

**Comparative study of *Pongamia pinnata*, *Annona glabra* and *Moringa oleifera* extracts on growth performances of *Basella alba* L. (Spinach)**

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Excessive use of agrochemicals creates adverse health and environmental impacts. However, organic farming maintains sustainable agricultural systems while sustaining the health of human and ecosystems. This research aimed to study utilization of cow urine based leaf and seed extracts of *Annona glabra*, leaves of *Pongamia pinnata* and *Moringa oleifera* for enhancement of growth performances of *Basella alba*. The extracts were prepared by aerobic digestion of 100 g of dried leaves or seeds with 600 ml of cow urine for 2-weeks and the same procedure was done with water. Nutrient analysis of all extracts was done to determine the total nitrogen (Kjeldhal method), total phosphorus (Molybdo-vanadate method), potassium, magnesium, calcium, zinc and iron contents (atomic absorption spectrophotometry). Eight foliar application treatments of 1:15 diluted extracts were prepared by different combinations of the above extracts and applied to *B. alba* at twice a week for two months. *Basella* plants were grown in randomized block design with six replicates. Commercial fertilizer (Maxicrop) and distilled water were used as the standard and the control respectively. Shoot height, number of leaves, leaf area, stem girth and fresh and dry weights of shoot and root biomasses of *B. alba* were determined. The data were analyzed using ANOVA in MINITAB R16 statistical package. Analysis of cow urine based leaf extracts of all three species showed higher nutrient contents than the aqueous extracts. *B. alba* applied with the combination of *P. pinnata* leaf and *A. glabra* seed extracts showed the significantly high ( $p < 0.05$ ) mean number of leaves ( $15 \pm 0.70$ ), dry shoot biomass ( $14.5 \pm 0.96$  g/plant), fresh shoot biomass ( $35.7 \pm 5.63$  g/plant) and mean shoot height ( $33.0 \pm 3.55$  cm). *B. alba* applied with the commercial fertilizer showed the significantly lower ( $p < 0.05$ ) dry shoot biomass ( $9.8 \pm 0.09$  g/plant), fresh shoot biomass ( $10.17 \pm 2.20$  g/plant) and mean number of leaves ( $9 \pm 0.80$ ) than the combination of *P. pinnata* leaf and *A. glabra* seed extracts applied *B. alba*. Growth performances of *B. alba* treated with *M. oleifera* extracts was significantly lower than that of *P. pinnata* leaf and *A. glabra* seed extracts. The prepared organic extracts can be used to increase yield of *B. alba* hence reducing the usage of agrochemicals.