

Potential of *Salvia discolor* extract against common agricultural pathogens

Poonam Devi,¹ Anna Paola Lanteri,² Andrea Minuto,² Valentina Parisi,³ Valeria Iobbi,¹ Nunziatina De Tommasi,^{#,3} and Angela Bisio^{#,1}

¹ Department of Pharmacy, University of Genova, Viale Cembrano 4, Genova, 16148, Italy

² CERSAA Centro di Sperimentazione e Assistenza Agricola, Regione Rollo 98, Albenga, 17031, Italy

³ Department of Pharmacy, University of Salerno, Via Giovanni Paolo II 132, Salerno, 84084, Italy, detommasi@unisa.it

*Correspondence Tina De Tommasi, Tel: +39 089 969754 E-mail: detommasi@unisa.it; #Correspondence Angela Bisio, Tel: +39 010 3352637 E-mail: angela.bisio@unige.it

Supplementary Materials

Figure S 1. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **1**

Figure S 2. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **2**

Figure S 3. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **3**

Figure S 4. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **4**

Figure S 5. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **5**

Figure S 6. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **6**

Figure S 7. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **7**

Figure S 8. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **8**

Figure S 9. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **9**

Figure S 10. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **10**

Figure S 11. Inhibition of growth of *Fusarium solani* mycelium 5 days after inoculation on poisoned media.

Figure S 12. Inhibition of growth of *Phaeoconiella chlamydospora* mycelium 5 days after inoculation on poisoned media.

Figure S 13. Inhibition of growth of *Pythium dissocotum* mycelium 4 days after inoculation on poisoned media.

Figure S 14. Inhibition of growth of *Botrytis cinerea* (strain 11) mycelium 5 days after inoculation on poisoned media.

Figure S 15. Effect of treatment dose on fungal growth inhibition across different species.

