

Development of Chinese Medicinal Ointment for Eczema

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Background

Eczema is a chronic cutaneous inflammatory disease that affects more than 7.5% of adults in China (Guo et al., 2019). Its symptoms are red, itchy, and skin patches. Generally, **Western medicine** uses topical corticosteroids and glucocorticoids. However, these have side effects and drug resistance (Law et al., 2024). **Chinese medicine**, "***Tripterygium wilfordii* (TW)**" consists of an active compound "**celastrol**" that is natural and less toxic, which possesses anti-inflammatory and antibacterial properties (Chen et al., 2018). Consequently, this research project aims to develop the TW ointment sought to alleviate eczema symptoms.

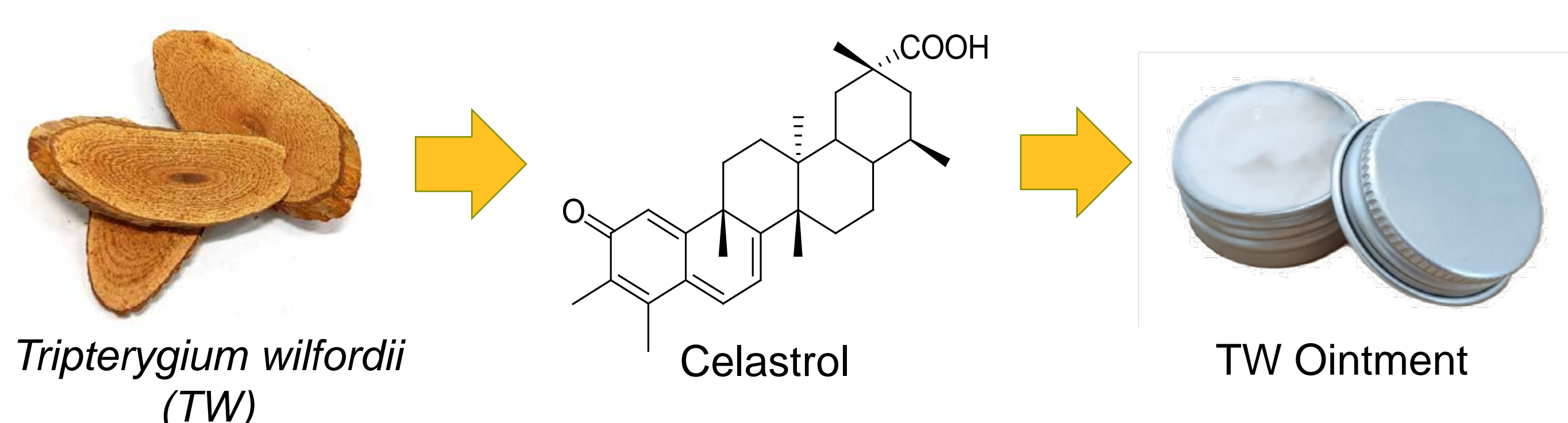


Fig 1. Overview of the study.

Research Objectives

1. To develop and make ointments with *Tripterygium wilfordii* (TW);
2. To determine the active ingredient, "celastrol" from making TW ointment; and
3. To evaluate the antibacterial properties of TW ointment.

Methodology

Quantitative analysis to ensure was used to ensure the "suitability" and "stability" of *Tripterygium wilfordii* ointment for eczema.

- Ø **Physical experiment:** odor, appearance, and natural components for cream selection;
- Ø **Chemical experiment:** Ultraviolet-Visible Spectroscopy (UV-Vis) and High-Performance Liquid Chromatography with Diode-Array Detection (HPLC-DAD) were used for the determination of an active ingredient, "celastrol" in the TW ointments; and
- Ø **Biological experiment:** agar plate assay with *Escherichia coli* (*E.coli*) was employed to evaluate the effectiveness of antibacterial properties in TW ointment.

