

Effects of *Tithonia diversifolia* on seed germination, growth parameters and the nutrient content of soybean

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Results and Discussion

Table 1: Effect of the extract of *T. diversifolia at* different concentrations and incubation time on the germination of Soybean seeds

Table 2: Effect of the different fertilizer treatments on growth parameters

CENTR	0 HOUR INCUBATION		3 HOURS INCUBATION		6 HOURS INCUBATION	
CON A	GERMINATED SEEDS	% GERMINATION	GERMINATED SEEDS	% GERMINATION	GERMINATED SEEDS	% GERMINATION
0	0	0	0	0	0	0
2.5	12	24	30	60	34	68
5	0	0	26	52	26	52
10	3	6	36	72	29	58
20	8	16	24	48	23	46

The extracts of *T. diversifolia* at varied concentration and different time of incubation affects the germination percentage of soybeans seeds as compared with the control treatment, with 72% being the best germination percentage obtained at 3 hours incubation time for 10% *T. deversifolia* concentration. This could be explained by the fact that, the chemical composition and the quality of the compounds present in the extract are responsible for the observed stimulation. Koeduka et al., (2006)

Table 3: Effect of the different fertilizer treatments on the nutrient content of Soybean grains

Treatment	Lipids	Proteins	Fibers	Polyphenol	Ash content	Dry Matter
T1	31.4±2.2 ^a	30.5±3.2 ^b	5.9±0.1 ^a	51.4±4.4 ^a	3.4±0.7 ^{ab}	91.1±0.4 ^a

of Soybean

Treatment	Plant Height (cm)	Number of pods per plant	Seed Weight per m2 (g)	Grain Yiled (t/ha)	100 dry Seed Weight (g)
S0T0	45,7 (3,1) ^a	35 (6) ^a	151,7 (12,6) ^a	1,5 (0,1) ^a	9,7 (1,5) ^a
S0T1	50,7 (2,1) ^{ab}	42 (5) ^a	209,0 (23,3) ^{ab}	2,1 (0,2) ^{ab}	12,3 (1,5) ^{ab}
S0T2	52,3 (1,5) ^{bc}	51 (2) ^b	219,7 (18,9) ^{ab}	2,2 (0,2) ^{ab}	12,3 (1,5) ^{ab}
S0T3	56,7 (4,9) ^{bcd}	50 (2) ^b	184,3 (6,8) ^{ab}	1,8 (0,1) ^{ab}	12,0 (3,0) ^{ab}
S1T0	54,3 (3,1) ^{bc}	69 (3) ^c	244,3 (19,5) ^{bc}	2,4 (0,2) ^b	15,3 (1,5) ^{bc}
S1T1	52,7 (3,1) ^{bc}	76 (4) ^{cde}	289,7 (18,6) ^{cd}	2,9 (0,2) ^{cd}	16,0 (2,0) ^{bc}
S2T0	60,0 (2,0) ^{cd}	79 (3) ^{de}	303,3 (73,7) ^{cd}	3,1 (0,7) ^{cd}	18,0 (2,0) ^{cd}
S2T2	63,3 (3,1) ^d	84 (5) ^e	357,7 (44,5) ^d	3,6 (0,5) ^d	20,3 (1,5) ^d
S3T0	54,7 (3,5) ^{bc}	74 (5) ^{cd}	212,7 (10,1) ^{ab}	2,1 (0,1) ^{ab}	15,7 (1,5) ^{bc}
S3T3	57,0 (2,0) ^{bcd}	79 (2) ^{de}	305,3 (29,1) ^{cd}	3,1 (0,3) ^{cd}	17,3 (1,5) ^{cd}

The difference in growth parameters can be explained by the fact that there is an increase in soil organic matter and micronutrient contents of the soil. *T. diversifolia* compost amendment and spaying with *T. diversifolia* compost produced a higher yield than *T. diversifolia* powder amendment and spraying with *T. diversifolia* extract due to its stabilizing property of the compost and the additional supply of nutrients from the spray. Improved growth parameters of soybean is due to constant supply of nutrients to plants by fertilizer application (Nguefack *et al.*, 2020).

T2	29.7±3.4 ^a	31.2±0.8 ^b	5.6±1.4 ^a	50.9±2.3 ^a	2.8±0.3 ^a	90.7±0.6 ^a
TO	30.6±2.1ª	19.3±2.7ª	5.4±1.7 ^a	51.7±2.3 ^a	2.5±0.5 ^a	91.4±1.2ª
Т3	28.4±2.1ª	29.9±2.9 ^b	5.3±0.9 ^a	45.2±7.2 ^a	4.1±0.5 ^b	91.7±0.4 ^a

Nguefack *et al.*, (2020) explained that the increased metabolite content in plants treated with TDC is due to one of essential minerals used by plants to build many organic compounds: amino acids, proteins and nucleic acids. This statement is dependent on a number of factors such fertilizers among others and the metabolic pathway in which a given group of compounds is formed (Woronuk *et al.*, 2011).

Conclusion

Results obtained from the study showed that, *T. divesifolia* made fertilizer especially the compost is a more promising bio fertilizer in optimizing seed germination, growth parameters, primary and secondary metabolite content of soybean.

Non amended soil (S0); Amended soil with : *T. diversifolia* Powder (S1), *T. diversifolia* Compost (S2), NPK (S3) Non pulverisation (T0); Pulverisation with extract of : *T. diversifolia* Powder (T1), *T. diversifolia* Compost (T2), NPK (T3)

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