Salvia discolor Kunth F.W.H.von Humboldt

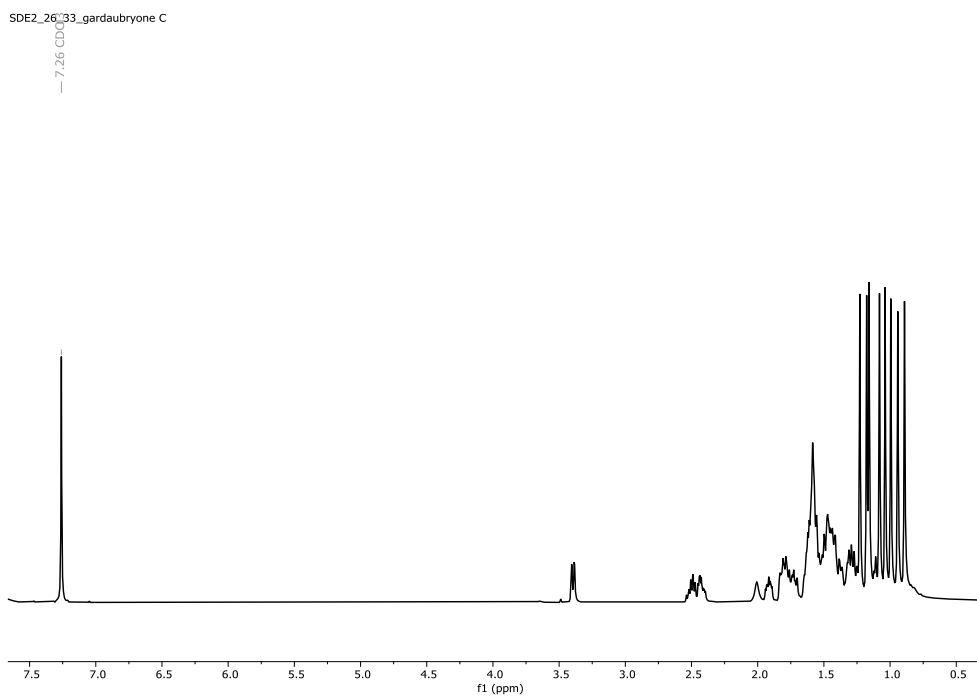


Figure S 1. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **1**

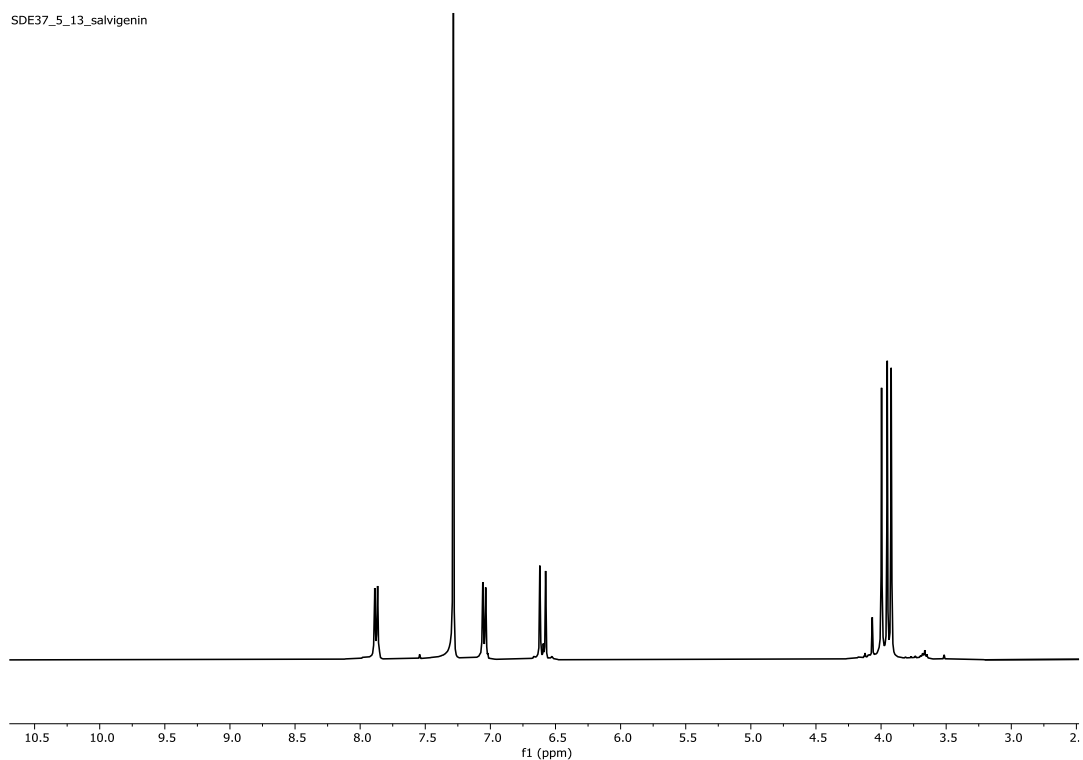


Figure S 2. ¹H NMR (600 MHz, CDCl₃) spectrum of compound **2**

SDE37_3_10_salvimitol

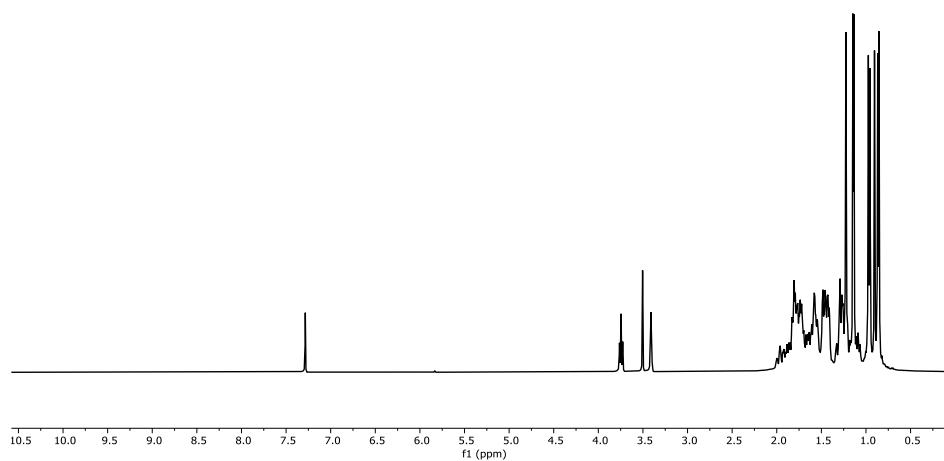


