

## Background

Drug-resistant pathogens are a global threat, Ghana reported 4.95 million related deaths in 2019, 20% in children under five. Anti-virulence strategies targeting quorum sensing and efflux pumps offer a promising strategy. *Salacia debilis*, a Ghanaian medicinal plant shows antimalarial activity, but its antimicrobial and anti-virulence potential remains unexplored despite isolated bioactive compounds.

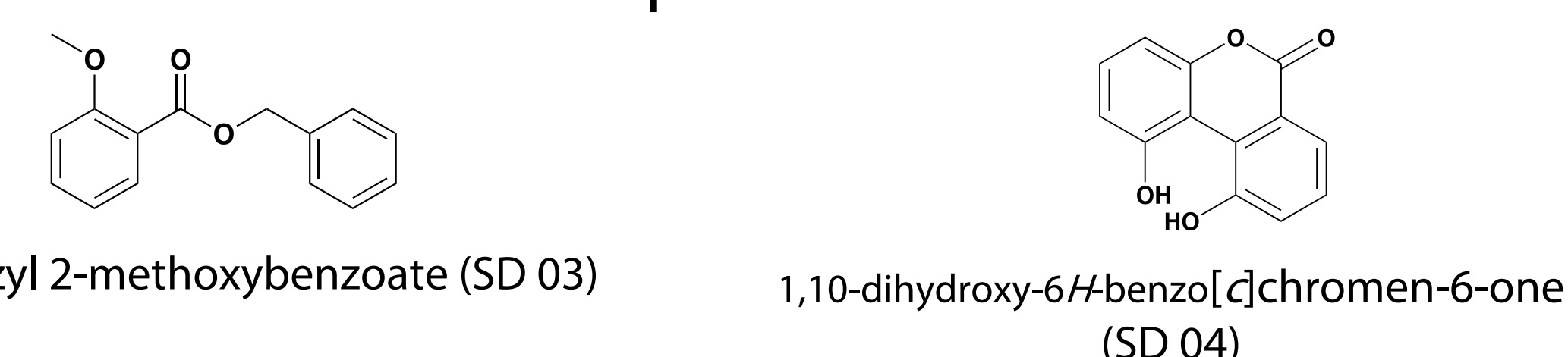
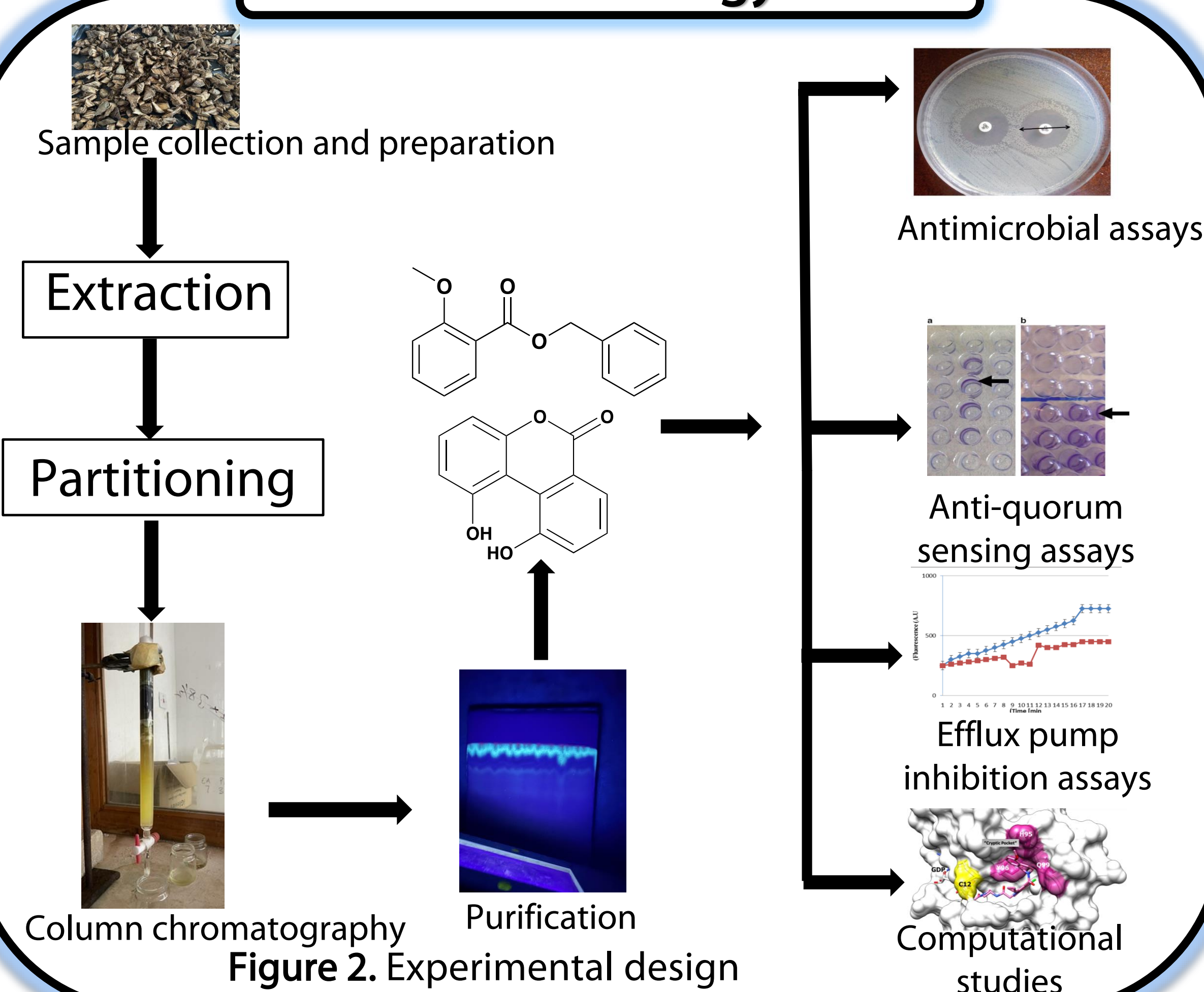