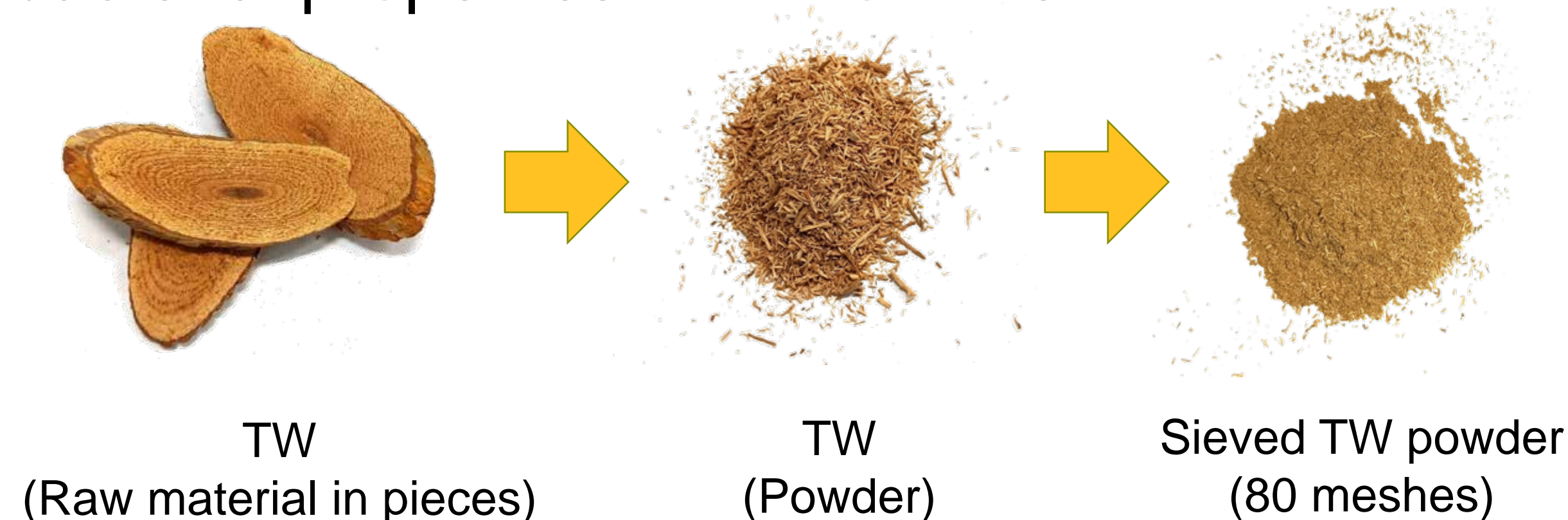


Fig 2. Preparation of TW powder in 80 meshes.

