

**Inhibitory effect and clinical trial of
malassezia by Zinc Pyrithione
Suspension**

Inhibitory activity of natural oils on *Malassezia* species

1. 사용한 비듬 균주 :

Malassezia furfur : KCTC 7743

Malassezia sympodialis : KCTC 7985

사용배지 : modified Leeming&Notman 배지를 변형한 배지(glucose 20g, malt extract 50g, polypeptone 1g, bile salts (oxid) 20g, tween 40 0.1g, glycerol 0.02g, agar 15-20g, D.W 1000ml)

배양온도 : 30-37°C incubator에서 배양

2. Natural oils

Zinc Pyrithione Suspension(징크피리치온현탁액)

Lavender bulgarian oil

Tea tree oil

3. 비등균 억제 효과: MIC, MBC, DISC법 측정함

MIC(minimal inhibitory concentration): 미생물의 생육을 저해하는데 필요한 최저 농도

MBC(minimal bacterial concentration): MBC는 평판배지에서 세균이 자라지 않는 최소한의 농도

* MIC 측정법 (Inhibitory activity)

- Test tube를 series로 준비하고 시험균주가 접종된 동일량의 배지를 분주
 - 시험하고자 하는 오일의 농도를 조정(일반적으로 1/2 단계적 농도로 함, 즉 stepwise 2-fold dilution으로, 예: 1, 0.5, 0.25, 0.125%), positive control(오일 무첨가) 필요
 - 시험균주의 생육 적온에서 배양, 생육에 충분한 시간 동안 배양
 - 육안으로 생육 여부를 관찰,
 - 탁도(turbidity)는 650nm의 흡광도에 OD값으로 측정하여 오일농도의 MIC값을 나타냄 (MIC₅₀ : the conc. that inhibits 50% of the strains tested)
- ➡ 이와같이 MIC는 stepwise 2-fold dilution과 visual determination 방법을 사용함.

* MBC 측정법 (Determination of bactericidal activity)

- MIC 측정 시 오일 농도에 따라 균 배양
- 배양 후 각 배지를 취하고 적절히 희석하여 고체 배지상에서 생균수를 측정
- 48시간 배양 후 고체배지상에 "no colony"인 농도를 MBC로 함

* Diffusion method(disc diffusion test)

- filter paper disc 사용, 일정량의 항생제를 disc에 흡수 시킨 후 agar 배지상에서 16-20시간 배양하고 inhibition zone을 측정

