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The Influence of Media and Hydration Time Treatment in Dairy's Urine Liquid to the Growth of *Rosa Hibryda*'s Cuttings

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Abstract
Roses have been known as important horticultural industrial commodity. This research was aimed to know the ideal mixture of media and the effective hydration time of rose cuttings in dairy's urine liquid. This research was conducted in experimental field of Agricultural faculty of UNISMA, using a plastic house. Randomized Complete Design with two factors was used in this experiment and each treatment was replicated three times. The first factor comprised four levels of medias treatment (soil; soil and rice husk; soil and compost; soil+rice husk+compost). The second factor comprised of three levels of hydration time (3 hours, 6 hours,and 9 hours). The result of this research indicated that the combination of soil media and nine hours hydration of cuttings in dairy's urine give the highest total buds, compared with the other treatments . Six hours hydration treatment gave the best result in cell enlargement and cell division of the buds compared with the other treatments. The combination of soil, rice husk and compost with six hours hydration treatment of dairy's urine liquid gave the highest total leaves , fresh root, dry root weight, total fresh weight of cuttings and also its total dry weight.

Key words : Hydration, soil, media, rice husk, compost

Introduction

Roses have been cultivated as ornamental plants and cut flowers since along time ago. It has been known as important horticultural industrial commodity (Singh et al., 2020). People also use roses as the raw materials of cosmetic industry, food flavor industry and parfum industry because of its exotic fragrance (Kumar et al., 2023). As cut flowers, the people like roses with large size, beautiful color (especially red), and could be stored in a long time. Roses (Rosa hybrida L.) known as the queen of flowers are loved for their beautiful colors and fragrant aroma. The production of cut roses according to the Directorate General of Horticulture (1018) ranks highest among other cut flowers (23.36%) which results in this type of flower having a significant economic role in society. Alongside with the development of the demand, the production of roses must be notified using best practice technology since the propagation phase.

The farmers usually use stem cutting as propagation method of roses. Good quality of cuttings are needed to grow healthy plants of roses which would produce high

quality flowers. The growth speed of rose's cuttings can be promote by using proper growth regulators with specific application method. There are so many kinds of growth regulators but usually they cost too expensive. We can find growth regulators from natural resources, such as dairy urine and coconut water. They doesn't cost too much. It has been known the urine of herbivora can stimulate root growth of plants. The results of research from (Sitinjak, 2023) showed that the application of horse and cow urine liquid fertilizer and their interactions had a very significant effect on the growth of *Cattleya labiata* shoot diameter at week 4.

Separately, the treatment of 20% cow urine fertilizer gave the best results on the performance of the seedlings. The length of hydration time cuttings depend on the urine concentration and plant commodity. Rose's productivity is also influenced by media's condition. Currently, there are still limited data on the interaction of ideal mixture seedling media and the using of dairy urine fertilizer to the performance of rose cuttings. The soil which has good texture, good aeration, good drainage and rich of organic materials will promote the roses to product high quality of flowers. This research was aimed to know the ideal mixture of media and the effective hydration time of rose cuttings in dairy urine liquid.

Materials and Method

This research was conducted in experimental field of Agricultural Faculty of UNISMA, using a plastic house. Randomized Complete Design with two factors was used in this experiment and each treatment was replicated three times. The first factor comprised four levels of medias treatment (soil; soil and rice husk; soil and compost; soil+rice husk+compost). The second factor comprised of three levels of hydration time (3 hours, 6 hours,and 9 hours).

The dairy's urine was used as growth regulator. The urine was taken from young and healthy cattle in Batu and kept in the bottle as soosn as possible. The cuttings were soaked in 10% dairy's urine liquid for 3, 6, and 9 hours. The cuttings were planted in the polybag in the afternoon. The watering was given once a day to keep the humidity of the medias, by pouring the water to the cuttings/media. Basic fertilizer (NPK) was given at 28 days after planting 95 g/plant, and remediated every two weeks with the same dosage.