Figure S 3. ¹H NMR (600 MHz, CDCl₃) spectrum of compound 3

SDE27_6_8_eupatorin

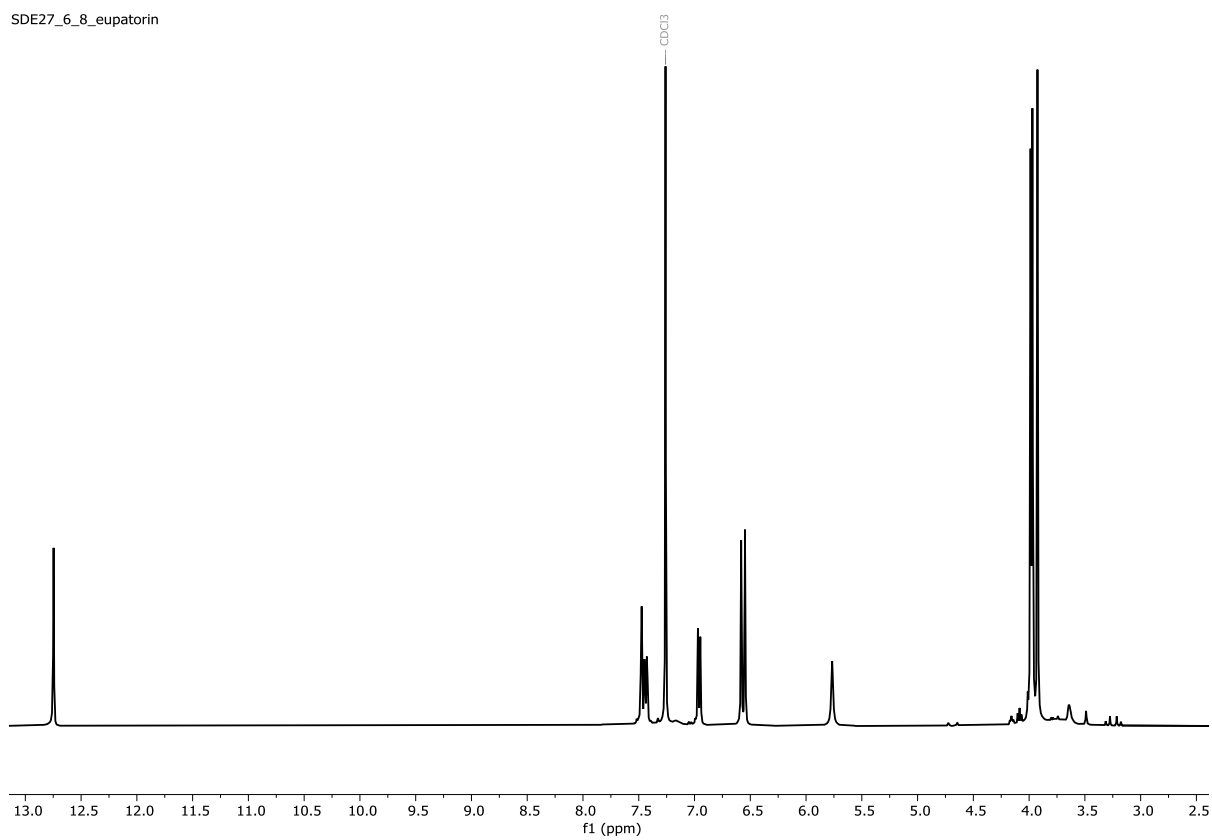


Figure S 4. ¹H NMR (600 MHz, CDCl₃) spectrum of compound 4

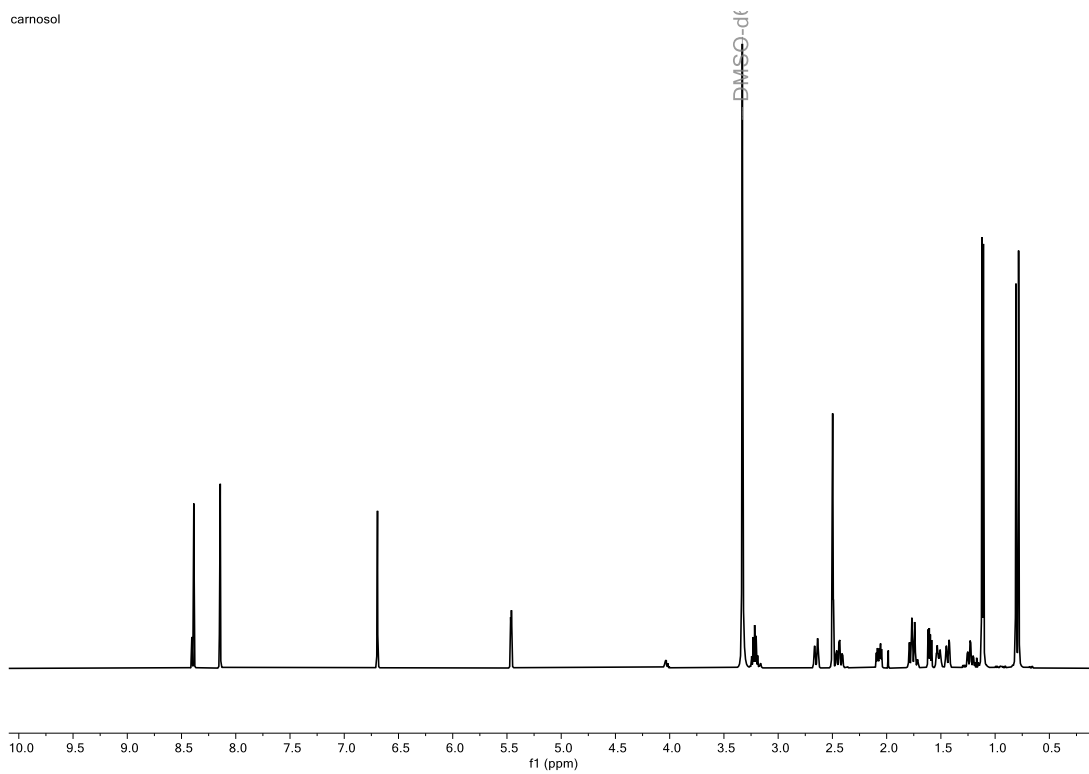


Figure S 5. ^1H NMR (600 MHz, CDCl_3) spectrum of compound 5

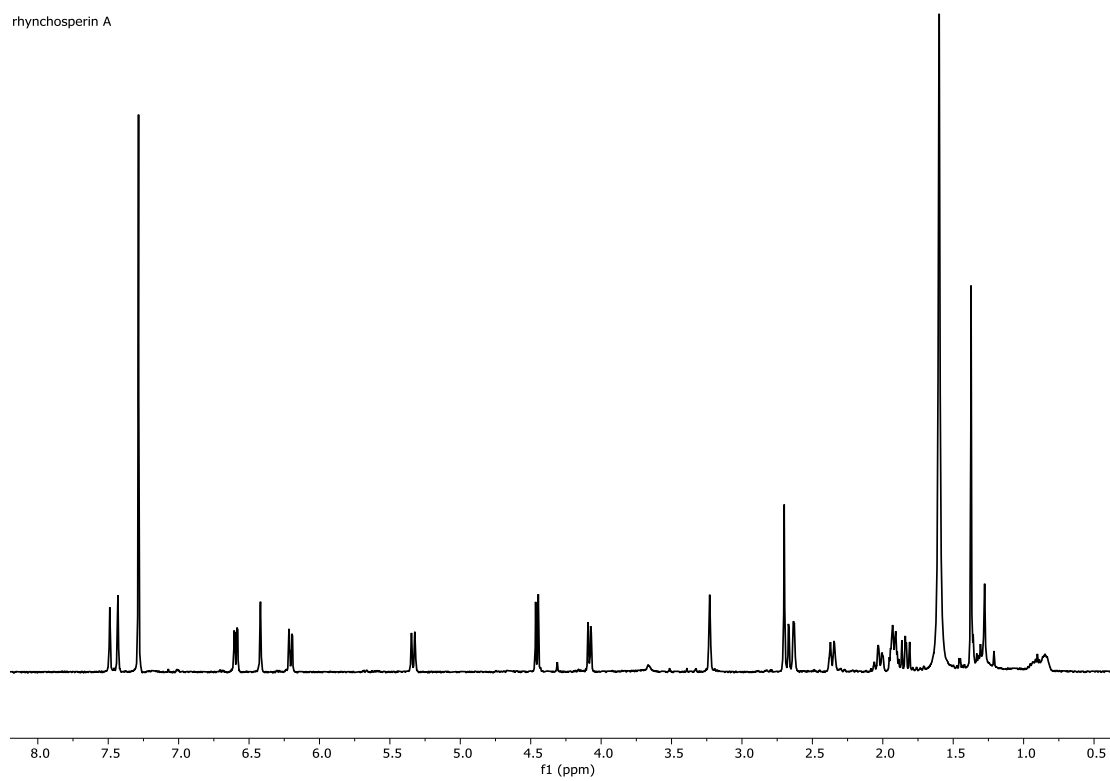