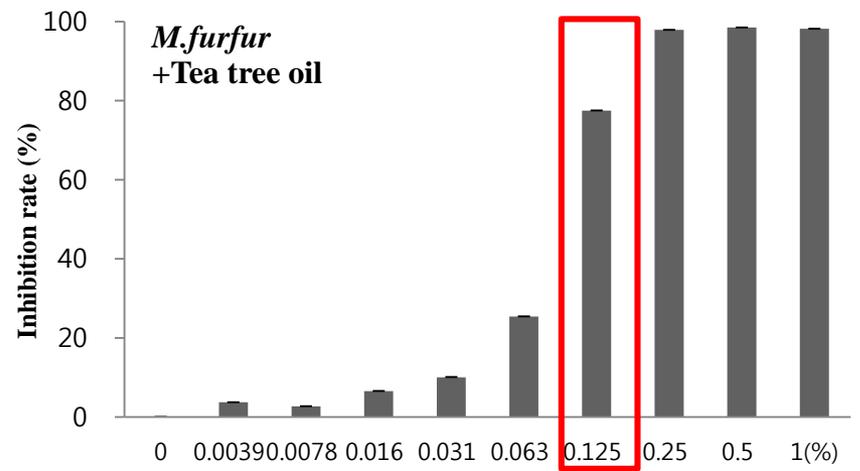
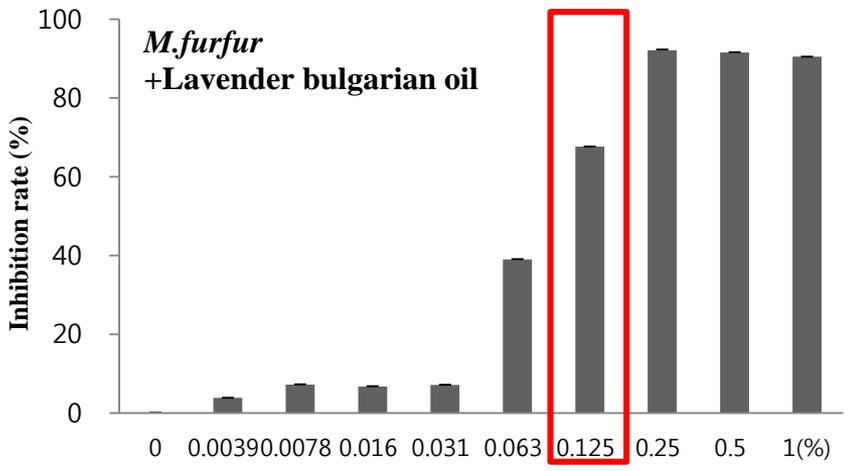
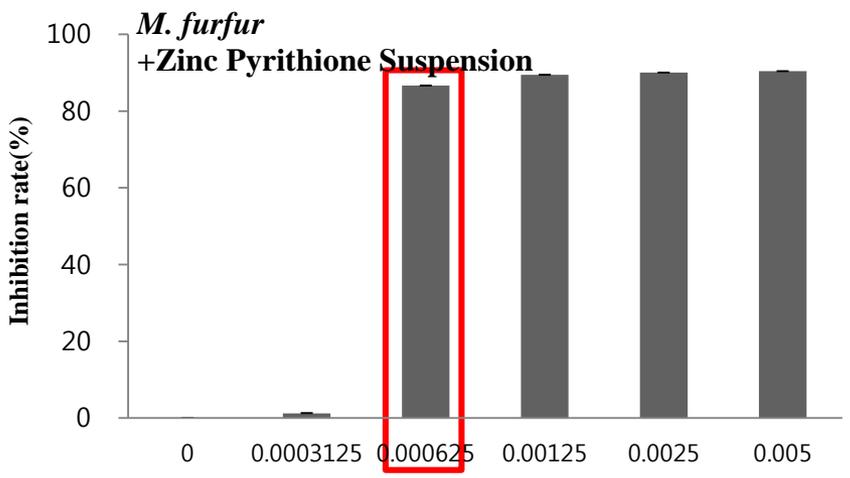
MIC ₅₀	<i>M.furfur</i>	<i>M.sympodialis</i>
Zinc Pyrithione Suspension	0.000625%	0.000039%
Lavender bulgarian oil	0.125%	0.063%
Tea tree oil	0.125%	0.125%

