Physical Properties of Red Galangal Rhizome Extract (*Alpinia Purpurata* K. Schum) In Oil/Water-Based Cream and its Antifungal Activity Against *Trichophyton rubrum*

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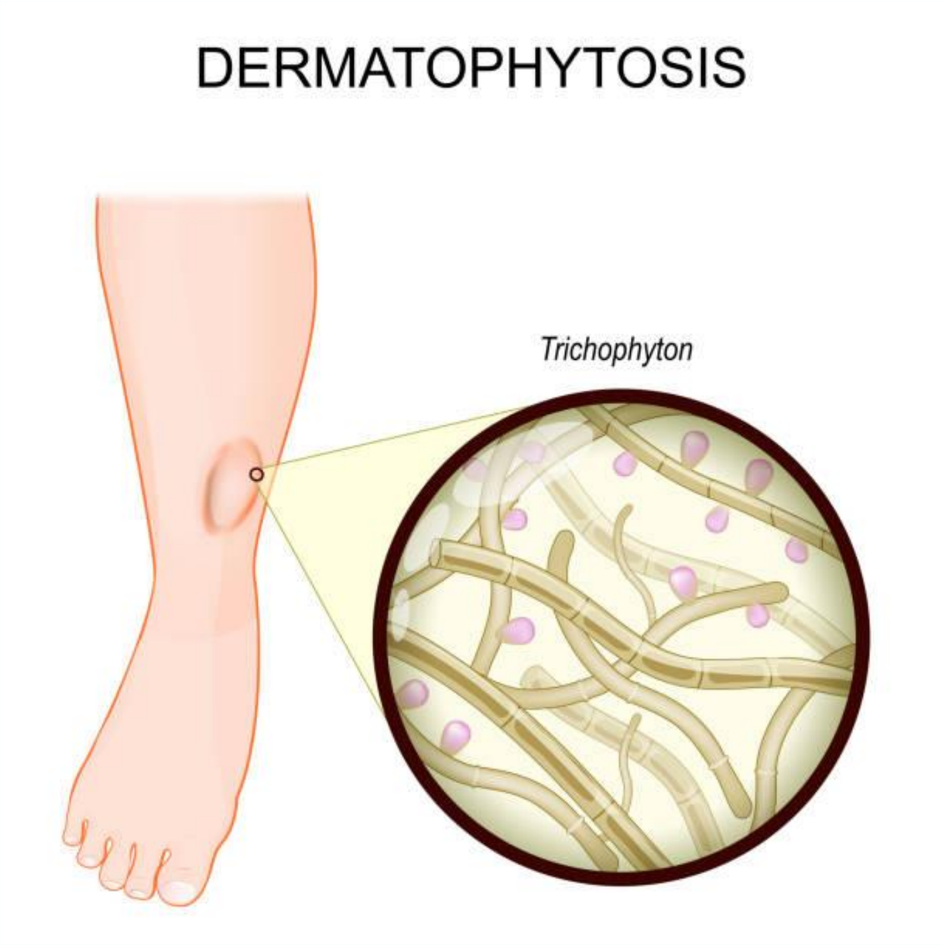
Background



Dermatophytosis

Also known as ringworm, is a fungal infection of the skin.

Results in a red, itchy, scaly, circular rash.

Hair loss may occur in the area affected..

Trichophyton rubrum

A fungus causes skin infections, especially dermatophytosis.

In Indonesia, the prevalence rate of skin disease is 3-27%.

Mechanism is to attack the stratum corneum, the outermost layer of the epidermis and the fungus will infect the skin (Dewi et al, 2019).

Background

Red Galangal Rhizome

Alpinia purpurata K. Schum

A. purpurata chloroform extract affects the growth of the fungus Trichophyton rubrum.
MIC 20 mg/mL and MFC were and 40 mg/mL (Azizah et al., 2022).

Concetration 10 % of A. purpurata inhibited Microsporum canis, Microsporum gypseum, and Trichophyton metagrophytes growth (Pangestuti et al, 2020).