Figure S 6. ^1H NMR (600 MHz, CDCl_3) spectrum of compound 6

sde_27_6_14_2D_ermanin.1.fid

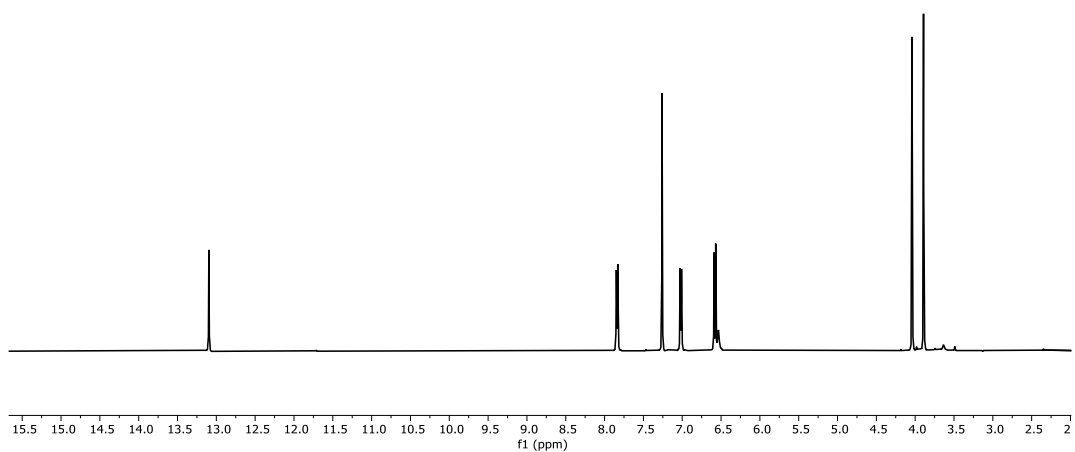


Figure S 7. ¹H NMR (600 MHz, CDCl₃) spectrum of compound 7

SDE19_16_9_kaempferide

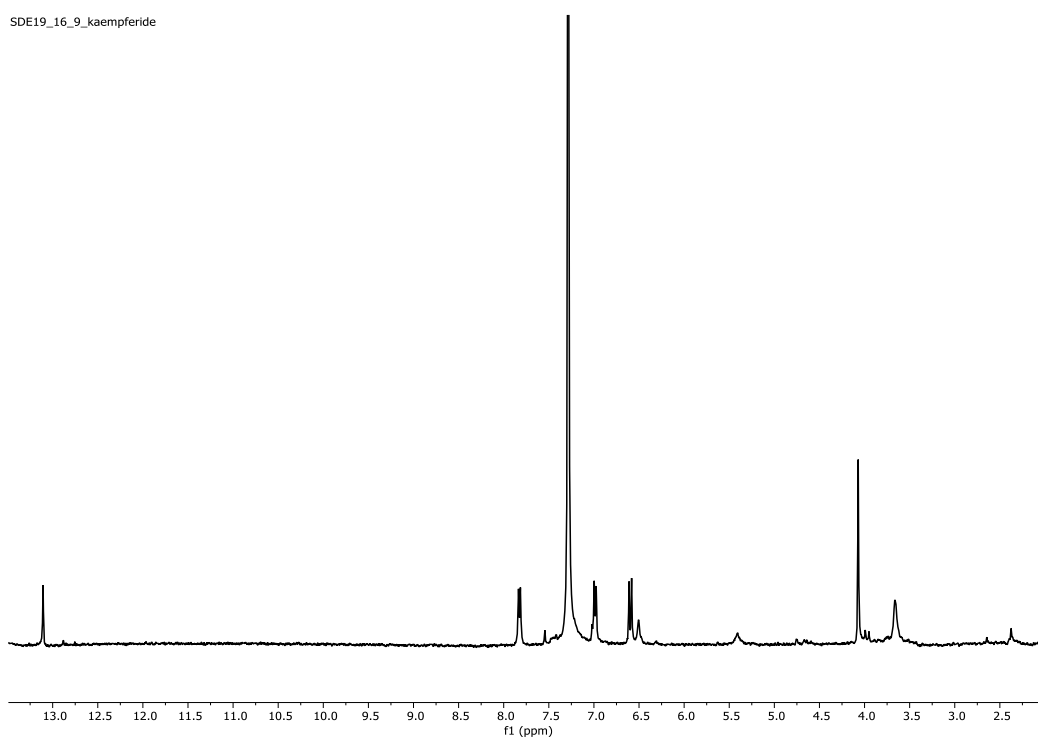


Figure S 8. ¹H NMR (600 MHz, CDCl₃) spectrum of compound 8

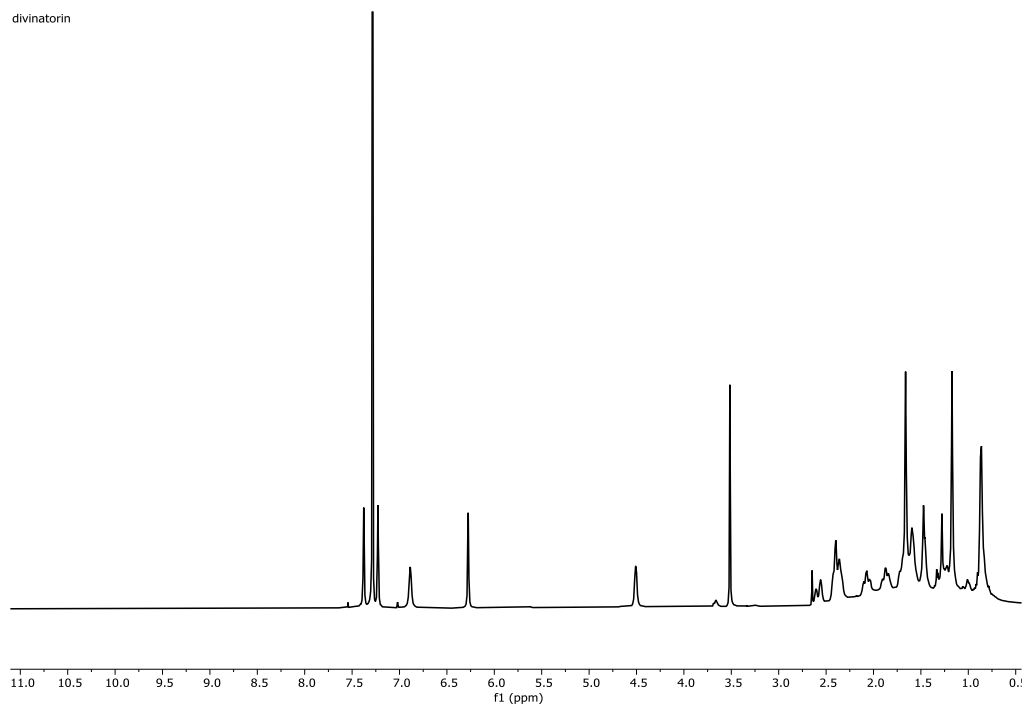