표1. ZP용액, 라벤다오일, 차나무오일의 항진균효과인 MBC 비교

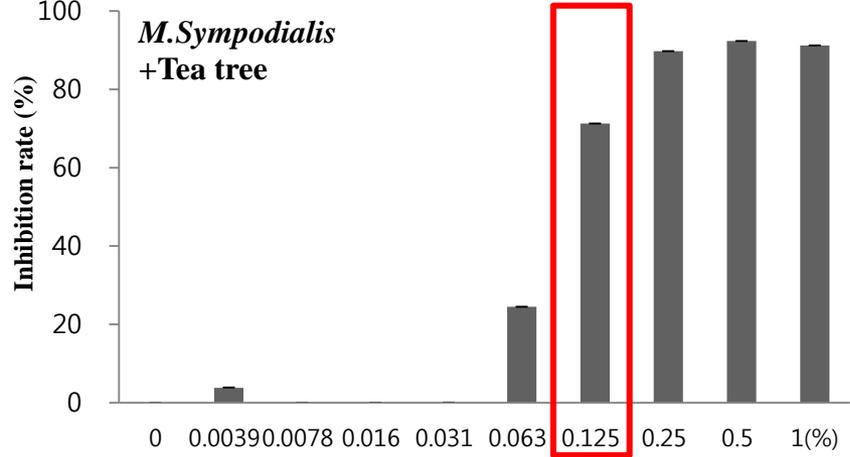
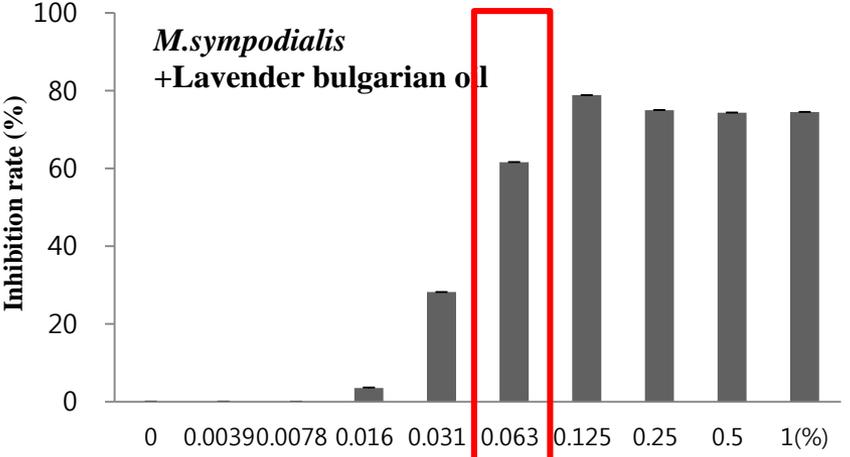
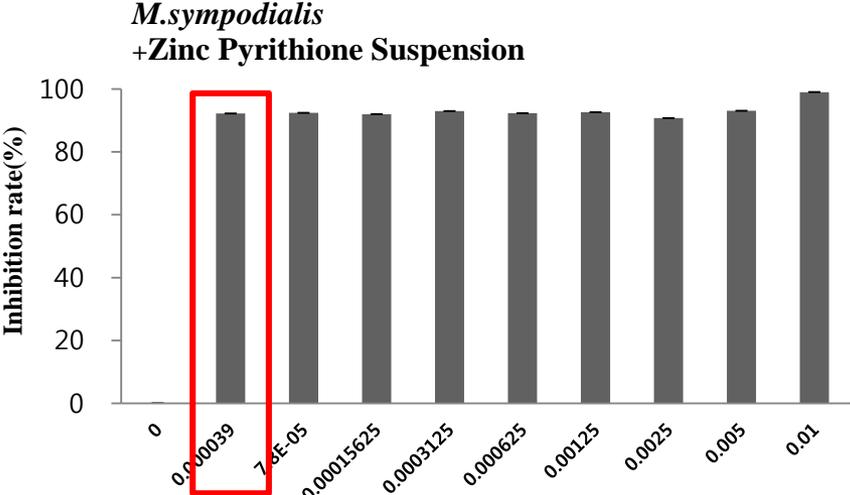
MBC	<i>M.furfur</i>	<i>M.sympodialis</i>
Zinc Pyrithione Suspension	0.0025%	0.000078%
Lavender bulgarian oil	0.5%	0.25%
Tea tree oil	0.5%	0.25%

