

## Revision paper submitted deadline (ISODOTF2021)

External

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1

ITFRI Balitbu Tropika <isodotf.itfri@gmail.com>

Tue, Jan 4, 2022,  
9:07 AM

to bcc: me

Dear Author,

We hope the revision of the manuscript could be done by the deadline of Jan 12th. The revision paper should be sent back to us via this email only.

Thank you.  
Best regards,

ISDOTF2021 Organising Committee  
Email : [isodotf.itfri@gmail.com](mailto:isodotf.itfri@gmail.com)

## Increasing the Flowering and Fruiting of *Citrus reticulata* Blanco by Application of Potassium Nitrat and Agrodyke

Sakhidin Sakhidin

*Faculty of Agriculture, Jenderal Soedirman University*

*Corresponding author: sakhidin@unsoed.ac.id*

**Abstract.** The appropriate treatment is needed to strengthen the flowering induction of citrus especially at wet season. Potassium nitrat is reported as an effective dormancy breaking agent so its application can enhance the flowering of many fruit crops. Agrodyke is known as an organic fertilizer that contains macro and micro nutrients. The research aimed to obtain the best dose of potassium nitrat and agrodyke to support the flowering and fruiting of citrus. This study used Completely Randomized Design with two factors arranged factorially. The first factor was dose of potassium nitrat (0, 25, and 50 g/plant), the second factor was dose of agrodyke (0, 20, and 40 g/plant). There are nine combination treatments, each repeated four times so there are 36 citrus trees planted at planterbag. Observed variables consists of flowering and fruiting components. The result of research shows that application of 50 g/plant potassium nitrat and 40 g/plant agrodyke gave the fastest flowering (50 days after application of treatment). Application of the same treatment gave the highest number of flower and fruit, but the lowest fruit drop.

**Comment [L1]:** No interaction between both treatments

## INTRODUCTION

This Citrus is an important fruit crop because it is planted more by 140 countries in the world. This fruit is known as good source of vitamin C that give important function in enhancement of immune systems[1]. Good immune system in our body is very needed to face the pandemic of covid 19. Beside that, vitamin C can reduce the risk of cancer and cardiovascular diseases. Citrus fruit can be consume as fresh fruit or as many products like juice, jam, and candy[2]. There are many species of citrus, one of them is Citrus reticulata Blanco.

Comment [L2]: Reference

Citrus fruit production must be preceded by flowering process. There are many factors that determine citrus trees to flower. But, generally for inducing flowering, citrus trees need the drought stress condition for number times [3]. Frequently, it is difficult to get enough drought stress condition especially at wet season. The appropriate treatments must be apply to improve or to enhance the flowering process. One of them is fertilization for improving the nutrient availability to support the optimum growth and development of citrus fruit[4]

Comment [L3]: Should ?

Application of the appropriate dose of fertilization has been reported to enhance the availability of nutrient in the soil [5, 6]. Application of potassium nitrate can increase the number of flowering shoots, number of panicles, and fruit yield [7]. Agrodyke is an organic fertilizer, so application of this fertizer can improve soil properties and yield of citrus[8]. The objective of the research is to study the effect of doses of potassium nitrate and agrodyke on flowering and fruiting of *Citrus reticulata* Blanco

Comment [L4]: Not suitable reference

## MATERIAL AND METHODS

The research used three-years old citrus trees of *Citrus reticulata* Blanco planted at planter bag (size of 50 l media). It was carried out from April until October 2021 at Experimental Farm belongs to Faculty of Agriculture, Jenderal Soedirman University, Purwokerto, Central Java. This location has altitude of about 113 m asl. Planter bag and its citrus plant was placed at the open land at the uniform environment condition. All of citrus plant get the same the number of rain and sun shine. By measuring at a local meteorological station, the average sunshine was seven h per day, average rainfall was 146 mm per month, and average air temperatur was 22-36°C.

