Australian Journal of Science and Technology

ISSN Number (2208-6404)
Volume 5; Issue 3; September 2021

Original Article

Effect of Coconut (*Cocos nucifera* L.) water on flowering behavior of selected potato (*Solanum tuberosum* L.) varieties in Jos, Plateau State, Nigeria

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ABSTRACT

This research was conducted at the Botanical Garden, Bauchi Road Main Campus, University of Jos, Jos, Plateau State, Nigeria, from November 2017 to February 2018, under irrigation to investigate the effects of naturally occurring phyto-hormones from coconut (*Cocos nucifera* L.) water on flowering behavior of selected varieties of potato (*Solanum tuberosum* L.). Experiment was carried out in a completely randomized design, with three replicates. A 3 × 3 factorial arrangement was used, consisting of three potato varieties (Caruso, Jelly and Marabel) and three concentrations of coconut water (0 - control, 50, and 100%). Percentage establishment count, plant height, number of above ground stem, number of leaves per plant, days to formation of first flower bud, number of inflorescence formed/plant, and number of flower buds formed/plant were evaluated. Variety had significant effect in all the parameters studied. The variety Caruso was significantly ($P < 0.05$) higher for all the parameters studied, while variety Jelly was lowest, except for number of leaves at 4 weeks after planting, where jelly was highest. Different concentrations of coconut water used were significantly ($P < 0.05$) different in all parameters assessed. About 50% and 100% concentrations of coconut water were significantly ($P < 0.05$) higher than the control (without coconut water) in all the parameters studied. There was a significant ($P < 0.05$) interaction of variety x coconut water concentrations for all the parameters assessed, except for number of inflorescence formed, where there was no interaction. It is, therefore, recommended that plant breeders should use variety Caruso because of its high performance and coconut water to induced flowering in potato.

Keywords: Coconut water, concentrations, flowering and potato

Submitted: 27-07-2021, Accepted: 02-08-2021, Published: 30-09-2021

INTRODUCTION

Potato (*Solanum tuberosum* L.) is a starchy tuberous crop from the perennial nightshade family and the word potato refers to the edible tuber or the plant itself.[1,2] It is the world's fourth most important food crop after wheat, rice, and maize because of its great yield potential and high nutritive value.[3,4] Flowering behavior in potatoes shows a wide range of genetic variability[5] and is influenced by several factors such as genotype, temperature, photoperiod, inflorescence position, plant/stem density, competition between flower and tuber, precipitation, date of planting, and nutrient level[6-8] Increased flower production has been reported as a result of an increased number of inflorescence,[9] an increase in number of flower buds,[10,11] and reduced flower abortion.[10-12] It has been reported that the most important components in flower production are the stem production and flower primordial development and they are both highly dependent on the genotype and its interaction with temperature and photoperiod.[13] Flowering has been suggested to be best under long day (16 h), abundant moisture is available and cool temperature.[13,14] Photoperiod of 12–14 h and night temperature of 12–15°C has been shown to favor flower production and seed-setting in potato.[5,9]

Plant growth substances (phytohormones) are grouped into five classes depending on their chemical makeup: Abscisic acid, auxins, cytokinins, ethylene, and gibberellins. These hormones control or influence all aspects of plant growth and reproduction, including seed germination, growth of roots, stems and leaves, plant flowering, seed development, seed

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fill, and seed dormancy.[15] Ethylene governs the development of leaves, flowers, and fruits. It may also promote, inhibit, or induce senescence depending on the optimal or sub-optimal ethylene levels.[16-18] Auxins may influence flowering in plants by affecting ethylene evolution. The treatment of Gibberellic acid (GA) to the foliar bud of plants increased the number of flowers and fastened flower development due to an increased endogenous level of GA and auxin.[15] Cytokinins promote cell division, or cytokinesis in plants roots and shoots. They are involved primarily in cell growth and differentiation, but also affect apical dominance, axillary bud growth, and leaf senescence.[19] There are two types of cytokinins: Adenine-type represented by kinetin, zeatin and 6-benzylaminopurine, and phynylurea-types cytokinins such as diphenylurea and thidiazuron.[20] Cytokinins regulate a wide range of growth and developmental processes throughout the life cycle of a plant, including seed germination, leaf expansion, induction of flowering, as well as flowering, and seed development.[21,22]