The weeding was done every month manually. Pest control was done every week using Furadan 3-G and *Cymbus pesticide* (0,2 cc/l). The parameters observed in this research were the first appearance of buds, the length of buds, total leaves, width of leaves, total roots, fresh weight of cuttings, dry weight of cuttings. The data were analyzed by ANOVA followed by DMRT at 5% level.

Result and Discussion

The result of this research indicated that the combination of soil media and nine hours hydration cuttings in dairy urine gave the highest total buds, compared with the other treatments. It was suggested that soil and mixture of soil and compost could support the cuttings to absorb the auxin from the dairy urine better than the other media. The combination of soil, rice husk and compost with six hours hydration treatment gave the best result for bud's length, total fresh weight of buds and total dry weight of bud. It means that the cuttings could absorb the nutrition from that media better than from the other medias. When it came to the maximum plant height, plant spread, the appearance of the first flower and the plucking stage of the flowering stage, and the highest number of leaves and shoots per plant, the media that contained a mixture of soil, rice husks, and compost performed better (Chauhan, et al., 2014).

(Bhatla & Lal, 2023) said that the plants need the auxin to promote cell enlargement and cells differentiation. Six hours hydration treatment gave the best result in cell enlargement and cell division of the buds compared with the other treatments.

Table 1. The Effect of Media and Hydration's Time in Dayri's Urine Liquid Treatment to Total buds, Length of Buds, Total Fresh weight of Buds

Treatments					
Media	Hydration Time (Hours)	Total buds 14 days	Length of Buds (Cm) 70 days	Total Weight of Buds (Gram) 77 days	fresh 77 days
Soil	3	1,56ab	33,80abc	9,96abc	4,67ab
Soil	6	1,60ab	36,30abc	11,40abc	5,40b
Soil	9	2,16c	34,83abc	9,03ab	3,37ab
Soil+Rice Husk	3	1,90b	33,93abc	9,63ab	3,30a
Soil+Rice Husk	6	1,33b	28,50abc	9,83ab	3,57ab
Soil+rice Husk	9	1,00a	27,63ab	8,76a	3,30a
Soil+Compost	3	2,00c	25,90a	10,73abc	4,73ab
Soil+Compost	6	1,26ab	37,90abc	9,16ab	3,77ab
Soil+Compost	9	1,30ab	39,40bc	10,73abc	4,80b
Soil+Rice Husk+Compost	3	1,30ab	35,03abc	9,30ab	4,00ab
Soil+Rice Husk+Compost	6	1,56ab	42,23c	12,83c	6,00b
Soil+Rice Husk+Compost	9	1,33ab	27,43ab	11,50bc	4,93b

Note : The numbers followed by same alphabeths, showed no significantly differences between the treatments

Nguyen et al., (2023) stated that auxin also act as stimulator for cambium activities, so that the translocation of carbohydrates will go well. The mixing media (soil, rice husk and compost) had higher nutrient than the other medias. It has been known that compost can increase the nutrition in the media and repair the biological soil condition (Aguilar-Paredes et al., 2023). Compost consist of Nitrogen, Phospor, Kalium, Magnesium and the other nutrient needed for plant to grow well. Giving compost properly in the media can increase the fertility of soil.

Nitrogen and Phospor play important role in plant growth. They influenced the nucleic cell and meristem development. (Rashid *et al.*, 2024) said that the lackness of Phospor and Nitrogen can reduce the growth of plant and also reduce the activities of cambium. The combination of soil, rice husk and compost with six hours hydration treatment of dairy's urine liquid gave the highest total leaves and leaves weight compared with the other combinations treatments. Rinsema (1983) said that the

increasing of nitrogen absorption can stimulate the activities of chlorophyl in the leaves. Fathi (2022) said that The primary component of protein and chlorophyll in plant cells, N is essential for calculating the rate of photosynthetic reaction.