Figure S 9. ^1H NMR (600 MHz, CDCl_3) spectrum of compound **9**

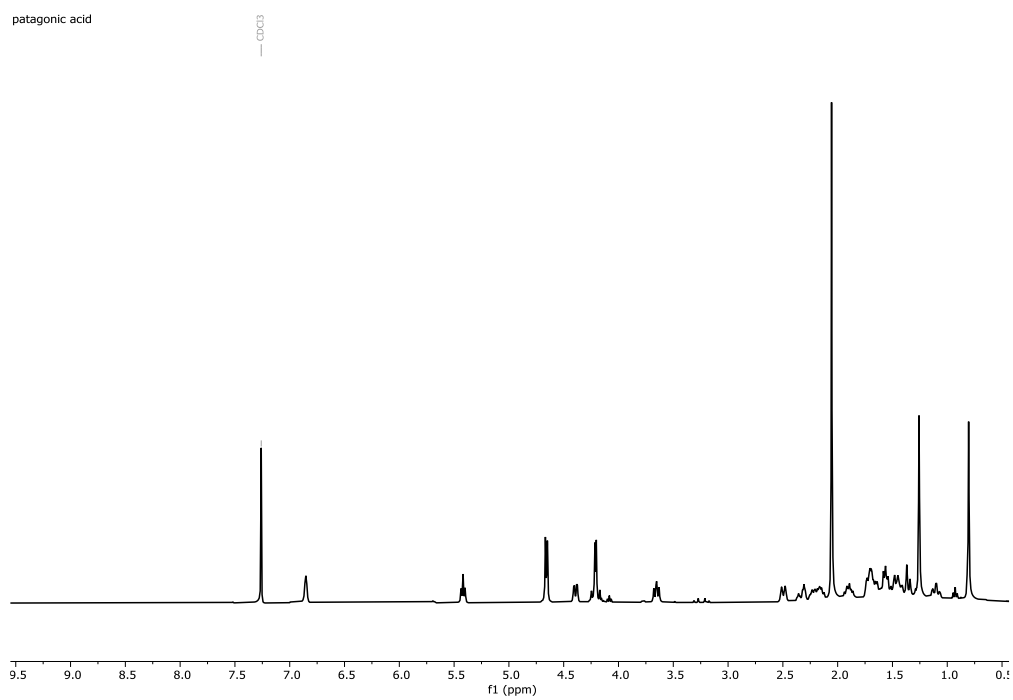


Figure S 10. ^1H NMR (600 MHz, CDCl_3) spectrum of compound **10**

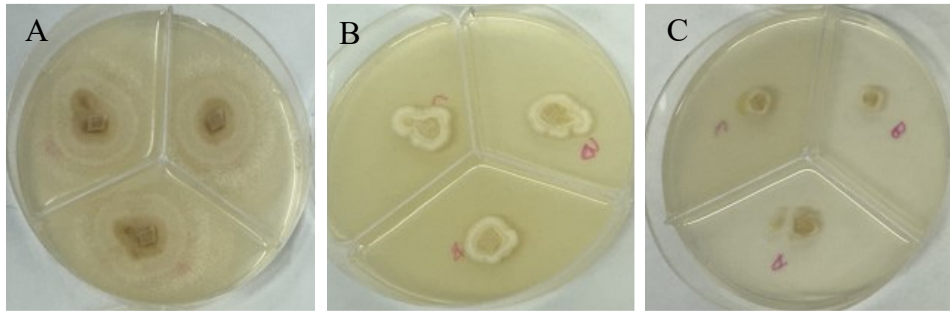


Figure S 11. Inhibition of growth of *Fusarium solani* mycelium 5 days after inoculation on poisoned media.

