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by Anindita Riesti Retno Arimurti Dosen Fik

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"Effect Of Peel Extract and Crown of Pineapple (*Ananas comosus L.Merr*) on The
Growth of *Trichophytonrubrum* Fungus"

Fatin Farazilah¹, Baterun Kunsah², Anindita Riesti
Retno Arimurti^{3*}

¹ Study Program DIII Health Analyst, Faculty of Health Sciences, University of Muhammadiyah
Surabaya, Indonesia; fatinfarazilah197@gmail.com

² Study Program DIII Health Analyst, Faculty of Health Sciences, University of Muhammadiyah
Surabaya, Indonesia; kunsah11@um-surabaya.ac.id

³ Study Program DIII Health Analyst, Faculty of Health Sciences, University of Muhammadiyah
Surabaya, Indonesia; aninditariesti@um-surabaya.ac.id

Coessponding author : aninditariesti@um-surabaya.ac.id

ABSTRACT

Trichophyton rubrum is a fungal species that often infects human skin. Treatment in healing these infections usually uses chemical drugs sold in the market such as ketoconazole drugs. These chemical drugs have many side effects, so there is a need for natural remedies that can replace chemical drugs. Pineapple peel and leaf crown (*Ananas comosusL. Merr*) is a type of fruit part which is a residual waste and is not used. The content in the peel and crown of pineapple leaves (*Ananas comosusL. Merr*) are flavonoids, alkaloids, saponins, and tannins which have the content to inhibit the growth of the fungus *Trichophyton rubrum*. The purpose of this study was to determine whether there was an effect of extracts of the peel and crown of pineapple leaves (*Ananas comosusL. Merr*) on the growth of the fungus *Trichophyton rubum*. This research includes experimental research using the Kirby-Bauer method or disc paper. The treatments in this study used concentrations of 25%, 50%, 75% extract of pineapple peel and leaf crown (*Ananas comosusL. Merr*), negative control (0%) and positive control (ketoconazole). Based on the Mann-Whitney test with a significant provision of 0.05, it was found that there were differences in each treatment. These results indicate that there is an effect of extracts of the peel and crown of pineapple leaves (*Ananas comosusL. Merr*) on the growth of the fungus *Trichophyton rubrum* and the best concentration of inhibition zone is 75%.

Keyword : *Trichophyton rubrum*, peel and crown extract of pineapple (*Ananas comosusL. Merr*).

INTRODUCTION

Dermatophytosis disease in Indonesia ranks second caused by fungal diseases (Pravitasari *et al.*, 2019). *Trichophyton rubrum* is one of the fungi that cause dermatophytosis of anthropilic species, which usually inhabits the soil to decompose keratin substances. *Trichophyton rubrum* is a fungal species that can cause various skin infections, including

tinea barbae, tinea capitis, tinea corporis, tinea cruris, tinea pedis and tinea unguinum (Nurhayati, Kuswiyanto and Pilo, 2017). According to research conducted by Supriyatin (2017), there are 6 steam motorbike or car wash workers in Arjawinangun village, Cirebon Regency who are positive for tinea pedis disease where steam washing workers often wear shoes for a long time so that the skin on their feet is moist. In Hardika's research (2016). There are also cases of *Trichophyton rubrum* causes tinea pedis where there are 4 farmers in Barong Hamlet Sawahan, Jombang Regency who complained of itching, felt pain and does not go away until you feel uncomfortable caused use of closed footwear. In addition, tinea corporis is an example other diseases caused by *Trichophyton rubrum*. Based on research that conducted by Riani (2017), as many as 94 respondents in the Fisherman Village Working Area of Jambu Health Center, Rokan Hilir Regency in 2016 which suffering from tinea corporis as a result of poor personal hygiene and several other factors. So far, the treatment carried out is with use antifungals (Arimurti and Azizah, 2021).

