

Killing the Mites with Good smell

~ curb the breeding of house mites by using essential oil ~

Hyogo pref. Kobe high school Science course grade 1

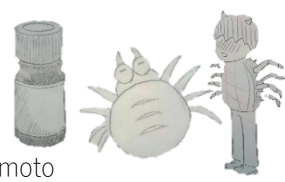
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Objectives

Mites living in the house are allergens, and damage our health. Today, various chemical drugs are used to get rid of them. However, some of these may affect our environment or ourselves.

So, in this research, we focused on the essential oil to kill the mites with natural materials. We studied about the effect in terms of three points; 'Miticidal effect', 'Immediacy—how quick the mites died', 'Repelling action of the mites.'

We used the D.p. species as the tested mites. We used 6 essential oils; grapefruit, spearmint, Japanese cypress, lavender, clove, and rosemary.

Procedure

Breed the mites

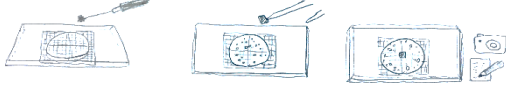
- Seal the mites and the culture medium in Tupperware.
- Temperature---25°C(in an incubator),
- Humidity---75% (saturated by saline solution).

Separate the mites

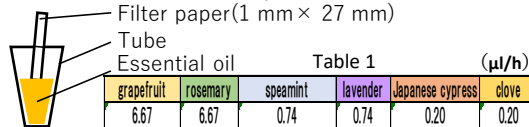
- Separate the mites from a culture medium by Brine Flotation and suction filtration.

Experiment

- We made original test plate of acryl board. Soak 1 mm² filter paper to 1 μl of essential oil. Put the filter paper and 20 mites in the test plate. Observe with a stereomicroscope and record with a camera.



Measurement of Evaporation Rate



consideration

	result1	result2	result3
Clove	1	5	1
Spearmint	2	1	4
Lavender	3	2	3
Rosemary	4	3	5
Grapefruit	5	4	6
Japanese cypress	—	—	2

Prospect

In this research, we were able to compare the mite-killing effect of each essential oil with taking evaporation rate into account.

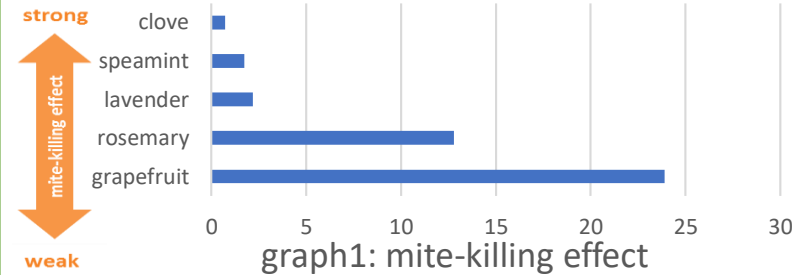
We think that evaporation rate is important information for comparing the various effects of essential oil because the result was affected by evaporation rate. We analyzed more than 80 movies to observe the mites' action. We were able to get enough information to build up a few hypotheses.

We are going to analyze the mites' action in more detail, and approach the answer of our question, "Why does essential oil kill the mites?"

Reference

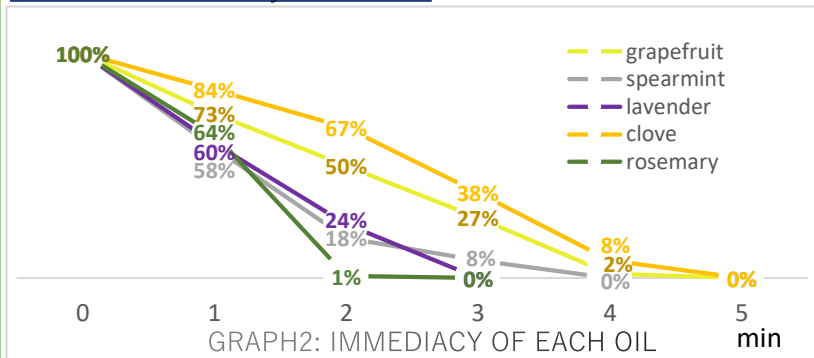
佐々木薫『最新3版 アロマテラピー図鑑』2016年 主婦の友社
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<http://ginacyo.net/11008908173> 精油の揮発成分によるヤケヒョウヒダニ、コナヒョウヒダニおよびケナガコナダニに対する殺ダニ効果

Result 1: Clove has the most mite-killing effect



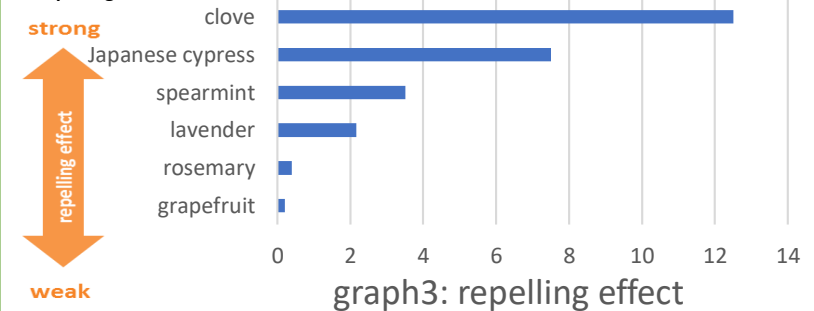
Result 2: Immediacy of each oil

(min · μl/h)



Result 3: Repelling action of the mites

◎Repelling effect



◎Analyses of mites' action pattern

	Mite-killing effect(μl/h)	Mites' action		Immediacy(min)	Mites' action
Clove	0.71	Stirred around Gradually stopped Move & stop	Rosemary	1.92	Immediately stopped Less movement— moved back & forth
Spearmint	1.73	Immediately stopped Suddenly stopped	Spearmint	2.33	Immediately stopped Suddenly stopped
Lavender	2.17	Less movement Stirred around	Lavender	2.93	Less movement Stirred around
Rosemary	12.8	Immediately stopped Less movement— moved back & forth	Clove	3.57	Stirred around Gradually stopped Move & stop
Grapefruit	23.9	twitched Immediately stopped Less movement	Grapefruit	3.58	twitched Immediately stopped less movement
Japanese cypress	No effect	twitched	Japanese cypress	No effect	Twitched