Cemical compounds that can inhibit fungal growth namely flavonoids and saponins interfere the function of the fungal cytoplasmic membrane, besides that they can cause leakage and aggregation of the outer cell membrane, which can inhibit the growth of dermatophytes.

Background

Red Galangal Rhizome

Alpinia purpurata K. Schum

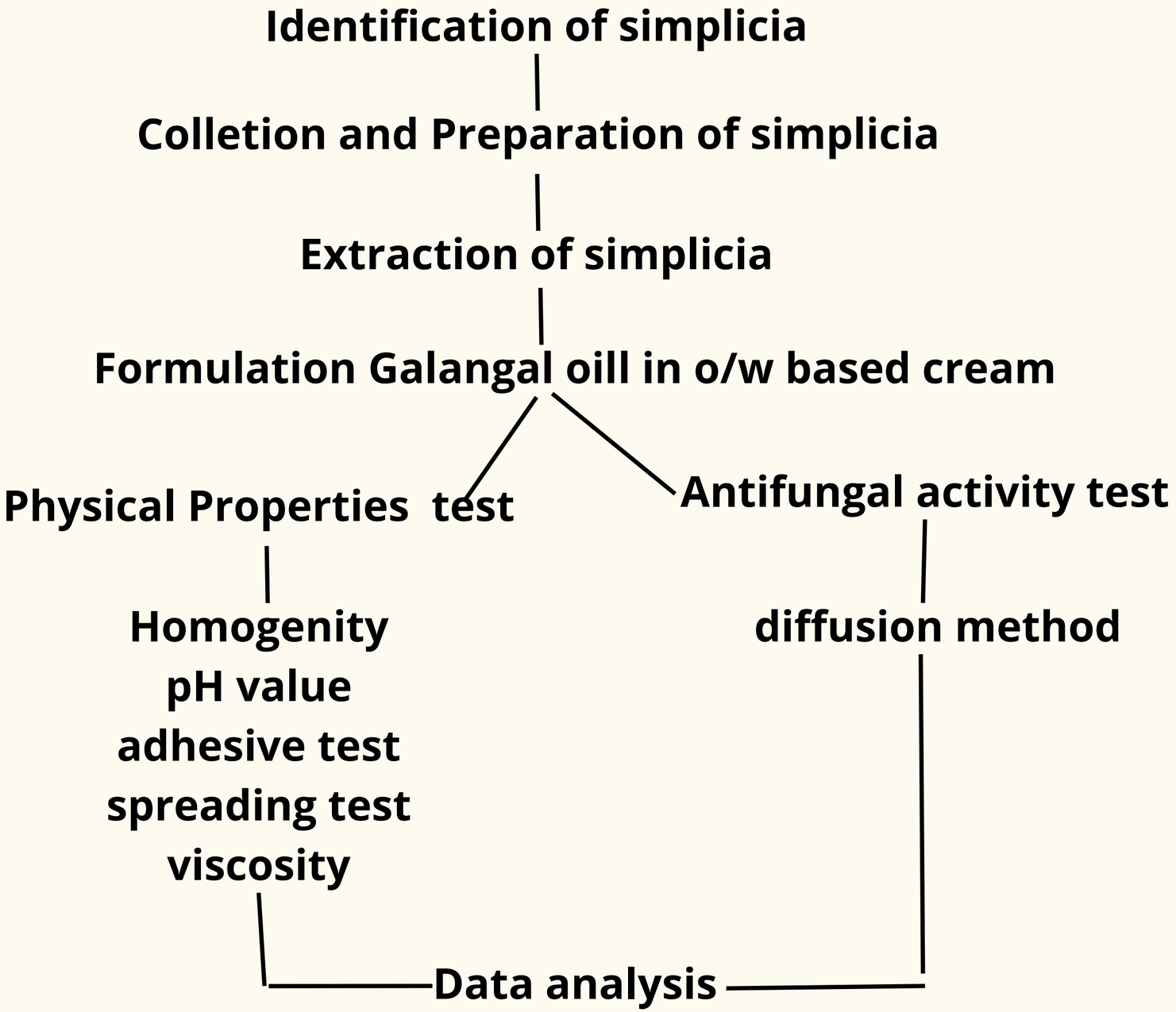
A. purpurata extract potential as an antifungal agent.

