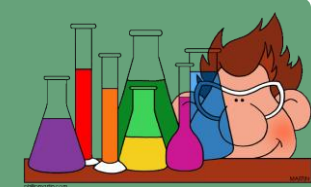


# Investigating the effect compounds with similar flexophore structure have on the growth of mycetoma causing fungi

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## Introduction

Mycetoma is an infectious disease of the skin and subcutaneous tissue typically present in tropical areas with both bacterial and fungal variants of the disease extance. While the bacterial form is easily treatable with antibacterial medication, the fungal variant presents more of a challenge.

Current best course treatments such as surgery, antifungals and amputation are used to varying degrees of efficacy.

Mycetoma is currently highly neglected around the world due to a lack of commercial enticement. With disabling yet easily preventable consequences, Mycetoma is also being titled a disease for the poor. The OpenMycetoma group was formed to help combat the disease. The group provides an open-source collaborative method to discover efficacious drugs and begin developing potential treatments for the fungal form of the disease.

## Research Question

The purpose of this project is to use DataWarrior to identify compounds of similar structure based on the flexophore similarity descriptor. Furthermore, we investigate how they inhibit the growth of mycetoma fungi based on standard growth in nM.



## Methods

- ❑ DataWarrior is an open-source software designed to help visualise and analyse the relationships between chemical structures and biological data.
- ❑ DataWarrior was used in this project to calculate flexophore similarity and compare related structures.
- ❑ A structure activity landscape index(SALI) plot was also generated to provide a graphical comparison between structure similarity and biological activity of the compounds.
- ❑ It was noted that structures that contained an acidic oxygen (pKa < 7) had interesting properties which were investigated and also graphically represented.



## Results

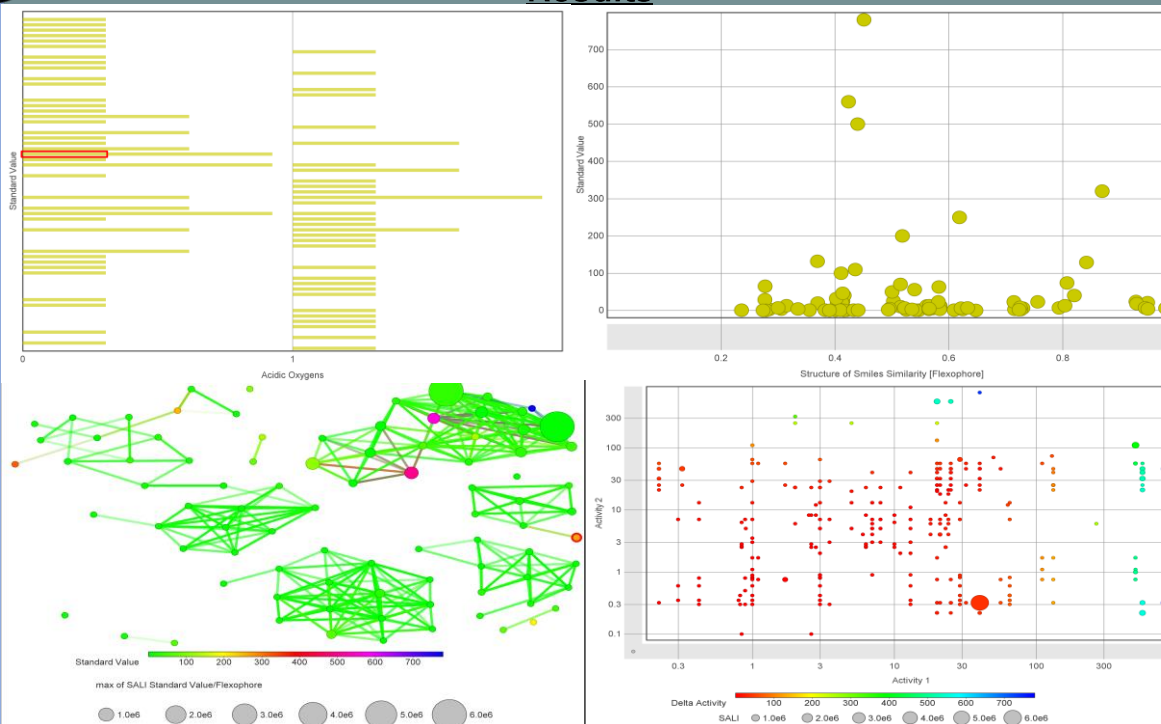


Figure 1: Plots representing the relationship between structural and biological activity of a variety of compounds using DataWarrior

## Discussion

Upon completion of the SALI plot, it became evident that perhaps structures with an acidic oxygen component had high levels of inhibition of the mycetoma fungi. These compounds were isolated for further investigation. As evident in box plot in the results, compared to compounds without acidic oxygen, those who contained the fragment inhibited growth to less than 20 nM more so than their counterparts. It would therefore appear that compounds which contain acidic oxygens and are deemed to be structurally similar based on their flexophore similarity should be investigated further as they appear to inhibit fungal growth quite well. This is further made clear in the SALI plot wherein lots of the green linkages exhibited acidic oxygens.

## Future Work

- ❑ Compounds with acidic oxygen groups should be investigated.
- ❑ Compounds with carboxylic acid groups should also be further investigated due to similar flexophore similarity to acidic oxygens and their ability to also inhibit growth based.

## Acknowledgements & References

- ❑ Weksh, O., Vera-Cabrera, L., & Salinas-Carmona, M. C. (2007). Mycetoma. *Clinics in Dermatology*, 25(2), 195-202.
- ❑ We would also like to thank the students and researchers at the university of Sydney for performing the research and their collection of the data used in his poster. This has proved invaluable.