So far, the treatment for fungal infections is the use of antifungals. Antifungal is a drug to treat infectious diseases caused by fungi. The treatment currently available on the market is griseofulvin, but resistance exists. To overcome cases of griseofulvin resistance can use ketoconazole. However, the main danger of ketoconazole is that it can cause liver toxicity if used for more than 10 days. From the shortage of market drugs, many people think that it is safer to use herbal medicines so that many people start trying traditional medicines from herbal plants (Septiana, 2015). Pineapple peel (*Ananas comosus L. Merr*) contains active substances including flavonoids, alkaloids, tannins and saponins (Juariah, Irawan and Yuliana, 2018) Pineapple leaf crown (*Ananas comosus L. Merr*) also contains the same alkaloids, tannins, flavonoids as pineapple peel (*Ananas comosus L. Merr*) which can be used as antifungals (Aeni, Aini and Pratama, 2022). This plant is spread almost evenly throughout all regions in Indonesia (Amda, Hanafiah and Kardhinata, 2020) Pineapple peel and leaf crown waste (*Ananas comosus L. Merr*) can be a product that has economic value and can also reduce the amount of waste in the environment (Rahmawati *et al.*, 2019). Based on this description, the researcher wanted to examine the "Effect of the peel and crown leaf extract of pineapple (*Ananas comosus L. Merr*) on the growth of *Trichophyton rubrum*".

METHODS

This research is a study to measure the inhibition zone using the Kirby-Bauer method. The treatments used were negative control (0% concentration), positive control (ketoconazole), 25%, 50% and 75% extract of the peel and crown of pineapple leaves (*Ananas comosus L. Merr*). The principle of this research is to analyze the data on the effect of pineapple (*Ananas comosus L. Merr*) peel extract and leaf crown on the growth of the fungus *Trichophyton rubrum* obtained from laboratory tests. In this study, the effect of *Trichophyton rubrum* growth was determined by the presence of a clear zone around the paper disc. After doing the research, the resulting inhibition zone was measured using a ruler in mm units and then data analysis was carried out using SPSS.

RESULTS

The following are the results of research in the microbiology laboratory in table 1 :

Table 1. the results of observations on the growth of *Trichophyton rubrum* on extract of the peel and crown of pineapple leaves (*Ananas comosus* L. Merr)

No	Treatment	Inhibition zone diameter at each Repetition (mm)					Mean	Total	SD
		I	II	III	IV	V			
1	Control Negative (0%)	0	0	0	0	0	0	0	0
2	Control Positive (+)	37	38	35	38	40	37,6	188	1,81
3	25%	7	8	7	8	10	8	40	1.22
4	50%	12	10	10	11	10	10,6	53	0,89
5	75%	14	15	20	11	12	14,4	72	3,50

Source: Research data (June, 2022)

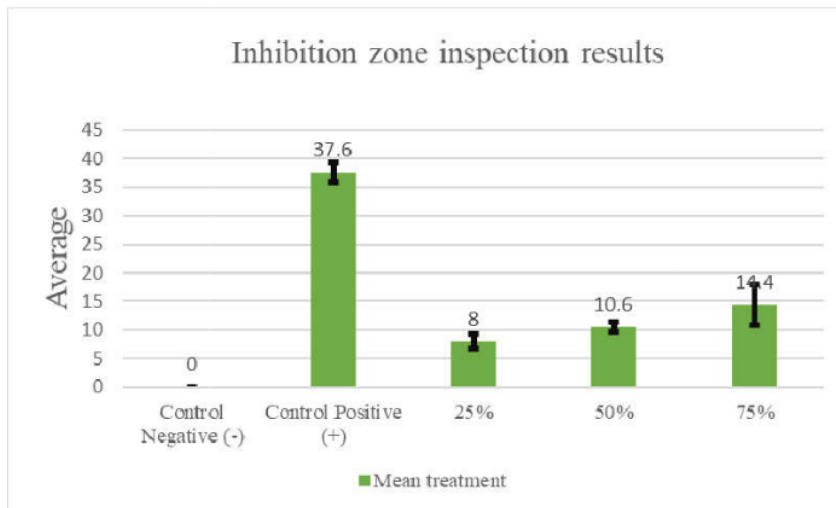


Figure 1. Mean of Inhibition zone inspection results

From the results of this study, it can be seen that the average inhibition zone of each concentration is different. At a concentration of 25%, an average of 8 mm was obtained, an average of 50% concentration was 10.6 mm, and a concentration of 75% an average of 14.4 mm was obtained (Figure 1.).