Figure 1. Compounds isolated from *S. debilis*

## Methodology



## Aims and objectives

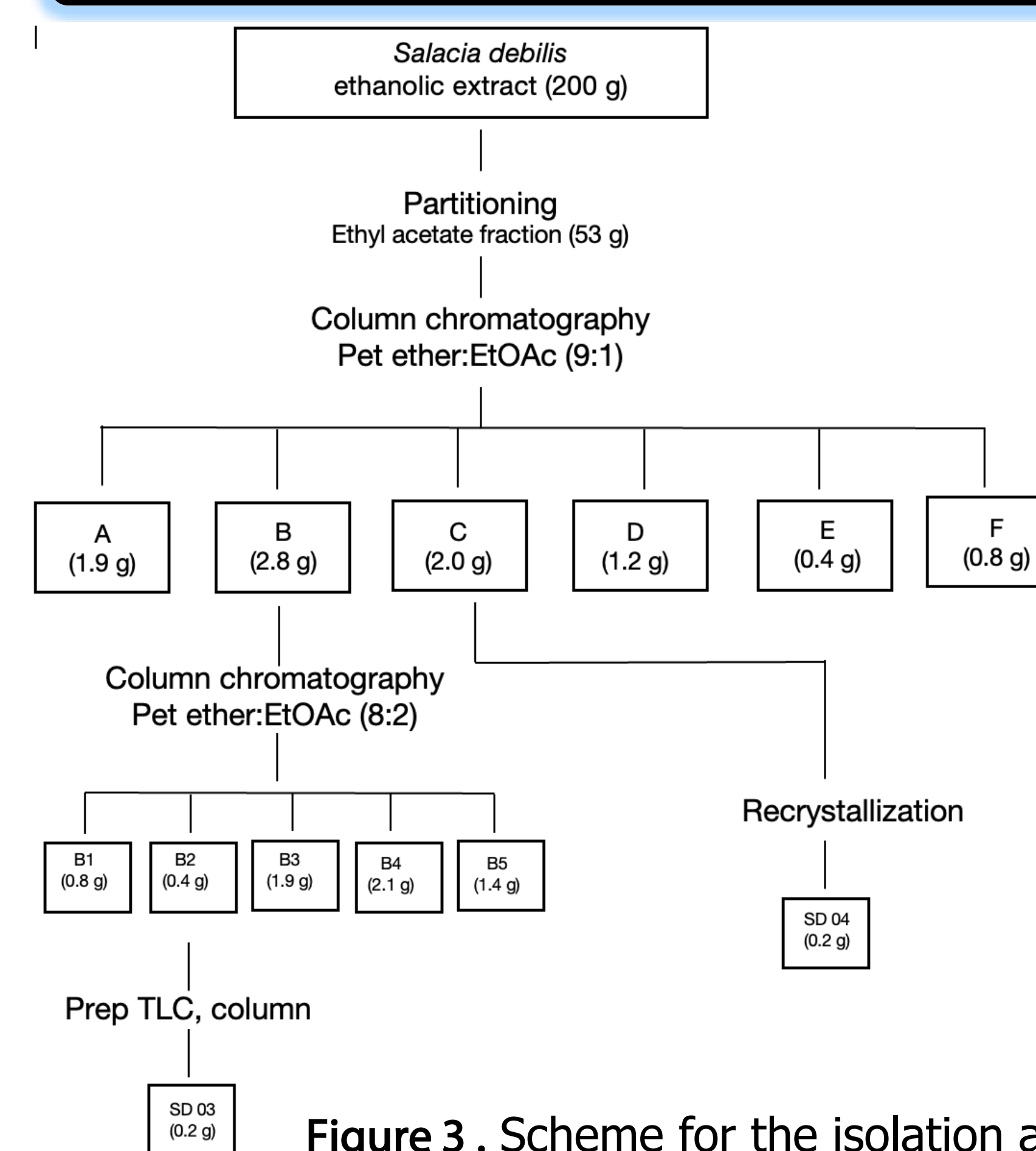
### Aim

- To assess the quorum sensing and efflux pump inhibitory activity of compounds from *Salacia debilis*

### Objectives

- To isolate SD 03 and SD 04 from *Salacia debilis*
- To determine the quorum sensing and efflux pump inhibitory activity of isolated compounds
- To establish a potential mechanism of action by studying molecular interactions of isolated compounds with *P. aeruginosa* and *S. aureus* quorum sensing and efflux pump associated proteins

## Isolation scheme



## Results

### 1. Antimicrobial activity

Table 1: Minimum Inhibitory Concentrations (MICs) of standard antibiotic, crude extract, fraction, and isolates

| Microorganisms           | Crude extract (mg/ml) | Ethyl acetate fraction (mg/ml) | SD 03 (µg/ml) | SD 04 (µg/ml) | Ciprofloxacin (µg/ml) |
|--------------------------|-----------------------|--------------------------------|---------------|---------------|-----------------------|
| <i>P. aeruginosa</i> (-) | 12.500                | 6.250                          | >100          | >100          | 0.625                 |
| <i>S. aureus</i> (+)     | 25.000                | 12.500                         | >100          | >100          | 1.250                 |