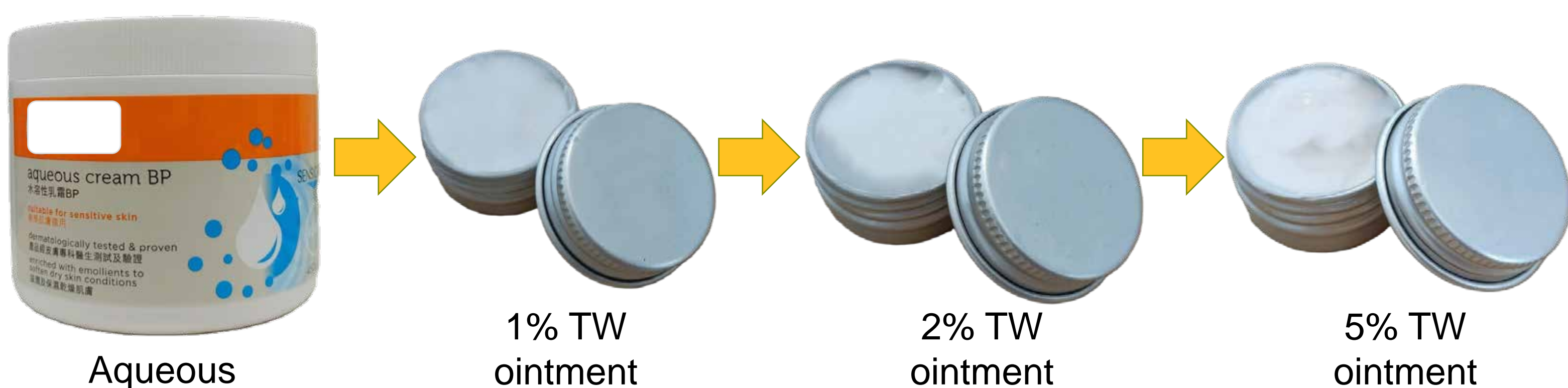


Fig 3. Preparation of 1%, 2%, and 5% TW ointments.

Findings

Aqueous Cream BP was chosen since it has no odor with natural compounds (Fig. 3); **UV-Vis spectroscopy and HPLC-DAD** results indicated the TW ointment had an active ingredient, "celastrol" (Fig. 4 & 5); and an **agar plate assay** demonstrated the 1%, 2%, and 5% TW ointments had antibacterial properties (Table 1 & Fig. 6).