Table 2. The Effect of Media and Hydration's Time in Dayri's Urine Liquid Treatment to Total Leaves, Width of leaves, Total Fresh weight of roots,total Dry weight of Roots

Treatments		Total leaves 70 days	Width of leaves (cm^2) 70 days	Total Fresh Weight of Roots (Gram) 77 days	Total Dry Weight of Roots (Gram) 77 days
Media	Hydration Time (Hours)				
Soil	3	263,33abcd	1027,20a	13,10abc	1,46ab
Soil	6	287,90abcd	1067,83a	10,50ab	1,53b
Soil	9	286,16abcd	1034,90a	10,30ab	1,06a
Soil+Rice Husk	3	326,93bcd	1076,73b	12,20abc	1,83bc
Soil+Rice Husk	6	222,83abc	814,80a	10,96ab	1,50b
Soil+rice Husk	9	201,43a	598,13a	11,50ab	1,43ab
Soil+Compost	3	216,70ab	605,13a	10,26ab	1,60bc
Soil+Compost	6	331,83cd	1411,83b	10,80ab	1,56bc
Soil+Compost	9	263,10abcd	974,26a	10,10a	1,66bc
Soil+Rice Husk+Compost	3	283,00bcd	956,00a	10,56ab	1,46bc
Soil+Rice Husk+Compost	6	354,46d	1102,60b	17,06c	2,06c
Soil+Rice Husk+Compost	9	266,16abcd	874,53a	14,96bc	1,66bc

Note : The numbers followed by same alphabeths, showed no significantly differences between the treatments

The combination of soil, rice husk, and compost with six hours hydration treatment in dairy's urine liquid also gave the highest total fresh root weight and total dry root weight. It showed that dairy's urine can stimulate root growth of the cuttings. This study's findings are consistent with the results reported by Sadhukan et al. (2019), who found that cow urine improves soil physical characteristics and increases nutrient availability to crops, particularly nitrogen, due to its 2.5% urea content. Meanwhile Sharma et al., (2023) discovered that combining soil, sand, vermiculite, cocopeat, and perlite (1:1:1:1:1) with cow urine resulted in considerably improved tap root length, diameter, and root/shoot ratio.

Organic materials from the mixing media (soil, rice husk and compost) can promote the growth of the roots well. Rice husk and compost can repair soil structure. Owing to its ability to enhance soil structure, rice husk is frequently utilized as a planting medium (Asfar et al., 2021). Soil is a diverse, dynamic, biologically active porous material. A healthy soil structure enables drainage, aeration, water movement and storage, and biological activity, all of which are essential for plant growth (Wang et al., 2024).

Table 3 shows that the combination of soil, rice husk, and compost with a six-hour hydration treatment produced the highest total fresh dry weight of the cuttings. It is proved that the treatment can encourage the plant to use nutrients in the media optimally. A combination of optimal planting medium and organic fertilizer will yield higher growth results than cultivation without applied organic matter. Cow urine has higher nutrient content, including nitrogen, than cow feces. Nitrogen is essential for the production of chlorophyll and auxin. It is also essential for protein production and promotes plant development. Cells will divide, differentiate, and become more prevalent (Dewanti et al., 2023).

Table 3. The Effect of Media and Hydration's Time in Dayri's Urine Liquid Treatment to Total Fresh weight of Plants and total Dry Weight of Plants

Treatments		Total Fresh Weight of Plants (gram) 77 days	Total Dry Weight of Plants (gram) 77 days
Media	Hydration Time (Hours)		
Soil	3	47,63a	15,90a
Soil	6	49,53a	14,50a
Soil	9	47,46a	15,53a
Soil+Rice Husk	3	50,33a	16,06a
Soil+Rice Husk	6	49,23a	15,83a
Soil+rice Husk	9	54,03a	15,96a
Soil+Compost	3	48,86a	15,56a
Soil+Compost	6	49,33a	14,86a
Soil+Compost	9	46,96a	14,90a
Soil+Rice Husk+Compost	3	47,33a	15,66a
Soil+Rice Husk+Compost	6	67,96b	22,46b
Soil+Rice Husk+Compost	9	53,70a	17,73a

Note : The numbers followed by same alphabeths, showed no significantly differences between the treatments