MIC

Malassezia furfur



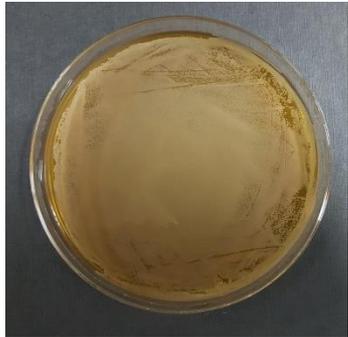
Malassezia sympodialis



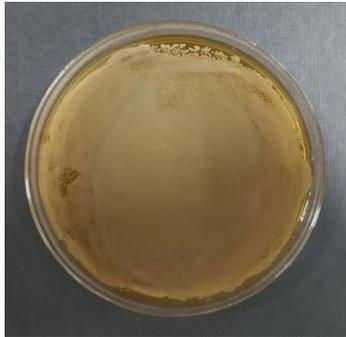
MBC

M. Furfur

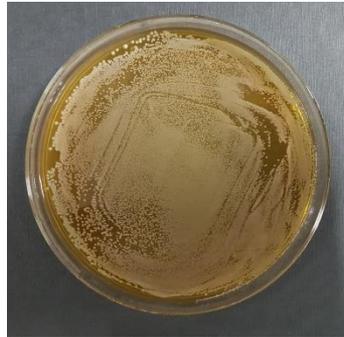
그림 1. *M. Furfur* 배양 균주에 대한 ZP Suspension 농도에 따른 MBC결과



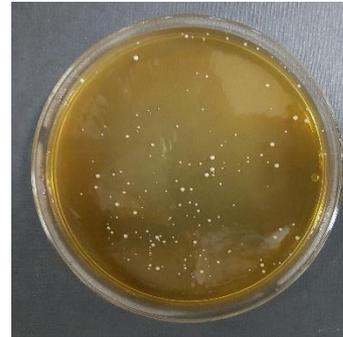
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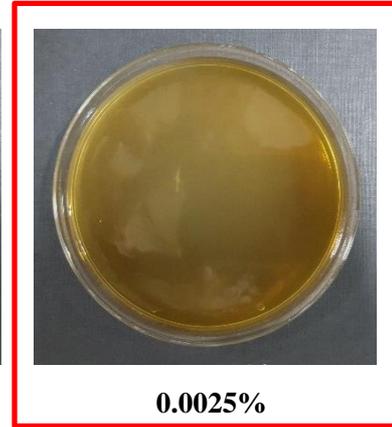
0.0003%



0.0006%



0.00125%



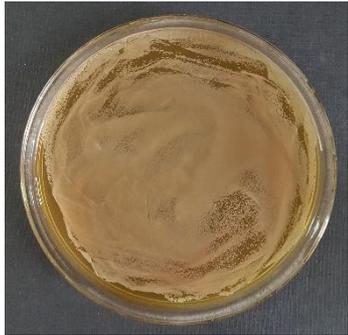
0.0025%

M.Furfur

Lavender bulgarian oil



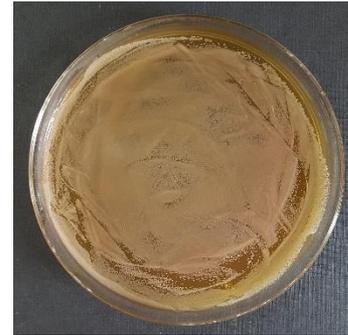
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0.0039%