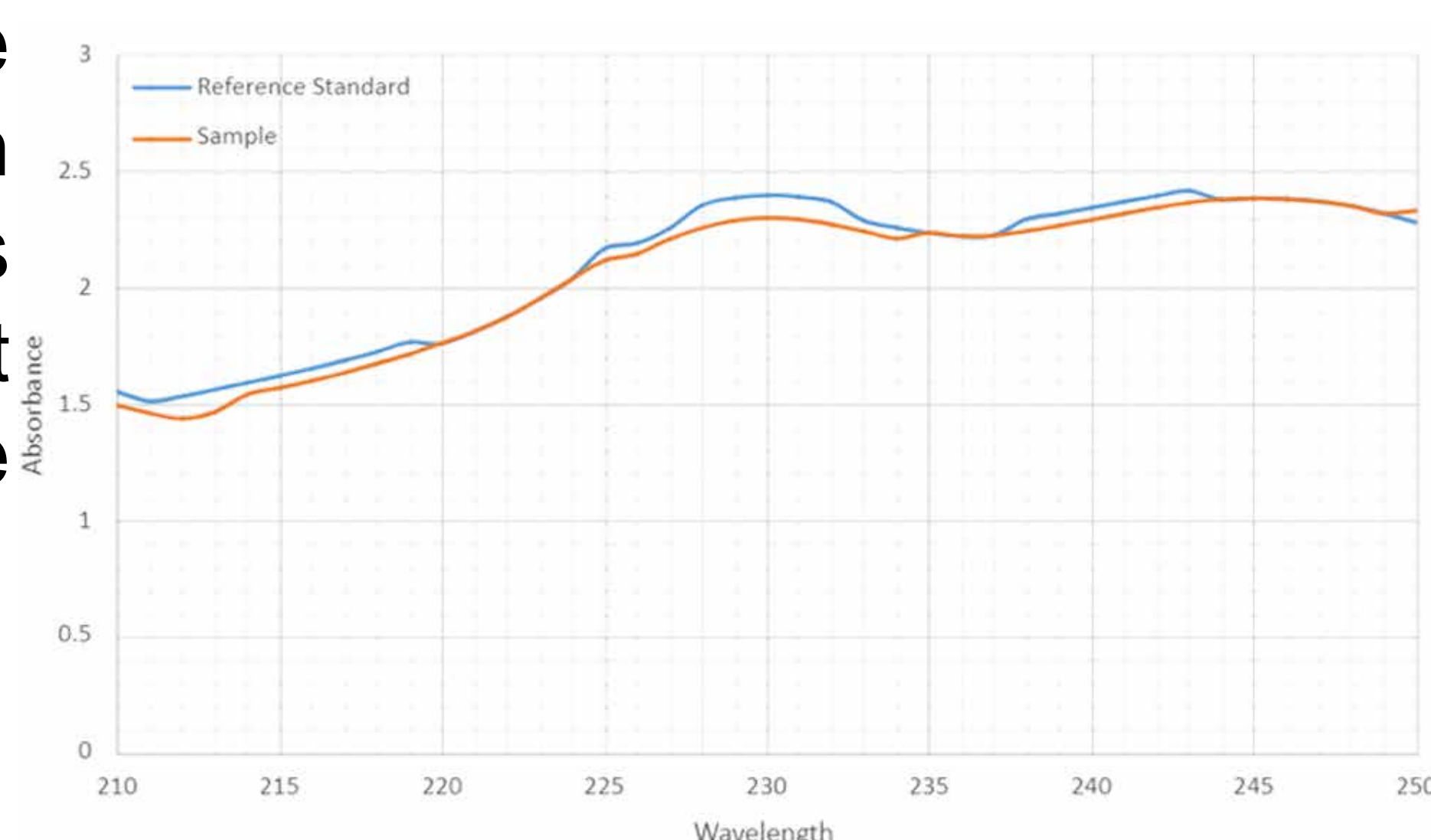


Fig 4. UV-Vis Spectrum of the reference standard (Celastrol) and sample.

Types of Samples	Number of Colony Forming Units (CFU)			Mean of Colony Forming Units (CFU) and Standard Deviation
	Replicate 1	Replicate 2	Replicate 3	
<i>E.coli</i> (Control)	210	207	220	212.33 ± 6.29
<i>E.coli</i> + MeOH (Control)	78	88	103	89.67 ± 11.63
<i>E.coli</i> + 1% TW in MeOH (Control)	86	71	95	84.00 ± 11.20
<i>E.coli</i> + 2% TW in MeOH (Control)	67	52	83	67.33 ± 14.32
<i>E.coli</i> + 5% TW in MeOH (Control)	60	32	49	47.00 ± 13.03
<i>E.coli</i> + Blank ointment (Control)	TNTC	TNTC	TNTC	TNTC
<i>E.coli</i> + 1% TW ointment	94	109	125	109.33 ± 14.32
<i>E.coli</i> + 2% TW ointment	87	96	74	85.67 ± 10.22
<i>E.coli</i> + 5% TW ointment	36	46	50	44.00 ± 6.66

Table 1. Agar plate assay for the 1%, 2%, and 5% TW ointments on antibacterial activity.

