncan, $p<0.05$).

Table S2. The influence of different straw treatments on soil enzyme activities.

Time	Treatments	URE	SUC	ACP
1st-30	5422	90.33±5.48b	141.43±4.69a	66.54±2.14a
	5422Bt1	122.99±5.01a	131.83±8.01a	65.06±0.79a
	5422CBCL	51.84±2.55c	105±3.93b	68.12±1.54a
1st-60	5422	70.6±3.62b	162.5±1.29a	64.26±1.3b
	5422Bt1	99.24±7.48a	150.75±3.47b	70.01±0.35a
	5422CBCL	89.77±2.69a	136.64±2.81c	69.43±1.33a
1st-120	5422	74.97±1.84c	108.8±6.79a	64.18±0.69c
	5422Bt1	90.03±2.75b	108.15±7.8a	70.39±0.61a
	5422CBCL	122.32±5.44a	113.83±6.78a	68.28±0.61b
2nd-30	5422	79.28±1.06c	178.31±5.61a	98.52±0.8b
	5422Bt1	98.81±3.95b	142.62±11.44b	89.32±2.12c
	5422CBCL	139.29±8.66a	140.53±9.37b	108.29±1.97a
2nd-60	5422	70.13±4.99c	57.77±3.9b	120.03±2.91a
	5422Bt1	120.13±2.12b	74.55±9.59b	91.19±6.54b
	5422CBCL	145.95±7a	124.51±1.09a	90.77±3.87b
2nd-120	5422	23.94±1.63c	37.12±2.14b	109.84±4.59a
	5422Bt1	81.76±2.3b	77.01±4.35a	107.18±4.4a
	5422CBCL	108.84±3.55a	47.19±2.73b	108.44±1.51a
3rd-30	5422	134.96±11.35a	88.6±6.71b	116.51±0.7b
	5422Bt1	103.13±11.33a	78.33±4.59b	133.38±1.52a
	5422CBCL	102.95±9.62a	110.04±3.46a	135.64±2.6a
3rd-60	5422	132.33±1.94c	44.13±3.27c	124.91±2.49b
	5422Bt1	192.41±7.85a	103.95±5.23a	135.5±1.88a
	5422CBCL	162.8±6.97b	81.03±5.6b	140.18±2.77a
3rd-120	5422	111.03±5.08b	33.18±2.04b	127.36±6.81b
	5422Bt1	148.18±3.65a	32.83±0.55b	127.57±4.3b
	5422CBCL	115.35±5.85b	46.18±1.15a	151.11±2.08a
4th-30	5422	155.94±5.58a	228.61±9.91a	239.31±28.98a
	5422Bt1	129.7±7.73b	190.85±12.68ab	304.6±7.38a
	5422CBCL	124±4.42b	146.08±26.7b	251.71±28.39a
4th-60	5422	121.48±3.42b	109.15±9.76b	230.48±20.84b
	5422Bt1	124.96±6.81b	107.76±5.87b	322.94±31.42a
	5422CBCL	147.28±6.98a	210.57±20.12a	275.98±3.01ab
4th-120	5422	124.97±13.18a	191.62±11.68a	256.58±18.12b
	5422Bt1	105.89±8.79a	123.35±8.56b	316.58±5.02a
	5422CBCL	118.4±7.86a	146.03±16.93b	244.25±13.22b
5th-30	5422	187.55±3.49b	225.07±5.41a	300.19±13.08a
	5422Bt1	209.17±3.62a	93.35±9.78b	365.65±11.76a
	5422CBCL	175.38±5.63b	123.2±26.99b	302.85±30.16a
5th-60	5422	132.21±9b	167.56±20.67a	248±14.11b
	5422Bt1	195.36±10.92a	92.78±9.11b	325.7±12.36a
	5422CBCL	127.33±7.94b	144.82±25.87ab	251.45±20.2b
5th-120	5422	72.55±9.69b	101.43±7.73b	238.82±10.68a
	5422Bt1	72.99±12.56b	148.03±11.83a	237.5±11.97a
	5422CBCL	123.9±3.77a	27.52±4.72c	151.77±9.86b

Abbreviations: URE- urease, SUC- sucrase, ACP- acid phosphatase; Different letters (a, b and c) indicate significant differences between different treatments according to one-way ANOVA (Duncan, $p<0.05$).