A. Control B. Crude extract at 1000 µg/mL C. Azoxystrobin at 250 µg/mL.

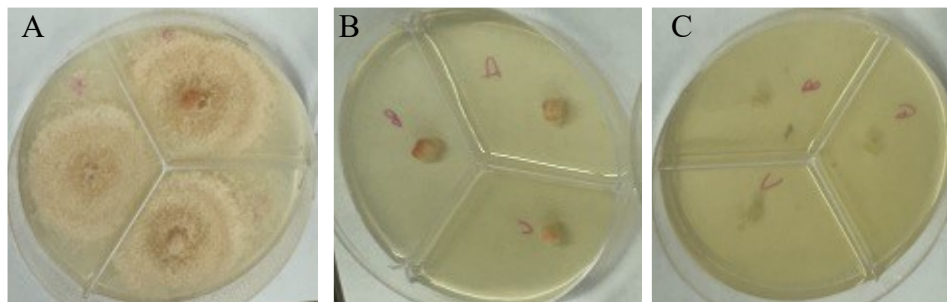


Figure S 12. Inhibition of growth of *Phaeoconiella chlamydospora* mycelium 5 days after inoculation on poisoned media.

A. Control B. Crude extract at 1000 µg/mL C. Difenoconazole at 250 µg/mL.

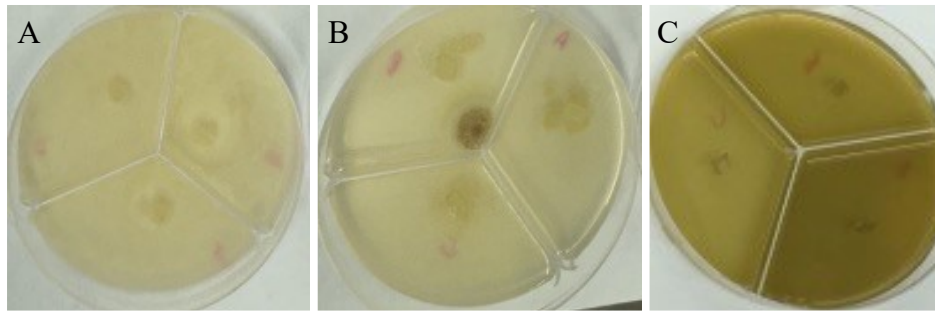


