

Plant Science 2018: Growth and yield responses of okra (*Abelmoschus esculentus* L.) as influenced by sawdust ash and ammonium nitrate- Abdulraheem Mukhtar Iderawumi-The College of Education-Lanlate

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In recent years, there are lots of soil problems associated with the use of chemical or minerals fertilizers and also the cost of mineral fertilizers, insufficiency of the commodity supply as well as distribution have not been of advantage of the local farmer. Hence this study tends to investigate the effects of sawdust ash and ammonium nitrate on the performance of okra (*Abelmoschus esculentus* L.) in Lanlate. Field trials were conducted at teaching and research farm of The College of Education, Lanlate, Southwest Nigeria in 2016 and 2017. There were six treatments replicated three times in a Randomized Complete Block Design (RCBD). Treatments were applied three weeks after planting by ring method with ammonia nitrate and sawdust ash mixed. Soil chemical properties, plant nutrients content, growth and yield parameters were evaluated. Data were Analyzed using Analysis of Variance (ANOVA) and Duncan multiple range tests were used to compare the treatment means. The test soil indicated that it was marginal in organic matter, inadequate in available P and slightly acidic. SDA and its combinations with reduced rates of ammonium nitrate significantly increased number and weight of fruits. The 60 kgha-1 urea+4.5 t/ha-1 SDA increased pod weight significantly in both years. Relative to control, urea alone, 180 kg/ha-1 AN+1.5 t/ha-1 SDA, 120 kg/ha-1 AN+3.0 t/ha-1 SDA, 60 kg/ha-1 AN+4.5 t/ha-1 SDA, and 6.0 t/ha-1 SDA increased pod

weight by 29, 32, 37, 52 and 39% respectively. Combination of 60 kg/ha-1 AN+4.5 t/ha-1 SDA is recommended.

Okra (*Abelmoschus esculentus* (L.) Moench) is a popular vegetable grown for its pods and leaves. It has been found that continuous use of nitrogen fertilizer increases soil acidity and reduces nutrient uptake and yield of okra [1, 2]. Okra contains 86% of water, 2.2% of protein, 10% of carbohydrate, 0.2% of fat and vitamins A, B and C. [3] documented that okra is consumed throughout Nigeria. Okra is in high demand particularly in rural villages and in the drier regions where a slimy vegetable is needed as an accompaniment to the often coarse and staple food such as millet, garri and others. In Nigeria, okra is grown for its fruits which are used in the preparation of different kinds of soups with or without other condiments [4]. Ash derived from burnt plant residue is a source of plant nutrients [5] which can be used alone or in combination with N-rich chemical fertilizer or organic manure such as that of goat and poultry. The majority of the Southern Sudan recognizes that accumulations of wood ash provide valuable sites for cultivating ecologically specialized plants. Soils in the area are largely acidic, so K. can become a limiting factor. With no synthetic fertilizer available, wood ash has a clear and significant effect on the growth and yield of many crops [6]. Ash is

composed of many major and minor elements needed by the tree for plant growth. Since most of these elements are extracted from the soil and atmosphere during the tree's growth cycle, they are elements that are common in our environment and are also essential elements in the production of crops and forages. Wood ash contains nutrients which are readily available to plants and this raises the possibility of using it as fertilizer. [7] in the South West Nigeria found positive response of yield and nutrients contents of amaranthus and okra to application of wood ash treatments. In another study [8] found that application of 2, 4, 6, and 8 t/ha wood ash treatments increased okra fruit count and weight, soil organic matter, N, P, K, Ca and Mg contents and leaf N, P, and K contents. Another investigation was carried out [9] to investigate the effectiveness of wood ash fertilizer on maize grown under a humid tropical condition. Wood ash was applied at 0, 2, 4, 6 and 8 t/ha to maize crops. Wood ash increased soil organic matter content pH, N, P, K Ca and Mg contents. Wood ash treatments increased maize plant height, ear and grain weight significantly.

Due to increasing number of saw milling industries in Nigeria, sawdust is being daily generated and burnt. There is urgent need to study the use of sawdust ash waste for soil improvement and as fertilizer and liming material. Hence, the objective of this study is to evaluate the effect of combined application of Sawdust ash and its combined application with Ammonium nitrate and NPK fertilizer on the growth and pod yield of okra plant nutrients composition and okra nutritional quality.

The test soil was marginal in organic matter (OM), adequate in Nitrogen, Calcium, Magnesium and

Potassium but inadequate in Phosphorus and slightly acidic [10]. Therefore the soil requires application of fertilizing amendment that will particularly supply P for enhancing okra.

In terms of nutrients uptake, SDA alone or with combined with Ammonium nitrate or NPK was found to increase P, Ca and Mg concentrations significantly in okra plant. Its combined use at 50% SDA + 50% AN and 50% SDA + 50% NPK significantly increased plant P and Ca. The latter combination also gave highest plant N and P among combined treatments. This affirms that SDA is a source of nutrients for crop uptake.

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