This factorial experiment of 3x3 was arranged by Completely Randomized Design. There were two observed factors namely doses of potassium nitrate and doses of agrodyke. Doses of potassium nitrate consist of 0, 25, and 50 g/plant; whereas doses of agrodyke : 0, 20, and 40 g/plant. Each treatment was replicated four times, so there were 36 citrus trees in total. All of the citrus trees were applied the same cultivation techniq.

The observed variables were flowering and fruiting components. Flowering components consist of time appearing of first flower, the number of flower, flower drop; whereas fruiting components consist of the number of fruit, fruiset, and fruitdrop. Data were analyzed using analysis of variance (ANOVA). Following ANOVA, means were separated by Duncan's Multiple Range Test at p=0.05.

## RESULT AND DISCUSSION

### Effect of doses of potassium nitrate

Table 1 showed that application of potassium nitrate 50 g/plant gave the appearing time for first flower faster compared to other treatments. It indicates that drought stress naturally especially at wet season not enough to induce flowering of citrus plant. The same treatment also give the highest number of flower. This result was different with the result reported by Astiari, application of potassium nitrate 40 g/plant gave the highest yield compared to without application of potassium nitrate[9]

Comment [L5]: What does it mean ? .... there is no drought stress during wet season

The citrus plant applied 50 g/plant potassium nitrate shows the highest number of fruit (60.2), increased 28.6% and 336% compared to the number of fruit achieved by dose of potassium nitrate of 25 and 0

g/plant respectively. Application potassium nitrate 50 g/plant gave the lowest fruit drop (5.3%), 64% lower compared to the fruit drop by application of potassium nitrate 25 and 0 g/plant (Table 2). The same result was reported that application of potassium nitrate increased flowering and fruiting attributes of Zebda cultivar in the “off-year”[10], mango[11,12]

### Effect of doses of agrodyke

Table 1 shows that application of 40 g/plant gave the flowering process faster (the first flower was appear at 50.2 days after application of treatment) compared to other treatments. Beside that, that treatment also gave the highest number of flower (86.1), increased 45% and 276% compared to the same variable achieved by dose of agrodyke 20 and 0 g/plant respectively. Application of agrodyke 40 g/plant gave the highest number of fruit (49.2), increased 50 and 290% compared to the number of fruit achieved by 20 and 0 g/plant dose of agrodyke respectively. The same treatment reduced fruit drop until 6%, the lowest fruit drop compared to other treatments (Table 2). Hendrajaya *et al* reported that application of agrodyke 30 g/plant gave the highest yield citrus[13].

Table 1. Effect of doses of potassium nitrate and agrodyke on flowering

Doses of potassium nitrate nitrat (g/plant)	The appearing time for first flower (days after application of treatment)	Number of flower	Flower drop (%)
0	82,6 a	20.6 c	32,8 a
25	66,8 b	68.8 b	34,3 a
50	50.0 c	92.2 a	35,3 a
Doses of agrodyke (g/plant)			
0	81.2 a	22.9 c	43,9 a
20	68.8 b	59.2 b	44,7 a
40	50.2 c	86.1 a	46,3 a

Note : The numbers followed by the same letter at the same column and treatment not significant different at DMRT  $p=0.05$

Table 2. Effect of doses of potassium nitrate and agrodyke on fruiting

Doses of potassium nitrate nitrat (g/plant)	Number of fruit	Fruitset (%)	Fruit drop (%)
0	13,8 c	67.0 a	14.8 a
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Doses of agrodyke (g/plant)			

0	12.6 c	54.9 a	14.9 a
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## CONCLUSION

The result of research shows that application of 50 g/plant potassium nitrat and 40 g/plant agrodyke gave the fastest flowering (50 days after application of treatment). Application of the same treatment gave the highest number of flower and fruit, but the lowest fruit drop.

**Comment [L6]:** The result shows no interaction between both treatments...so it can't say like that

## ACKNOWLEDGEMENTS

We thank the General Directorate of Higher Education, Ministry of Education, Culture, Research, and Technology of Indonesia for research funding as written in the implementation contract of competitive loan from the Institute for Research and Community Services of Jenderal Soedirman University No. T/549/UN23.18/PT.01.03/2021.