Figure S 13. Inhibition of growth of *Pythium dissocotum* mycelium 4 days after inoculation on poisoned media.

A. Control B. Crude extract at 1000 µg/mL C. Metalaxyl-m + copper 20+141.9 µg/mL.

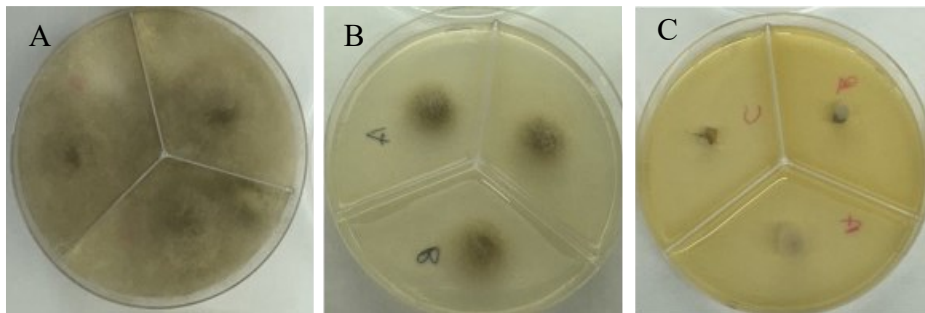


Figure S 14. Inhibition of growth of *Botrytis cinerea* (strain 11) mycelium 5 days after inoculation on poisoned media.