Coconut water has cytokinins hormones that signal the plant to divide cells in the roots and growing shoots, equaling explosive growth. Coconut water (coconut liquid endosperm), with its many application is one of the world's most versatile natural products, this refreshing beverage is consumed world-wide as it is nutritious and beneficial for health.[23] The liquid endosperm contains a number of amino acids, organic acids, nucleic acids, several vitamins, sugars and sugar alcohols, plant hormones (auxins and cytokinins), minerals, and other unidentified substances, none of which alone is totally responsible for growth promoting qualities.[24] It is traditionally used as a growth supplement in plant tissue culture/micropropagation. The wide application of coconut water can be justified by its unique chemical composition of sugars, vitamin, minerals, amino acids, and phytohormones.

Data on the flowering process of potato crop are limited because potatoes are multiplied vegetative by tubers. Hence, it has been mainly the breeders who were interested in flowering processes for crossing among cultivated and wild species, aimed at the production of new varieties. Lack or inadequate flowering limits the use of some promising varieties in a breeding program and prevents the making use of their genetic potentials either as sources of improved yield/quality or disease resistance. Cultivated potato varieties are highly adapted to temperate long day conditions and do not flower under relatively short day conditions and thus cannot be cross breed with wild varieties. Effort can be made to overcome this limited by inducing flowering in genotypes which normally do not flower under short photoperiod using growth-promoting hormones.[25,26] Foliar feeding is the application of nutrients, plant hormones, bio-stimulants, other beneficial substances, and pesticides to the leaves and stems of plants. The application of these substances during growth and development can improve the nutrient balance of crops, which, in turn, leads to increased yield and quality, greater resistance to diseases and insect pests, improved drought tolerance, and influenced flowering.[27] To minimize the cost of crop production, the use of locally available inputs or other growth enhancing products such as coconut water should be given importance. Hence, this work is aimed to study the effects of varying concentrations of coconut water on the flowering behavior of some potato varieties.

MATERIALS AND METHODS

Experiment Location and Plant Materials

This research work was conducted at the Botanical garden of the Department of Plant Science and Biotechnology, Bauchi Road main campus, University of Jos, Jos Nigeria (latitude 09^{o}5'N and longitude 08^{o}53'E and altitude 1159 m above sea level), during November 2017 and February 2018, dry season. The potato varieties were obtained from National Root Crops Research Institute, Potato Programme, Kuru, Plateau State, Nigeria. Coconuts (*Cocos nucifera*) were bought from vendors.

Experimental Design and Growing Conditions

The experiment was laid out in a completely randomized design, with three replicates. A 3 × 3 factorial arrangement used, consisting of three potato varieties (Caruso, Jelly, and Marabel) and three concentrations of coconut water (0 - control, 50, and 100%). Each replication was represented by ten plant stands.

A mixture of top soil and cow dung manure in a ratio of 2:1 by volume was filled into polythene bags (7,433cm^3), on November 6, 2017. One seed tuber (fully sprouted) was planted into each of the polythene pot containing the soil mixture, on November 8, 2017. Fertilizer (N_{15} P_{15} K_{15}) was applied in band to each plant at the rate of 100 kgha^{-1} and weeding was carried out at by hand as required to keep the experiment free from weeds. Plants were watered 3 times in a week initially (at 7 days after planting [DAP]) and 4 times at the onset of flowering. In the treatments with concentrations of coconut water, these were applied as foliar sprays on plants. The control treatment was without coconut water. Plants were sprayed at 35 DAP using knapsack sprayer.

Parameters Evaluated

Along the experiment, at 2 and 4 weeks after planting (WAP), plant establishment count (EC) was determined. At 4, 6, 8, 10, and 11 WAP, plant height, number of above ground stem, number of leaves, number of inflorescence, and number of flower bud formed per plant were determined.