## REFERENCES

1. Z. Berk., *Citrus Fruit Processing* (1<sup>st</sup> Edn) (Academic Press, Cambridge, MA, USA,2016), 330 pp.
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To ISDOTF2021 Organising Committee  
Dear : Chairman of organising committee

Herewith, I submit my revised full paper, the revisions are indicated by blue letters. I hope this revised full paper as expected by committee, thank you very much

Sincerely,  
Sakhidin

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### **INTRODUCTION**

Citrus is an important fruit crop because it is planted more by 140 countries in the world. This fruit is known as good source of vitamin C that give important function in enhancement of immune systems[1]. Good immune system in our body is very needed to face the pandemic of covid 19. Beside that, vitamin C can reduce the risk of cancer and cardiovascular diseases[2]. Citrus fruit can be consume as fresh fruit

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Citrus fruit production must be preceded by flowering process. There are many factors that determine citrus trees to flower. But, generally for inducing flowering, citrus trees need the drought stress condition for number times [4]. Frequently, it is difficult to get enough drought stress condition especially at wet season. The appropriate treatments [should](#) be apply to improve or to enhance the flowering process. One of them is fertilization for improving the nutrient availability to support the optimum growth and development of citrus fruit[5]

Application of the appropriate dose of fertilization has been reported to enhance the availability of nutrient in the soil [6, 7]. Application of potassium nitrate can increase the number of flowering shoots, number of panicles, and fruit yield [8]. Agrodyke is an organic fertilizer, so application of this fertilizer can improve soil properties and yield of citrus[9]. The objective of the research is to study the effect of doses of potassium nitrate and agrodyke on flowering and fruiting of *Citrus reticulata* Blanco

## MATERIAL AND METHODS

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## RESULT AND DISCUSSION

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Table 1 showed that application of potassium nitrate 50 g/plant gave the appearing time for first flower faster compared to other treatments. It indicates that [content of water in the soil not enough to make the condition for inducing the](#) flowering of citrus plant. The same treatment also give the highest number of flower. This result was different with the result reported by Astiari, application of potassium nitrate 40 g/plant gave the highest yield compared to without application of potassium nitrate[9]

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Note : The numbers followed by the same letter at the same column and treatment not significant different at DMRT  $p=0.05$

## CONCLUSION

The result of research shows that application of 50 g/plant potassium nitrate gave the fastest flowering (50.0 days after application of treatment), the highest number of flower and fruit, but the lowest fruit drop. Application of 40 g/plant agrodyke gave the fastest flowering (50.2 days after application of treatment), the highest number of flower and fruit, but the lowest fruit drop.

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ISODOTF2021 Organizing Committee  
Email : [isodotf.itfri@gmail.com](mailto:isodotf.itfri@gmail.com)

To ISDOTF2021 Organising Committee  
Dear : Chairman of organising committee

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Sincerely,  
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Table 1 shows that application of 40 g/plant gave the flowering process faster (the first flower was appear at 50.2 days after application of treatment) compared to other treatments. Beside that, that treatment also gave the highest number of flower (86.1), increased 45% and 276% compared to the same variable achieved by dose of agrodyke 20 and 0 g/plant respectively. Application of agrodyke 40 g/plant gave the highest number of fruit (49.2), increased 50 and 290% compared to the number of fruit achieved by 20 and 0 g/plant dose of agrodyke respectively. The same treatment reduced fruit drop until 6%, the lowest fruit drop compared to other treatments (Table 2). Hendrajaya *et al* reported that application of agrodyke 30 g/plant gave the highest yield citrus[13].

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Note : The numbers followed by the same letter at the same column and treatment not significant different at DMRT  $p=0.05$

## CONCLUSION

The result of research shows that application of 50 g/plant potassium nitrate gave the fastest flowering (50.0 days after application of treatment), the highest number of flower and fruit, but the lowest fruit drop. Application of 40 g/plant agrodyke gave the fastest flowering (50.2 days after application of treatment), the highest number of flower and fruit, but the lowest fruit drop.

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