The use of extracts directly on the skin is not practical, it is necessary to develop dosage forms that are suitable for the skin. topical dosage form is cream. Cream can provide a cool, shiny and moisturizing effect on the skin.

The Objective of Research

- To determine the effect of *A. purpurata* extract concentration on the physical properties of the cream.
- To determine the effect of *A. purpurata* extract concentration on the antifungal activity of red galangal rhizome extract cream against *T. rubrum*.
- To find out which *A. purpurata* extract cream formula is optimal, based on the physical properties and antifungal activity against *T. rubrum*.

Methods


Identification of simplicia
Colletion and Preparation of simplicia
Extraction of simplicia
Formulation Galangal oill in o/w based cream
Physical Properties test
Antifungal activity test
Homogenity
pH value
adhesive test
spreading test
viscosity
diffusion method
Data analysis

Formula of *A. purpurata* Cream

Table 1. Formula of *A. purpurata* Cream

Ingredients	Cream base	F1 (10%)	F2 (15%)	F3 (20%)
A. purpurata (g)	0	2	3	4
Vaseline Alba (g)	4	4	4	4
Liquid Paraffin (g)	2	2	2	2
Stearic acid (g)	2	2	2	2
TEA (g)	0.4	0.4	0.4	0.4
Nipagin (g)	0.06	0.06	0.06	0.06
Nipasol (g)	0.006	0.006	0.006	0.006
Aquadest (g) ad	20	20	20	20

Adhesive and spreading power of *A. purpurata* cream

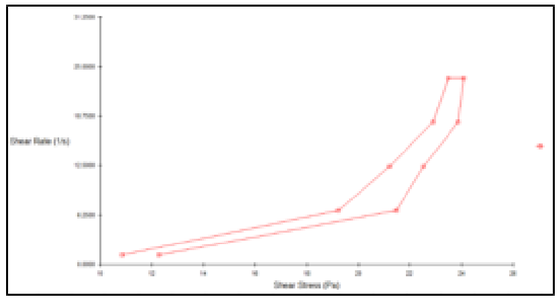
Table 2. Results of adhesive, spreadability and pH value of *A. purpurata* cream

Cream Formula	Adhesive power (s)	Spreadability (g.cm/s)	pH
Cream base	30.00 ± 0.0763	5,25 ± 0.0529	6.45 ± 0.0763
F1	45.90 ± 0.2645	5.09 ± 0.0360	6.408 ± 0.05
F2	50.06 ± 0.0763	4.62 ± 0.0577	5.51 ± 0.1040
F3	60.03 ± 0.0763	4,41 ± 0.0577	5.11 ± 0.1040

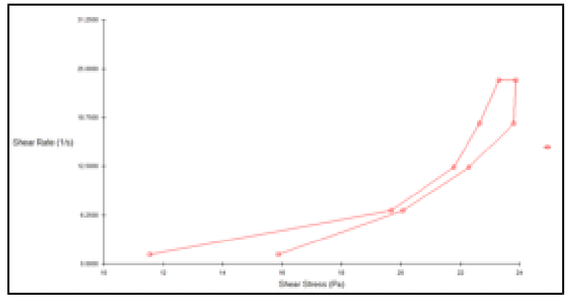
Protection power and viscosity of *A. purpurata* cream

Table 3. Results of protective power and viscosity of *A. purpurata* cream

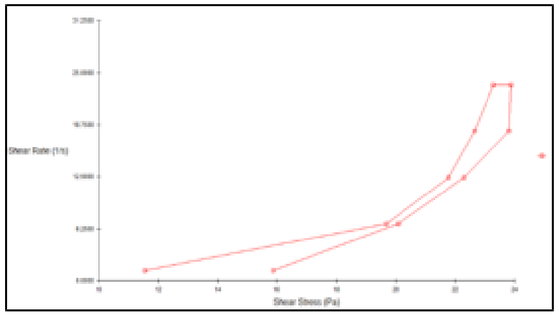
Cream Formula	Protection power (s)	Viscosity (cPs)
Cream base	21.10 ± 1.7616	1290,91
F1	24.81 ± 3.4988	1603,67
F2	27.10 ± 3.5958	1613,73
F3	45.07 ± 4.9951	4130,94