Statistical Analysis

The data collected were subjected to analysis of variance by F-test and the means were compared by least significant difference test at 5% level of probability.[28]

RESULT AND DISCUSSION

Plant EC (%)

Table 1 shows the effect of variety on mean EC. The varieties resulted in significantly different ($P < 0.05$) mean percentage EC at 2 and 4 WAP [Table 1]. At 2 WAP, variety Caruso had the highest mean percentage EC (75.56%). This was followed by variety Jelly (55.56%) while variety Marabel had the least mean percentage EC (40.00%). At 4 WAP, variety Caruso had the highest EC (85.56%) while variety jelly had the least mean percentage EC [Table 1]. The variation observed in plant emergence and establishment might be varietal characteristic and also due to environmental conditions. It has been reported that mean EC of five varieties of potato studied varied from 95.30% in variety Bertita to 98.70% in variety Ruaka.[29] Emergence have also been reported to be affected by sprout length and environmental factors such as soil moisture and soil temperatures,[30,31] physiological age, and characteristic of a particular cultivar.[32]

Above Ground Stem Plant

The effects of variety and coconut water concentrations on the mean number of above ground stems are presented on Table 2. The varieties resulted in significantly different ($P < 0.05$) mean number of above ground stems at all the sampling dates [Table 2]. At 6, 8, and 10 WAP, variety Caruso and Marabel had similar and significantly higher mean number of above ground stems than variety Jelly which had lowest stem number [Table 2]. Main stems have been reported to be highly cultivar specific.[33,34]. While Garcia[35] reported cultivar Aracy with average of 2–4 stems,[36] obtain average of 2.3 stems per plant. Plant/stem density has also been reported as one of the several factors that influences flower and fruit production in potato.[6-8]

The different concentration of coconut water resulted in significantly different ($P < 0.05$) mean number of above ground stems [Table 2]. At all the sampling dates, 100% and 50% concentrations of coconut water resulted in similar and significantly higher mean number of above ground stems than the control (0% concentration) which had the least [Table 2]. Regarding the concentrations of coconut water, the control (0% concentration of coconut water) resulted in a significantly lower mean stem number compared to the 50 and 100% concentrations of coconut water. This result agrees with the findings of El-Areiny *et al*.[37] found increased stem number with increased concentration of cytokinin.

The interaction of variety and different concentrations of coconut water on mean number of above ground stems is presented in Table 3. With variety Marabel, 100% and 50% coconut water treatment resulted in significantly higher mean number of above ground stems. With variety Jelly the control and 50% concentration had significantly higher mean number of above ground stems. With variety Caruso, the control had significantly higher mean stem number than 100% and 50% concentrations of coconut water.

Table 1: Effect of variety as affected by naturally occurring cytokinin (coconut water) on mean establishment count

Percentage establishment count		
Treatments	Weeks after planting	
	2	4
Variety		
Marable	40.00c	77.78b
Jelly	55.56c	68.89c
Caruso	75.56a	85.56a
LS	*	*
$LSD_{0.05}$	8.59	9.62

Table 2: Effect of variety as affected by Naturally Occurring Cytokinin (coconut water) on Mean number of above ground stem

Number of above ground stems				
Treatments	**Weeks after planting**			
	6	**8**	**10**	**11**
Variety				
Marable	2.54a	2.58a	3.45a	1.86c
Jelly	2.23b	2.40b	1.82b	1.93b
Caruso	2.53a	2.68a	3.42a	2.40a
LS	*	*	*	*
$LSD_{0.05}$	0.01	0.01	0.01	0.01
Coconut water conc.				
C_0 (control)	1.23b	2.04b	1.93b	1.77c
C_1 (100%)	2.62a	2.78a	2.27a	2.10a
C_2 (50%)	2.70a	2.83a	2.21a	2.10a
LS	*	*	*	*
$LSD_{0.05}$	0.69	0.61	0.10	0.11

Table 3: The interaction of variety and coconut water on mean number of above ground stem

Coconut water conc.	**Variety**	**Jelly**	**Caruso**
	Marable		
C0 (control)	6.07b	10.45a	12.03a
C_1 100%	10.22a	8.58b	10.45b
C_2 50%	9.38a	9.98a	10.20b
LS	*	*	*
$LSD_{0.05}$		1.01	