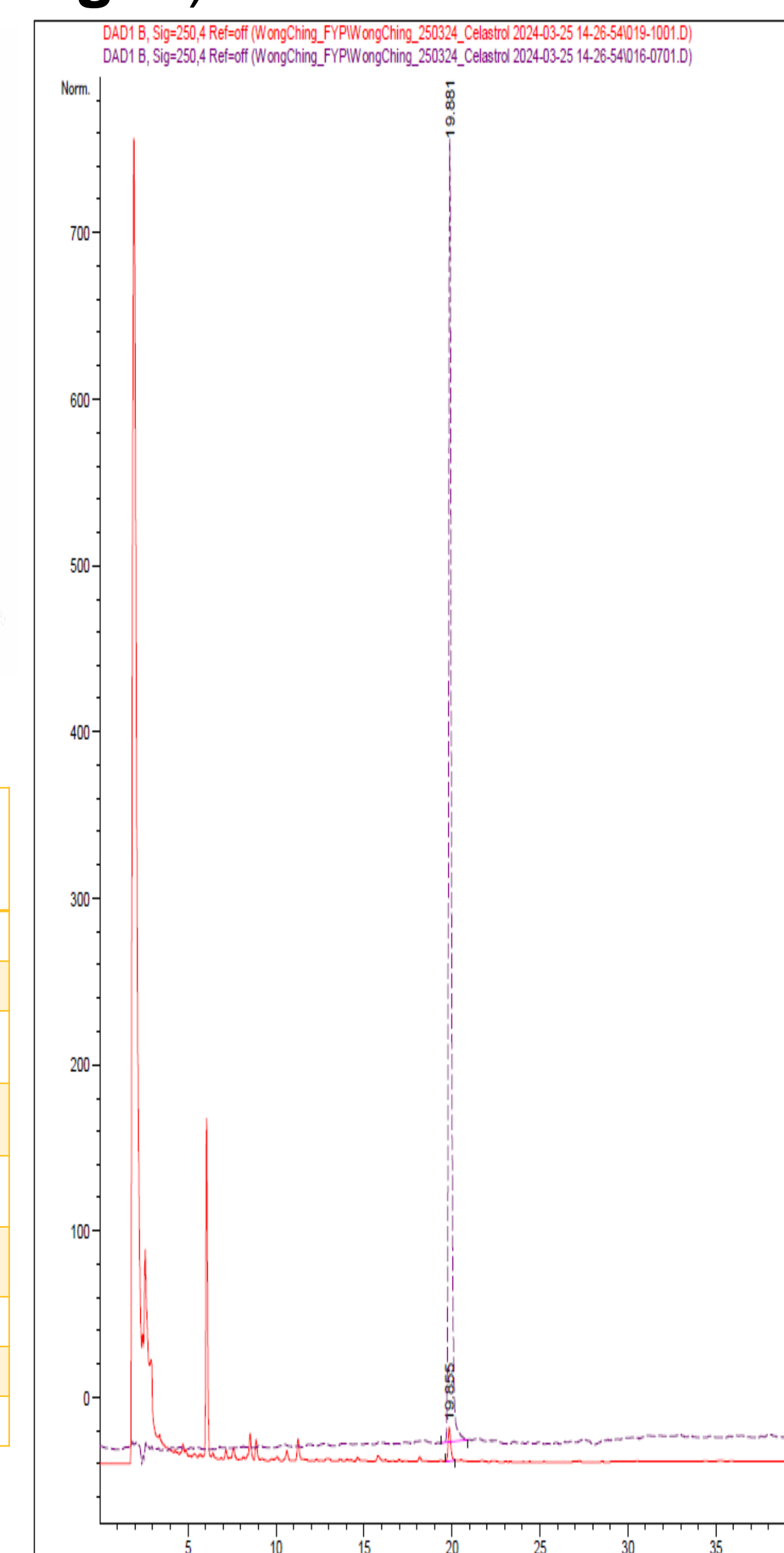


Fig 5. HPLC-DAD chromatograms of the reference standard (Celastrol) and sample.