(-) = Gram-negative, (+) = Gram-positive

### 2. Molecular docking

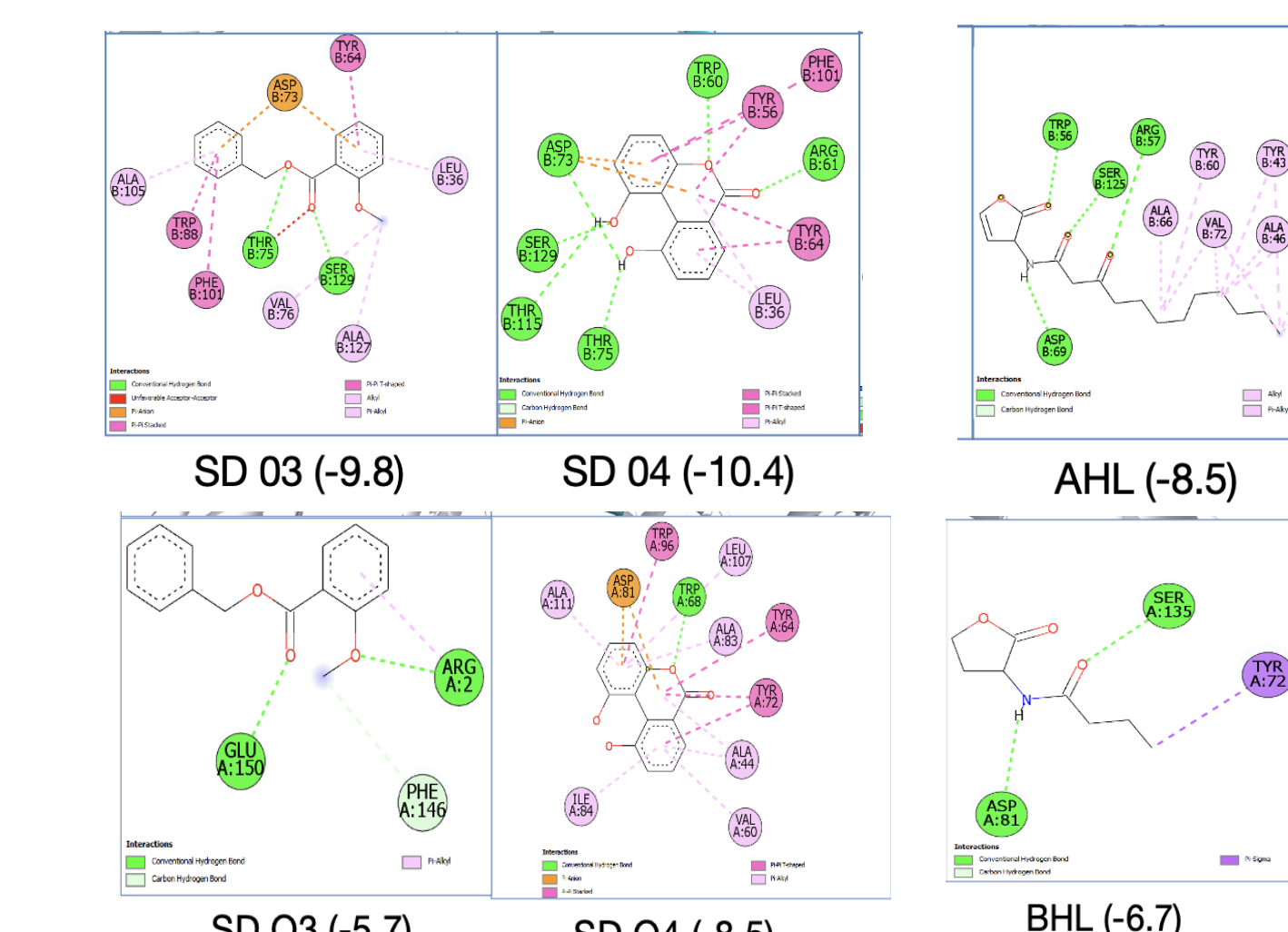


Figure 4. Docking of SD 03 and SD 04 against LasR and RhlR

### 3. Antibiofilm activity

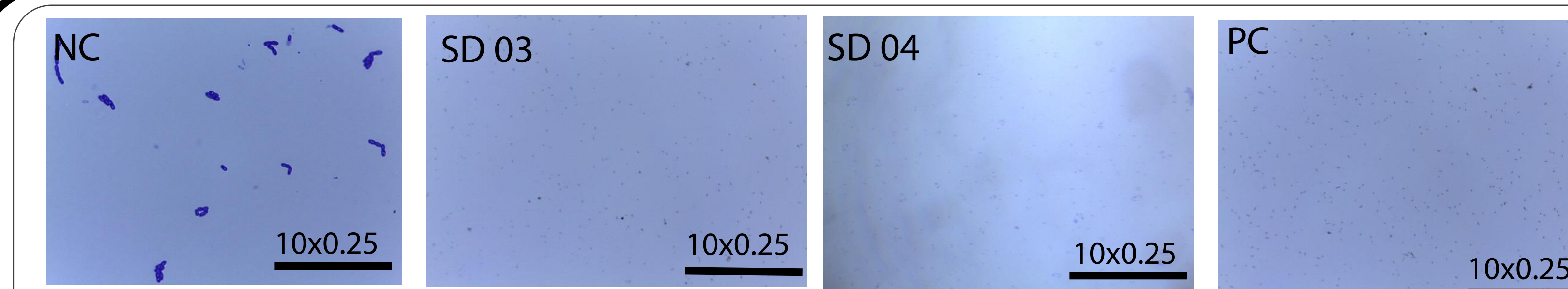


Figure 5. Eradication of preformed biofilm of *P. aeruginosa* on glass slide

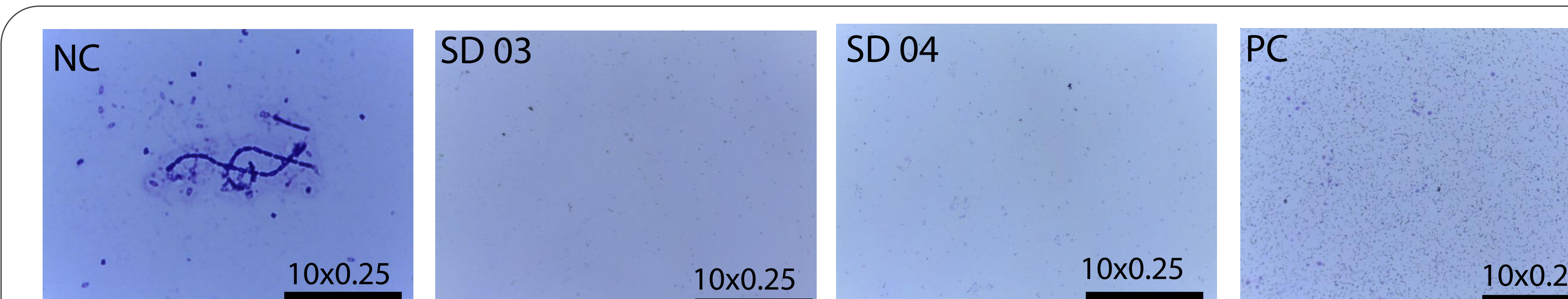


Figure 6. Eradication of preformed biofilm of *S. aureus* on glass slide

## Conclusion

These findings suggest that *S. debilis* derived compounds have antivirulence potential by targeting bacterial communication and drug resistance mechanisms.

## References

- Laryea, M. K., Boadu Ampomah, G., Ekuadzi, E., Dickson, R. A. & Borquaye, L. S. Antimalarial compounds from the climbing stems of *Salacia debilis*. *Nat. Prod. Res.* **0**, 1–10 (2023). Gasu, E. N., Ahor, H. S., & Borquaye, L. S. (2018).
- Brackman, G., Cos, P., Maes, L., Nelis, H. J. & Coenye, T. Quorum sensing inhibitors increase the susceptibility of bacterial biofilms to antibiotics in vitro and in vivo. *Antimicrobial Agents Chemother* **55**, 2655–2661 (2011)