Number of Inflorescence

The effects of variety and coconut water on mean number of inflorescence formed are presented in Table 4. The varieties resulted in significantly different ($P < 0.05$) mean number of inflorescence at 6, 8, and 11 WAP. However, at 10 WAP, the mean number of inflorescence was similar for all the varieties [Table 4]. Variety Caruso had the highest mean number of inflorescence formed at all sampling dates [Table 4]. The difference observed in number of inflorescence may be due to genetic composition of the varieties used. Potato inflorescence has been reported to be terminal comprising 1–30 (but usually 7–15) flowers, depending on the type of cultivar.[38] Increased flower production has been reported as a result of an increased number of inflorescence.[9] Flowering behavior in potatoes has been reported to show a wide range of genetic variability.[39,40]

The main effect of coconut water on mean number of inflorescence was significantly different ($P < 0.05$) at all the sampling dates [Table 4]. At 6 and 11 WAP, 100% concentration of coconut water had the highest mean number of inflorescence while the control (0% concentration) had the least. At 8 WAP, 100% and 50% concentrations resulted in similar mean number of inflorescence which were significantly ($P < 0.05$) higher than the control (0% concentration). The interaction between varieties and different concentrations of coconut water was not significant. Coconut water contains various cytokinins. Cytokinins have been reported to regulate a wide range of growth and developmental processes throughout the life cycle of a plant including induction of flowering, as well as flowering and seed development.[21,22]

Number of Flower Buds

The effect of variety and coconut water on mean number of flower buds formed is presented in Table 4. The varieties resulted in significantly different ($P < 0.05$) mean number of flower buds at all the sampling dates [Table 4]. Variety Caruso had the highest mean number of flower buds while variety jelly had the lowest and the differences were significant ($P < 0.05$) [Table 4]. Genotype has been reported as one of the factors that influence flower and fruit production in potato.[6-8,41] reported that varieties vary in number of flower buds formed ranging from variety Nicola which did not flower to variety Bertita which flowered profusely under Jos Plateau condition. Levy and Kedar,[39] Bhargava and Banerjee[40] reported that potato varieties differ in their flowering behavior.

The different concentrations of coconut water resulted in significantly different ($P < 0.05$) mean number of flower buds [Table 4]. At 6 WAP, 100% concentration resulted in the highest mean number of flower buds while the control had the least. At week 8 WAP, 100% and 50% concentration of coconut water had similar mean number of flower buds which was significantly higher than the control. At 10 and 11 WAP, 50% concentration resulted in highest mean number of flower buds while the control had the least and the difference was significant [Table 4].

Table 4: Effect of Variety as Affected by Naturally Occurring Cytokinin (Coconut Water) on Mean Number of Inflorescence and mean number of flower buds formed

Treatments	Number of inflorescence			
	Weeks after planting			
	6	8	10	11
Variety				
Marabel	1.38b	1.78c	1.93a	1.24b
Jelly	1.37c	2.02b	1.50a	0.64c
Caruso	1.80a	2.52a	2.43a	1.68a
LS	*	*	NS	*
LSD	0.01	0.37	-	0.16
Coconut water				
C_0 (Control)	0.83c	0.91b	2.26a	0.50c
C_1 (100%)	2.20a	2.67a	1.69c	1.62a
C_2 (50%)	1.51b	2.74a	1.92b	1.11b
LS	*	*	*	*
LSD0.05	0.20	0.11	0.01	0.22
Number of flower buds formed				
Treatments				
Variety				
Marabel	12.47b	11.28b	9.90b	7.97b
Jelly	5.56c	5.80c	4.18c	2.00c
Caruso	14.18a	12.63a	11.14a	9.22a
LS	*	*	*	*
$LSD_{0.05}$	0.70	0.37	0.14	0.23
Coconut water				
C_0 (Control)	9.10c	5.99b	34.44c	1.11c
C_1 (100%)	12.11a	12.01a	10.18b	6.71b
C_2 (50%)	11.01b	11.70a	11.59a	11.37a
LS	*	*	*	*
$LSD_{0.05}$	0.08	0.67	0.14	0.13

The interaction of variety and coconut water on mean number of flower buds is presented in Table 5. Variety Marabel x 100% concentration of coconut water resulted in significantly higher mean number of flower buds, followed by 50% concentration while the control had the least number of flower buds. Variety Jelly x 100% concentration of coconut water resulted in significantly higher mean number of flower buds than 50% concentration and the control which were similar. With variety Caruso, 100% and 50% concentration of coconut water resulted in similar mean number of flower buds which was significantly ($P < 0.05$) higher mean than the control [Table 5].