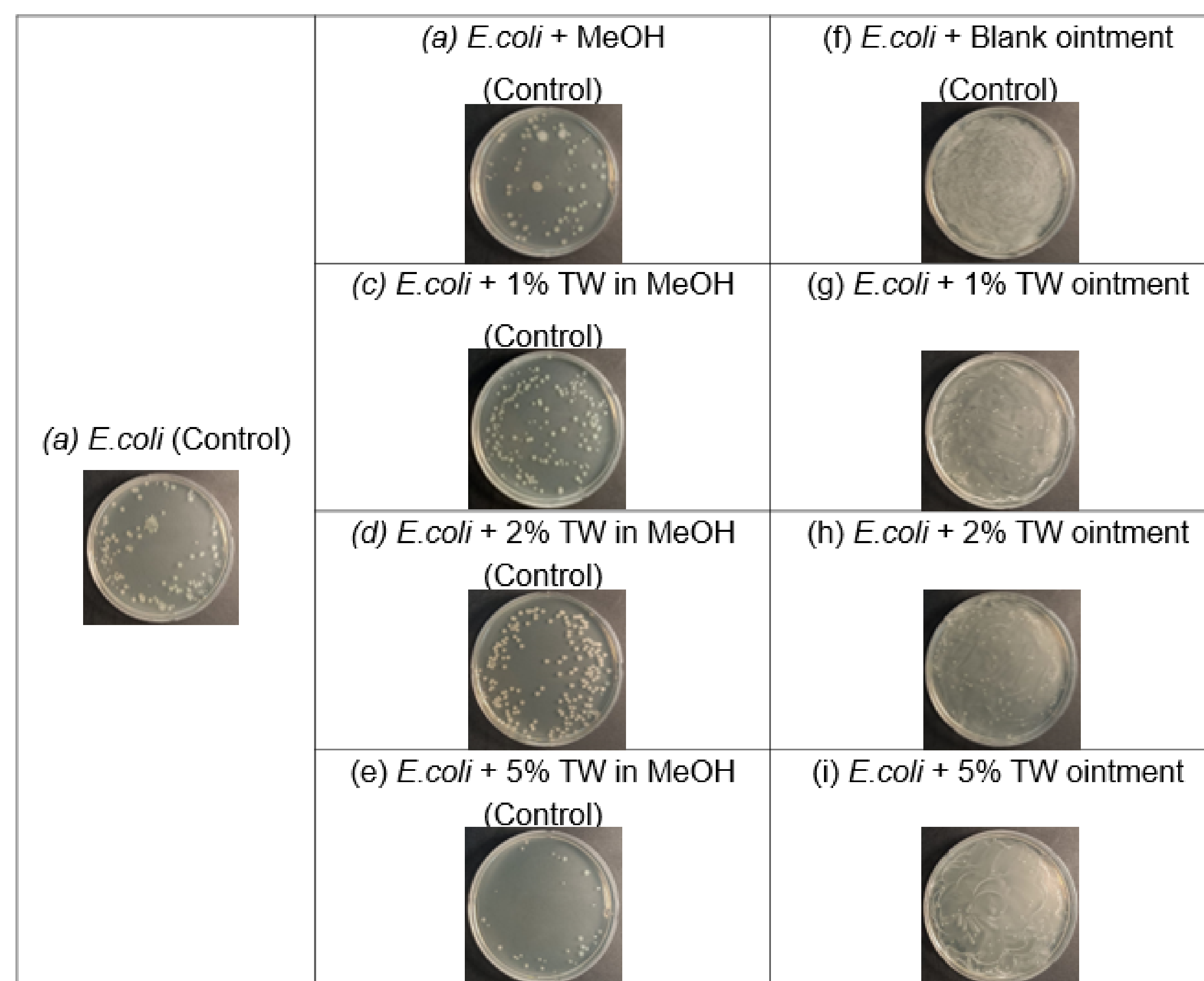


Fig 6. Agar plate assay for the 1%, 2%, and 5% TW ointments on antibacterial activity.

Conclusion

A Chinese Medicinal Ointment was developed successfully using an **Aqueous Cream BP** and the Chinese medicinal plant "***Tripterygium wilfordii* (TW)**". An active ingredient "**celastrol**", was determined by using **UV-Vis** and **HPLC-DAD** analysis. The 1%, 2%, and 5% TW ointments were evaluated for its effectiveness for **antibacterial properties**. However, further investigation of the biological mechanisms of TW ointments against eczema is needed.

- References**
 Guo, S. H., Li, P. (2019). Research progress of eczema in the external treatment. *Journal of Liaoning University of Traditional Chinese Medicine*, 21(4), 180-183.
 Law, S. K., Wu, X. X., Jiang, Z., Tong, C. W. S., Chow, W. Y. L., & Au, D. C. T. (2024). Pharmacological Activities of *Lonicerae japonicae* flos and Its Derivative-“Chrysoeriol” in Skin Diseases. *Molecules* (Basel, Switzerland), 29(9), 1972. <https://doi.org/10.3390/molecules29091972>
 Chen, S. R., Dai, Y., Zhao, J., Lin, L., Wang, Y., & Wang, Y. (2018). A Mechanistic Overview of Triptolide and Celastrol, Natural Products from *Tripterygium wilfordii* Hook F. *Frontiers in pharmacology*, 9, 104. <https://doi.org/10.3389/fphar.2018.00104>