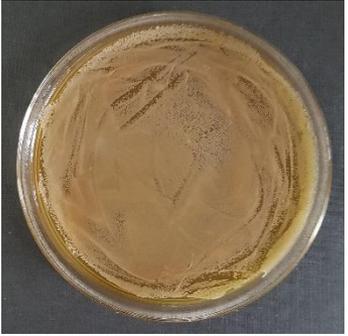
0.0078%



0.015625%



0.03125%



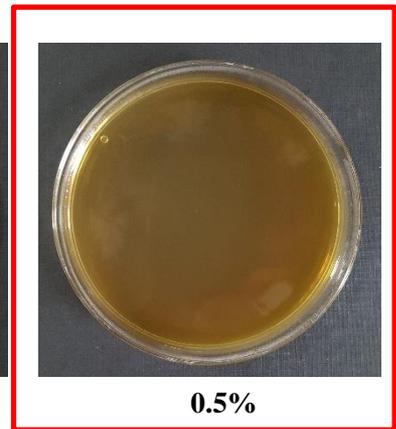
0.0625%



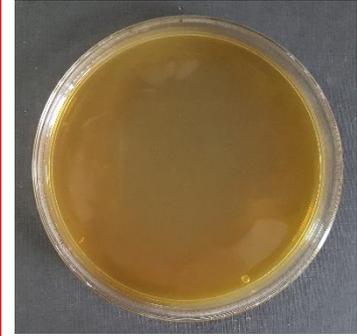
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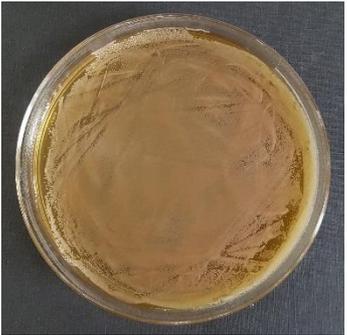
0.5%



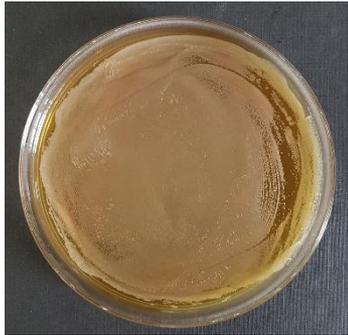
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M.Furfur

Tea tree oil



0%



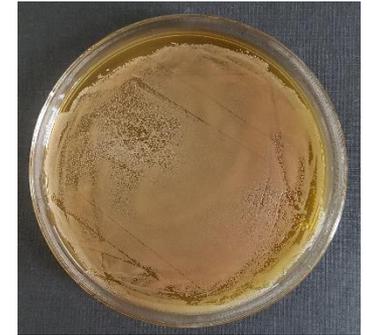
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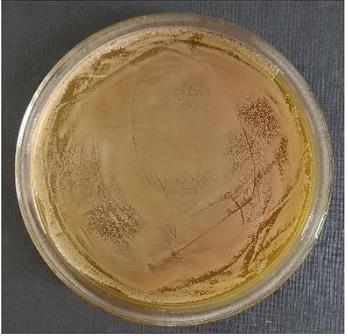
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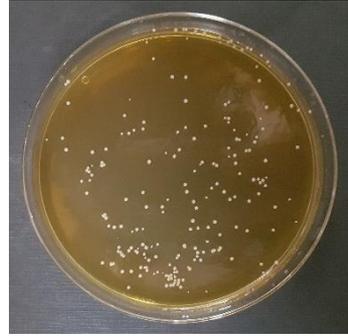
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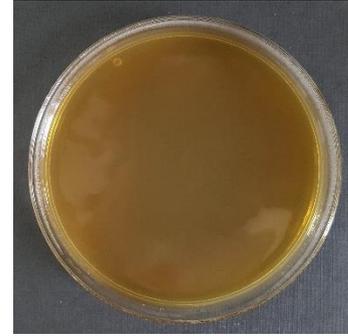
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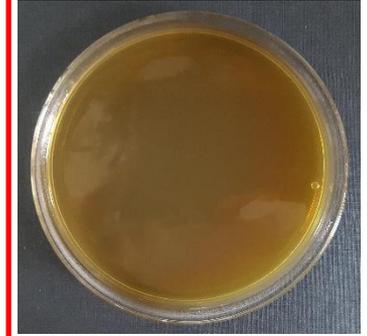
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0.25%



0.5%

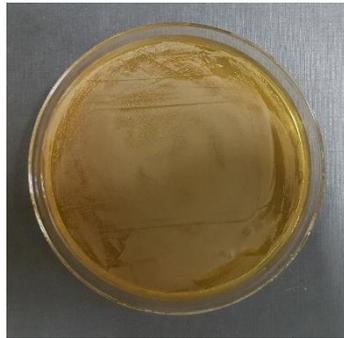


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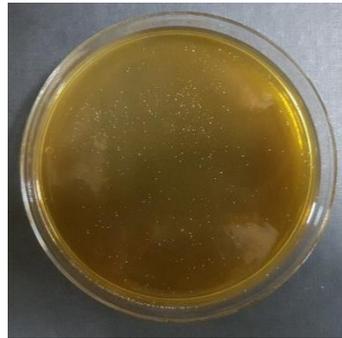
MBC