Table 5: The interaction of variety and coconut water on mean number of flower buds formed

Treatment Coconut water conc.	Number of flower buds formed		
	Variety		
	Marabel	Jelly	Caruso
C_0 (Control)	4.61c	3.47b	8.13b
C_1 (100%)	12.61a	5.17a	12.77a
C_2 (50%)	10.87b	38.50b	13.20a
LS	*	*	*
$LSD_{0.05}$		1.03	

CONCLUSION AND RECOMMENDATION

From the experiment carried out, the varieties differ significantly ($P < 0.05$) in all the parameters assessed. Variety Caruso was significantly higher in terms of growth and flowering behavior. About 50% concentration of coconut water resulted in significantly higher mean number of flower bud. Treatment of potato plants with coconut water enhanced growth and flowering.

REFERENCES

1. Hijmans RJ, Spooner DM. Geographic distribution of wild potato species. Ann J Bot 2001;88:2101-12.
2. Gebhardt C. The historical role of species from the Solanaceae plant family in genetic research. Theor Appl Genet 2016;129:2281-94.
3. Food and Agriculture Organization 2018. http://www.faostat3.fao.org/home/E.org.
4. Kumar M, Baishya LK, Ghosh DC, Ghosh M, Gupta VK, Verma MR. Effects of organic manures, Chemical fertilizers and Biofertilizers on growth and productivity of rainfed potato in the Easterne Himalayas. J Plant Nutr 2013;36:1065-82.
5. Gopal J. Considerations for successful breeding. In: Gopal J, Khurana SM, editors. Handbook of Potato Production, Improvement and Postharvest Management. New York: Haworth's Press; 2006. p. 77-108.
6. Almekinders CJ. Flowering and true seed production in potato (*Solanum tuberosum* L.) 2. Effects of stem density and pruning of lateral stems. Potato Res. 1991;34:379-88.
7. Almekinders CJ, Wiersema SG. Flowering and true seed production in potato (*Solanum tuberosum* L.) 1. Effects of inflorescence position, nitrogen treatment and harvest date of berries. Potato Res 1991;34:365-77.
8. Saini I, Kaushik P, Al-Huqail AA, Khan F, Siddiqui MH. Effect of the diverse combinations of useful microbes and chemical fertilizers on important traits of potato. Saudi J Biol Sci 2021;28:2641-8.
9. Almekinders CJ. The effect of photoperiod on flowering and TPS production in warm tropics. Potato Res 1992;35:433-42.
10. Werner HO. Relation of length of photo period and intensity of supplemental light the production of flowers and berries. J Agric Res 1942;64:257-74.
11. Turner AD, Ewing, EE. Effects of photoperiod, night temperature and irradiance on flower production in Potato. Potato Res 1988;31:257-68.
12. Bodlaender KB. Influence of temperature radiation and photoperiod in development and yield of Potato. In: Ivins JD, Mithorpe EL, editors. The Growth of Potato. London: Butterworths; 1963. p. 199-210.
13. Almekinders CJ, Struik PC. Shoot development and flowering in potato (*Solanum tuberosum* L.). Potato Res 1996;39:581-607.
14. Sleper DA, Poehlman JM. Breeding Field Crops. Hoboken, New Jersey: Blackwell Publishing; 2006. p. 424.
15. Igbal N, Khan NA, Ferrante A, Trivellini A, Francini A, Khan MI. Ethylene role in plant growth, development and senescence: Interaction with other phytohormones. Frontier Plant Sci 2017;8:475.
16. Konings H, Jackson MB. A relationship between rates of ethylene production byroots and the promoting or inhibiting effects of exogenous ethylene and water on rootelongation. Z Pflanzenphysiol 1979;92:385-97.
17. Khan NA. The influence of exogenous ethylene on growth and photosynthesis of mustard (*Brassica juncea*) following defoliation. Sci Hortic 2005;105:499-505.
18. Pierik R, Tholen D, Poorter H, Visser EJ, Voesenek LA. The Janus face of ethylene: Growth inhibition and stimulation. Trends Plant Sci 2006;11:176-83.
19. Kieber JJ. Tribute to folke skoog: Recent Advances in our understanding of cytokinin biology. J Plant Growth Regul 2002;21:1-2.
20. Gallo M. Ihidization induced tissue culture regeneration from quartered seed explants of *Archis paraguariensis*. Crop Sci 2012;52:555.
21. Sun TP, Gubler F. Molecular mechanism of gibberellin signaling in plants. Ann Rev Plant Biol 2004;55:197-223.
22. Yamaguchi S. Gibberellin metabolism and its regulation. Ann Rev Plant Biol 2008;59:225-51.
23. Pummer S, Heil P, Maleck W, Petroini G. Influence of coconut water on homeostasis. Am J Emerg Med 2001;19:28.
24. Molnar Z, Virog E, Ordog V. Natural Substances in tissue culture media of higher plants. Acta Biol Szegediesis 2011;55:123-7.
25. Gopal J, Rana MS. Induction of flowering in potato in North-Western plains of India. J Indian Potato Assoc 1988;15:91-3.
26. Sikka L, Kabir H, Chaudhury E.H, and Rashid, H. (1990). Potatoes from true potato seed: A promising alternative in Bangladesh for subsistence potato growing. Journal of Indian Potato Association 17(3/4): 141-6.
27. Laane HM. The effects of foliar sprays with different silicon compounds. Plants 2018;7:45.
28. Steel RG, Torrie JH. Principle and Procedure of Statistics. New York: McGraw-Hill Book Company Inc.; 1960. p. 480.
29. Deshi KE, Habila S, Dantata IJ. Pattern of growth of five varieties of potato (*Solanum tuberosum* L.) during three seasons in Jos Plateau, Nigeria. Biol Environ Sci J Trop 2016;13:121-9.
30. Tantowijoyo W, Van de Fliert E. All About Potatoes. An Ecological Guide to Potato Integrated Crop Management. International Potato Centre and FAO inter-Country Programme; 2006. p. 90.
31. Beukema HP, van der Zaag DE. Introduction to Potato Production. Netherlands: Pudoc, Wageningen; 1990. p. 208.
32. Johnson A. Trails of mercuric chloride for the prevention of