DISCUSSION

Based on the results of the study, this extract has potential as an antifungal indicated by the presence of inhibition zones formed on administration of the peel and crown leaf extract of pineapple (*Ananas comosus* L. Merr) with concentrations of 25%, 50% and 75%. In this case, the higher the concentration, the larger or wider the inhibition zone produced, the

more active substances from the peel and crown leaf extract of pineapple (*Ananas comosus L. Merr*) which consist of flavonoids, alkaloids, tannins and saponins that function as antifungals. The active substances contained in pineapple peel (*Ananas comosus L. Merr*) are flavonoids, alkaloids, tannins and saponins (Juariah, Irawan and Yuliana, 2018). The crown of pineapple leaves (*Ananas comosus L. Merr*) also contains the same content as alkaloids, tannins, and flavonoids that can be used as antifungals (Aeni, Aini and Pratama, 2022).

In this study, the peel and crown of pineapple (*Ananas comosus L. Merr*) leaves were used due to the large amount of waste produced from pineapple (*Ananas comosus L. Merr*). In addition, there are also ingredients that can both have potential as antifungals. According to research by Wenas, Ramadania and Herdini (2020), the inhibitory power of the leaf and peel extract of orange pamelo (*Citrus maxima (Burm.) Merr.*) at the same concentration of 30% concentration resulted in a large inhibition zone and almost the same diameter. On the leaves of the orange pamelo (*Citrus maxima (Burm.) Merr.*) the highest inhibition was 12.43% and on the peel of the orange (*Citrus maxima (Burm.) Merr.*) of 12.15%. This indicates that the two origins of the pamelo citrus plant material have almost the same potential for fungal inhibitory activity.

Of all the active substances contained, the mechanism of action of flavonoids is to disrupt the process of diffusion of food into cells, causing fungal growth to stop or die. In addition, the content of saponins which are polar surfactants will break the fat on the cell membrane which can cause disruption of cell membrane permeability. This can cause fungal cells to swell and burst (Masloman, Pangemanan and Anindita, 2016). The tannin content has the ability to inhibit the synthesis of chitin which functions for the formation of cell walls in fungi and damages cell membranes, thereby inhibiting the growth process of fungi. The antifungal mechanism possessed by alkaloids is by inserting between the cell wall and DNA and then preventing the repetition of fungal DNA so as to disrupt fungal growth (Komala, Yulianita and Siwi, 2019). In this study, the skin and crown of pineapple (*Ananas comosus L. Merr*) leaves were used due to the large amount of waste produced from pineapple (*Ananas comosus L. Merr*). In addition, there are also ingredients that have the same potential as antifungals.

The difference in inhibition zones at concentrations of 25%, 50% and 75% could also be caused by several factors, such as during the process of immersing the discs at each concentration. The extract was not optimally absorbed on the disc due to obstacles such as being too thick or watery as a result of the extract concentration solution that had been made. As stated by Nadziroh and Setiawan (2018), there are several factors of antimicrobial activity, including the number of microorganisms, acidity or alkalinity (pH), the intensity of the antimicrobial substance or concentration, the potential of an antimicrobial substance in the tested solution and the sensitivity of a microbe to antifungal concentration.

CONCLUSION

Based on the results of the research and statistical tests carried out, it can be concluded that the administration of pineapple peel and crown leaf extract (*Ananas comosus L. Merr*) at concentrations of 25%, 50% and 75% found an inhibition zone which means that

there is an effect on the growth of the fungus *Trichophyton rubrum*. In addition, among the concentrations of the peel and crown leaf extract of pineapple (*Ananas comosus L. Merr*) 25%, 50% and 75%, the best inhibition zone was at a concentration of 75%.

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