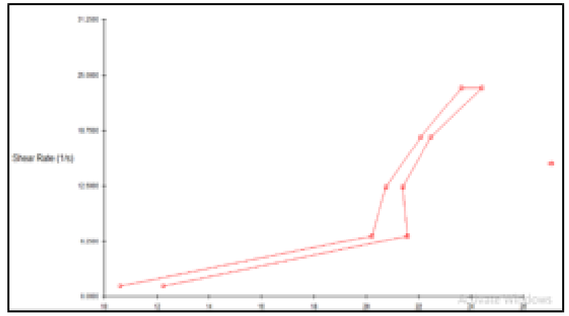
(a) Base



(b) F1



(c) F2



(d) F3

Antifungal activity of *A. purpurata* cream

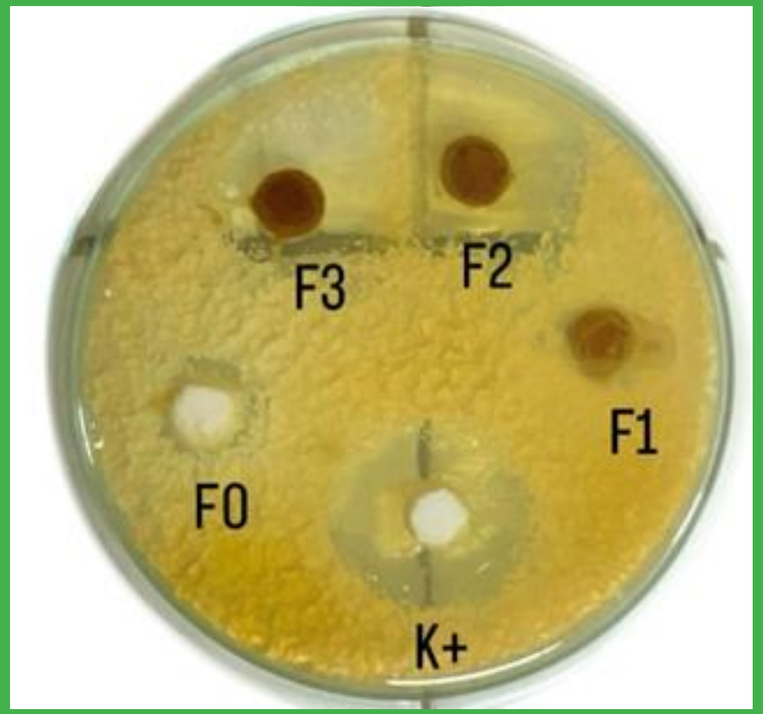


Table 4. Antifungal activity of *A. purpurata* cream against *T. rubrum*

Cream Formula	Diameter of inhibition zone (mm)
Negative control	7.50 ± 0.1732
F1	12.33 ± 0.2886*
F2	18.83 ± 0.2886*
F3	20.83 ± 0.2886*
Positive Control	21.66 ± 0.2886*

*significant different to negative control
F1 : 10 % A.purpurata extract
F2 : 15% A.purpurata extract
F3 : 20% A.purpurata extract
Negative control: cream base
Positive control: ketoconazole 2% cream

Conclusion

- **The higher concentration of *A. purpurata* extract in the cream was followed by an increase in its physical properties, such as viscosity, adhesive power and protective power.**
- ***A. purpurata* extract concentrations of 20% provide the greatest antifungal activity against T. rubrum.**
- **F3 was the optimal formula with a concentration of 20% *A. purpurata* extract in oil/water based cream.**

References

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Thank you