M.Sympodialis

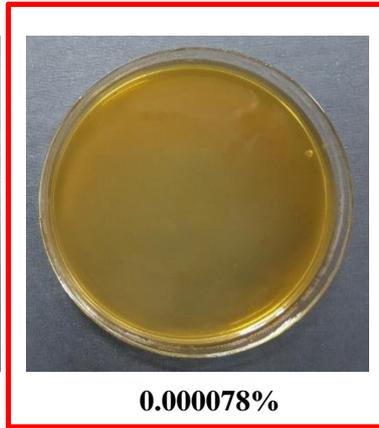
Zinc Pyrithione Suspension



0%



0.000039%



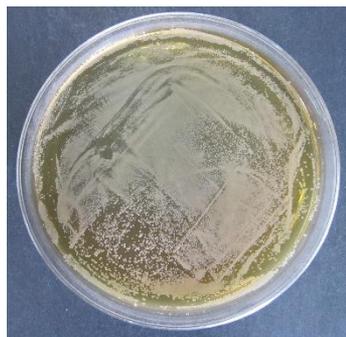
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M.Sympodialis

Lavender bulgarian oil



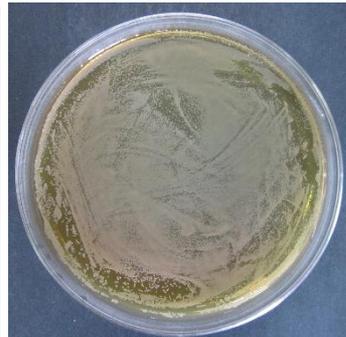
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0.0039%



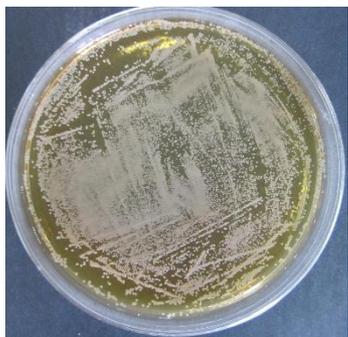
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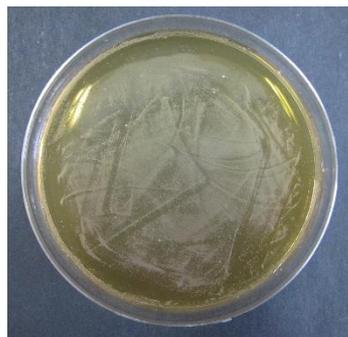
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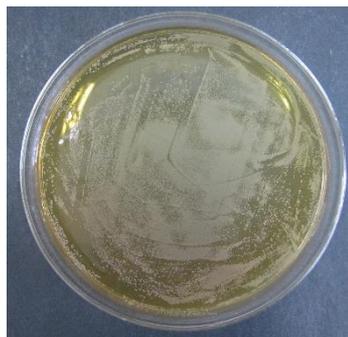
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M.Sympodialis