A. Control B. Crude extract at 1000 µg/mL C. Cyprodinil + Fludioxonil at 375 + 250 µg/mL.

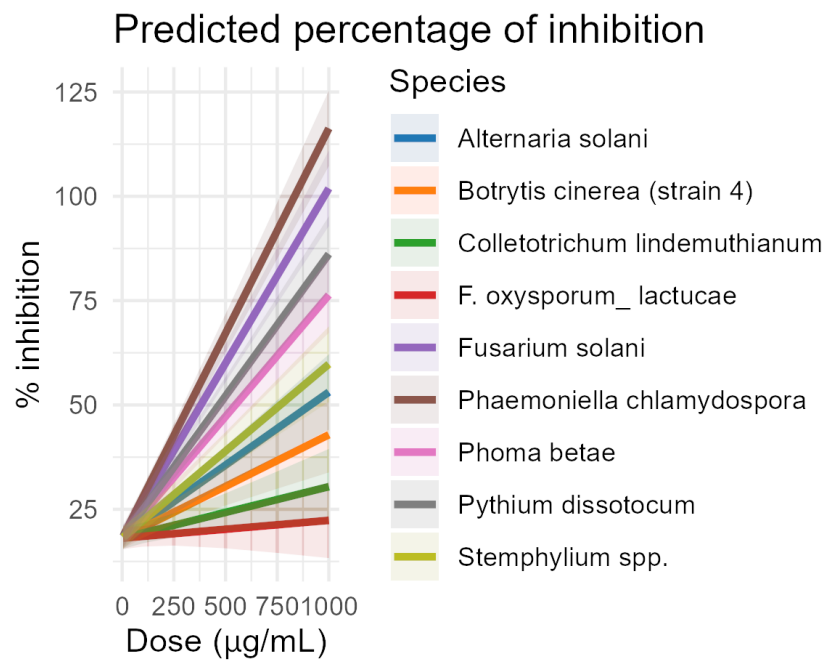


Figure S 15. Effect of treatment dose on fungal growth inhibition across different species.

The figure shows the fitted dose–response relationships for each fungal species, modeled using the selected generalized linear model (GLM). The model presented is the one with the highest R^2 value and statistical significance. Colors distinguish the fungal species, enabling visual comparison of their response patterns. Shaded areas around the fitted lines represent 95% confidence intervals, indicating the uncertainty associated with the model estimates.

***Salvia discolor* Kunth** F.W.H.von Humboldt

(Jenks *et al.* 2013, Martínez-Gordillo *et al.* 2019, POWO 2025)

In: A.J.A.Bonpland & C.S.Kunth, Nov. Gen. Sp. 2: 294 (1818)

Heterotypic Synonyms:

Salvia bonplandiana F. Dietr.

In Nachtr. Vollst. Lex. Gärtn. 7: 403 (1821),

Salvia mexicana Hemsl.

In Gard. Chron., n.s., 19: 341 (1883),

Salvia nigricans Hemsl

(In Gard. Chron., n.s., 19: 341 (1883).

Distribution: Peru

Climate and location: *S. discolor* flourishes when exposed to full sunlight for at least half the day, although it can also handle partial shade. This plant is particularly well-suited to warmer climates.

Soil and irrigation: This plant prefers well-drained soils as it is sensitive to waterlogged conditions. Ensuring proper drainage is crucial to prevent root rot and promote healthy growth. Consistent moisture improves the plant's overall condition and flowering.

Pruning: The plant has leafless stems that extend up to 90 cm before arching. Cutting back does not encourage bushier growth.

Fertilization: Requires moderate fertilization with a balanced fertilizer (N: P₂O₅=1:1). Alternatively, organic fertilizers can be applied every two months during active growth.

Propagation: Propagation is best achieved through semi-hardwood cuttings, which typically root well and establish quickly.

References

- Jenks A A, Walker J B, Kim S-C. 2013. Phylogeny of New World *Salvia* subgenus Calosphace (Lamiaceae) based on cpDNA (psbA-trnH) and nrDNA (ITS) sequence data. *Journal of Plant Research*, **126**, 483-496. doi,10.1007/s10265-012-0543-1.
- Martínez-Gordillo M, E. Martínez-Ambroz E, García-Peña M R, Cantú-Morón E A, Fragoso-Martínez I. 2019. *Lamiaceae Martinov*. Universidad Nacional Autónoma de México, México. 119.
- POWO. 2025. Plants of the World Online. [2025 January 24]. <https://powo.science.kew.org>