potato sickness. Ann Appl Biol 2008;2391:153-64.
33. Struik PC, Wiersema SG. Seed Potato Technology. Wageningen: Wageningen Pears; 1999. p. 383.
34. Otroshy M, Sruik PC. Effects of size of normal seed tubers and growth regulator application on dormancy, sprout behavior, growth vigour and quality of normal seed tubers of different potato cultivars. Res J Seed Sci 2008;1:41-50.
35. Garcia CJ. Irrigaçãoporgotejamento Superficial e Subsuperficial Nacultura da Batata (*Solanum tuberosum* L.) com Doissistemas de Plantio. Dissertação de Mestrado. Botucatu: Universidade Estadual Paulista "Julio de MesquitaFilho; 2003.
36. Fernandes AM. Crescimento, Produtividade, Acúmulo e Exportação de Nutrientesem Cultivares de Batata (*Solanum tuberosum* L.). Dissertação de Mestrado. Botucatu: Universidade Estadual Paulista, Faculdade de Ciências Agronômicas; 2010.
37. El-Areiny AA, Alkharpotly AA, Gabal AA, Abido AI. Potato yield and quality as affected by foliar application withcytokinin and salicylic acid. J Adv Agric Res 2019;24:1-34.
38. Acquaah G. Principles of Plant Genetics and Breeding. Maden, MA, USA: Blackwell Publishing; 2007. p. 758.
39. Levy D, Kedar N. *Solanum tuberosum*. In: Halevy AH, editor. Hand Book of Flowering. Vol. 4. Boca Raton, USA: CRC Press; 1985. p. 363-6.
40. Bhargava R, Banerjee VN. Growth and development of potato plant and its root system. In: Chadha KL, Grewal JS, editors. Advances in Horticulture. Vol. 7. New Delhi, India: Malhotra Publishing House; 1993. p. 383-403.
41. Ifenkwe OP, Deshi KE. Effect of grafting of potato on to tomato on the flowering behaviour of some potato (*Solanum tuberosum* L.) genotypes under Jos Plateau Environment. Niger J Bot 2006;19:74-83.

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