Tea tree oil



0%



0.0039%



0.0078%



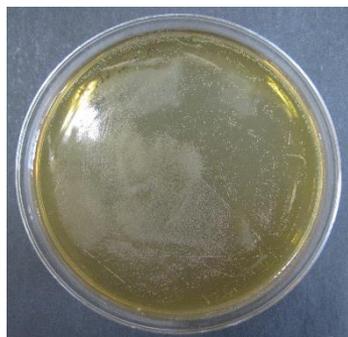
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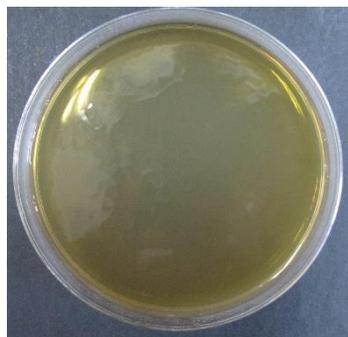
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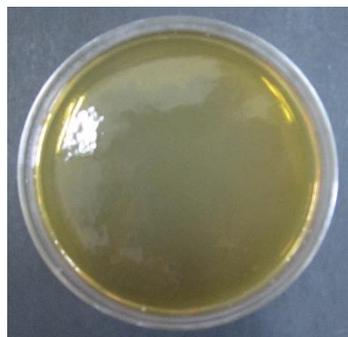
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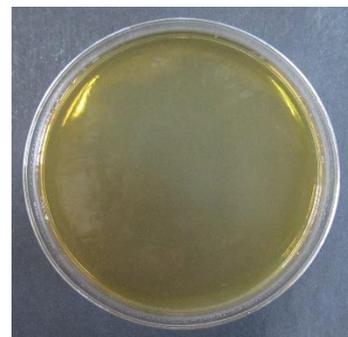
0.125%



0.25%



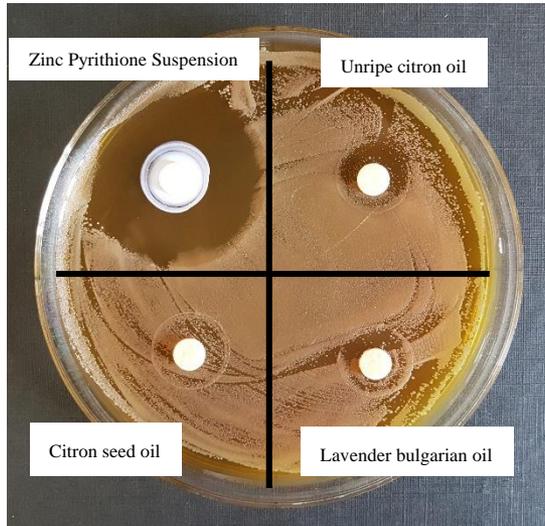
0.5%



1%

M.furfur

2.5%

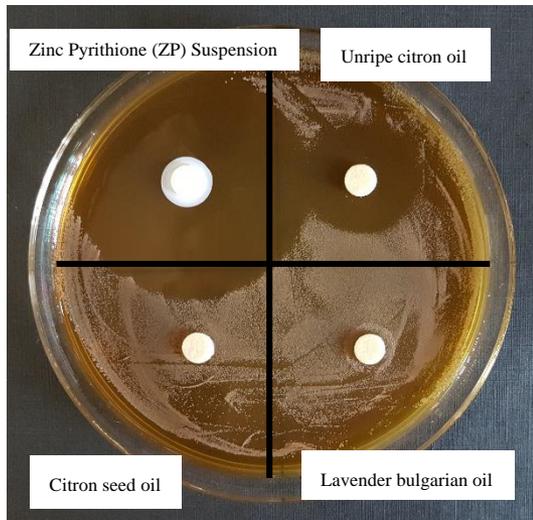


	<i>M.furfur</i>	<i>M.symphodialis</i>
Zinc Pyrithione Suspension	3.0	4.8
Unripe citron oil	1.7	2.9
Citron seed oil	-	-
Lavender bulgarian oil	-	1
Tea tree oil	-	-

M.Sympodialis

2.5%

그림 2. *M. Sympodialis* 균주에 대한 2.5% ZP 효과



오일 농도 (2.5%) / DISC (직경, cm)	<i>M.furfur</i>	<i>M.sympodialis</i>
Zinc Pyrithione Suspension	3.0	4.8
Unripe citron oil	1.2	2.2
Citron seed oil	-	-
Lavender bulgarian oil	1.1	-
Tea tree oil	-	-