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Effects of Osher, Neem and Argel as natural product growth hormone

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ABSTRACT

Aim: The present study intended to investigate the effect of aqueous extract from Osher (Calotropis procera), Argel (Solenostemma argel) and Neem (Azadirachta indica) on the propagation of Rosa spp.
Method and Materials: The cuttings of Rosa spp. were dipped in solutions containing 2g, 5g, 7g and 10g in 500 ml as concentrations of leaf extract of Calotropis procera, Solenostemma argel and Azadirachta indica. For control, distilled water was used. The effects of extracts on propagation percentage (roots and leave) were investigated.
Results: All plant materials used as phytohormones showed significant result and best results were obtained from Solenostemma argel followed by Azadirachta indica and Callotropis procera.
Conclusion: It was concluded that higher concentrations of extract 10%, 7%, 5% and 2% significantly induced root and shoot sprouting gradually and the greater concentration gave the greater amount of leave and roots.
Keywords: Azadirachta indica, Calotropis procera, phytohormone, Rose, rooting response, Solenostemma argel.

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Introduction

The use of growth hormone in vegetative propagation technique by stem cutting has been recognized as a method of mass propagate ion of desirable plants for clonal plantation, reforestation and for commercial purposes (Follosco-Edminston, 2002). Propagation by vegetative means is often the best way to preserve selected traits in tree species. It is also a mean of securing pathogen free plants. Other advantages that assure by this method include large number of plant production in shorter time period, irrespective of the season (Mulabagal and Tsay, 2004). Plant cell culture has been increasingly used as an alternative to the generation of conventional plant material (Awodele et al. 2013 and Takahashi et al, 2006). Auxins are known to promote adventitious root development of stem cuttings, through their ability to promote the initiation of lateral root primodia and enhance transport of carbohydrates to cuttings' bases (Hartmann et al, 2000).

Local rooting hormone (Coconut water) has been used as a supplement in many laboratories to improve regeneration of plant cells (Maddock, 1983). Coconut water contains mainly water (94%) and growth promoting substances that can influence *in vitro* cultures including inorganic ions, amino acids, organic acids, vitamins, sugars, alcohols, lipids, nitrogenous compounds and phytohormones (Yong et al, 2009). Also, (Acha et al, 2004 and Agele, 2010) asserted coconut water contains sugar, amino acid, myo-inositol, and micro constituents of phenyl urea for tree development. Hence this explains the reason why Cocogro, an extract of coconut water, that is less expensive than imported growth hormones but equally effective is usually utilized.

Materials and Methods

Study site

This study was conducted at the Experimental farm and Laboratory of the department of horticulture, Faculty of Agriculture, University of Zalingei, Sudan, during 2018 to investigate the effect of some natural products as alternative growth regulators on rooting response, growth of cuttings of rosemary (Rosa spp.) plants.

Experimental design

The experiment was laid out as complete randomized block design. This includes three treatments which were: the cuttings treated with the three plant extract as with for replications.

Preparation of aqueous extract

Insect-free, disease-free plants of Calotropis procera, Solenostemma argel and Azadirachta indica were collected from the around of the faculty of agriculture, University of Zalingei. They were washed thoroughly with distilled water and air-dried at room temperature for 96 h. The dried sample was then crushed in a mortar and pestle to make powder. Powdered materials of each part (10, 7.5, 5 and 2.5g) were added into 500 ml distilled water and kept in shaker for 1hour. After shaking for an hour, extracts were placed at room temperature for 48 hours following the method of Wardle et al. (1992). The extracts were then filtered with muslin cloth followed by Whatman filter paper No. 1. This served as the stock solution from which other concentrations (25%, 50%, 75% and 100%) were prepared by way of dilution.

Procedure and cultural practices

Plants which are chosen as a mother stock for collecting cuttings were obtained from a commercial nursery from of the city and planting in ground of the nursery. Terminal cuttings of 12 cm length were planted in plastic pots, 5 cm in diameter at a depth of 3 - 5 cm approximately each contained mud: washed sand (1:1 V/V) were placed on the soil surface in Zalingei nursery. The cuttings were immersed for 30 minutes in the prepared concentration as growth.

Data collection

The cuttings were assessed for the following parameters after 30 days: percentage root, root length and shoot were determined as the number of living plants per total cutting planted per treatment.

Statistical Analysis

The data collected were subjected to one-way analysis of variance (ANOVA) and the means were separated at $P \leq 0.05$ using LSD Multiple Range Test (DMRT). All statistical analyses were done using statistics software, 2003 version.

Results and discussion

It could be stated that types and concentrations of some growth regulators as Calotropis procera, Solenostemma argel and Azadirachta indica extraction at four different rates significantly affected vegetative growth characters (plant rooting, number of roots and number of leaves/plant, as shown in Tables (1).

Table 1. Showed the effect of plant extract on Rosa spp.

plant	Root N	Root L	Shoot N
Argel	3.68a	2.55a	7.00a
Neem	2.87b	1.66b	5.00b
osher	2.18b	1.09c	2.93c
LSD	0.70	0.41	1.19

These results may be ascribed to these plant extract appears to have growth regulatory properties which are a class of phytohormones, which enhancing growth of rose. The obtained result showed that argelgave the highest result followed by neem. The same response of alternative growth regulators was also confirmed by (Yong et al, 2013) who showed that coconut water contains a content of cytokinins which helps to stimulate the growth of roots and shoots. These results came in the similar point of view with those reported by (Krajnc et al, 2013, Shidiki et al, 2013, Dunsin et al, 2013, Ibironke, 2016a and Ibironke, 2016 b).

Table 2. Showed the effect of plant extract concentration on Rosa spp.

conc	Root N	Root L	Shoot N
10	3.83a	2.08a	6.50a
7	3.17ab	1.85ab	5.25b
5	2.50bc	1.60bc	4.33bc
2	2.16c	1.52c	3.83c
LSD	0.82	0.24	1.22

Data present in table 2 showed significant effect on number of root, root length and number of leaves. The experiment indicates that the greater amount of the phytohormone mean a greater yield. It can be concluded that treating Rosa spp. cuttings with argel, neem and osher at different rate of concentration as natural growth regulator in order to enhance rooting, vegetative growth. The natural growth regulator can stimulate vegetative growth of the plant (Górnik and Grzesik, 2005, Adewole and Ojewole, 2009). Similarly, argel, neem and osher can increase the percentage growth of root and shoot in the plant stem cuttings (Liaw et al, 2002, Chang et al, 2003 and Ana et al, 2018). In this study, in addition to the type of growth regulators, also the concentration of growth regulator is an important factor, which is closely related to its role to increase the growth shoot and root on stem cuttings of roses up to obtain maximum growth and development.

Conclusion

It was concluded that there were significant treatment differences on rooting and sprouting response of Rosa spp. The use of these plants extract have useful effect on rooting as growth hormones application was observed in terms of rooting behavior just like auxin and cytokynine.

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