Conclusion and Recommendations

A Randomized Complete Design with two factors (various media mixture and dairy's urine hiration time) was applied on rose's stem cutting. The result showed that the combination of soil media and nine hours hydration of cuttings in dairy's urine give the highest total buds, compared with the other treatments. It was suggested that soil and mixture of soil and compost could support the cuttings to absorb the auxin from the dairy's urine better than the other media. The combination of soil, rice husk and compost with six hours hydration treatment gave the best result for bud's length parameter, total fresh weight of buds and total dry weight of bud. Six hours hydration treatment gave the best result in cell enlargement and cell division of the buds compared with the other treatments. The combination of soil, rice husk, and compost with six hours hydration treatment in dairy's urine liquid also gave the highest total fresh root weight and total dry root weight. The data of the research also showed that the combination of soil, rice husk and compost with six hours hydration treatment gave the highest total fresh weight of cuttings and also its total dry weight.

References

Aguilar-Paredes, A., Valdés, G., Araneda, N., Valdebenito, E., Hansen, F., & Nuti, M. (2023). Microbial community in the composting process and its positive impact on the soil biota in sustainable agriculture. *Agronomy*, *13*(2), 542.

Asfar, A.M.I.A., Asfar, A.M.I.T., Thaha, S., Kurnia, A., and Syaifullah, A. 2021. The potential processing of rice husk waste as an alternative media for ornamental plants. Raje: Riau Journal of Empowerment. 4(3), 129-138.

Bhatla, S. C., & Lal, M. A. (2023). Auxins. In *Plant physiology, development and metabolism* (pp. 399–420). Springer.

Chauhan, R.V., Varu, D,K., Kava, K. P., and Savaliya, V. M. 2014. Effect of different media on growth, flowering and cut flower yield of gerbera under protected condition. Asian Journal of Horticulture, 2014, Vol. 9, No. 1, 228-231.

Dewanti, F. D., Sukendah, S., Tarigan, P. L., & Yunus, A. (2023). The Effects of Various Planting Media and Organic Fertilizers on the Growth and Yield of Purslane (Portulaca Oleracea L.). *Jurnal Penelitian Pendidikan IPA*, *9*(6), 4189–4193.

Fathi, A. (2022). Role of nitrogen (N) in plant growth, photosynthesis pigments, and N use efficiency: A review. Agrisost. Vol. 28, January-December 2022: 1-8

Kumar, A., Gautam, R. D., Singh, S., Chauhan, R., Kumar, M., Kumar, D., Kumar, A., & Singh, S. (2023). Phenotyping floral traits and essential oil profiling revealed considerable variations in clonal selections of damask rose (Rosa damascena Mill.). *Scientific Reports*, *13*(1). https://doi.org/10.1038/s41598-023-34972-5

Nguyen, T. T. T., Bae, E.-K., Tran, T. N. A., Lee, H., & Ko, J.-H. (2023). Exploring the seasonal dynamics and molecular mechanism of wood formation in gymnosperm trees. *International Journal of Molecular Sciences*, *24*(10), 8624.

Rashid, M. H. U., Li, Y., Farooq, T. H., Ahmad, I., Nawaz, M. F., Sohail, M., & Wu, P. (2024). Influence of Cambium Mechanism in Plants in Relation to Different Environmental Stresses. *Polish Journal of Environmental Studies*, *33*(1), 503–514.

Sharma, P., Yadav, R. K., Jain, M. C., & Bhateshwar, M. C. (2023). Improvement of papaya (Carica papaya L.) seed germination, seedling growth and chlorophyll content by using growing medium and organic liquid. *International Journal of Environment and Climate Change*, *13*(9), 2496–2506.

Singh, P., Shree, S., & Bhardwaj, A. (2020). Overview of the Floriculture Sector: Performance, Problems, and Prospects. In *Sustainable Agriculture* (pp. 89–117). Apple Academic Press.

Sitinjak, R. R. (2023). *Potential of liquid organic fertilization with horse and cow urine on shoot growth of Cattleya labiata Lindl.*

Wang, L., Lu, P., Feng, S., Hamel, C., Sun, D., Siddique, K. H. M., & Gan, G. Y. (2024). Strategies to improve soil health by optimizing the plant--soil--microbe--anthropogenic activity nexus. *Agriculture, Ecosystems \& Environment*, *359*, 108750.