SUPPLEMENTARY MATERIAL

Phytochemical Screening and Evaluation of Antioxidant Properties and Antimcrobial Activity Against Xanthomonas Axonopodis of *Euphorbia Tirucalli* Extracts in Binh Thuan Province, Vietnam

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Abstract: *Euphorbia tirucalli* is a medicine plant possessing many bioactive. The paper focused on phytochemical screening (alkaloid, flavonoid, saponin, tannin, and anthraquinone), the quantification of polyphenol and flavonoids, the activating evaluation of antioxidants and antimicrobial against *Xanthomonas axonopodis* of different extracts from *Euphorbia tirucalli* grown in Binh Thuan, Vietnam. The best activity fraction was used for purification and determining bioactive ingredients. The results showed that the phytochemical study revealed the presence of alkaloids, flavonoids, tannins, and terpenoids in ethyl acetate fraction. Saponin and anthraquinone did not present in all extracts. The content of polyphenol and flavonoid of *Euphorbia tirucalli* stem was in the range of 16.65 – 106.32 mg EqAG/g and 97.97 - 450.83 µg QE/g. Ethyl acetate fraction

showed higher amounts of polyphenol and flavonoids and antimicrobial activity against *X. axonopodis* than other fractions. Antioxidant (SC50) activity of *Euphorbia tirucalli* stem was in the range of 12.91 ± 0.70 and 528.33 ± 25.15 µg/mL. At a concentration of 5.0 mg/mL and 7.5 mg/mL, the diameter of inhibition of ethyl acetate fraction was 14.33 ± 0.76 mm and 17.87 ± 0.57 mm, respectively. MIC (minimum inhibitory concentration) was 0.156 mg/mL. Scopoletin, gallic acid, and piperic acid got MIC, corresponding to 78, 312, and 312 µg/mL, respectively. Purification of ethyl acetate fraction selected scopoletin, gallic acid, and piperic acid. Scopoletin, gallic acid, and piperic acid were found in the ethyl acetate fraction of *Euphorbia tirucalli* and exhibited the treatment of citrus bacteria canker and plant diseases.
Keywords: *X. axonopodis, E. tirucalli*, phytochemical, ethyl acetate, antibacterial activity

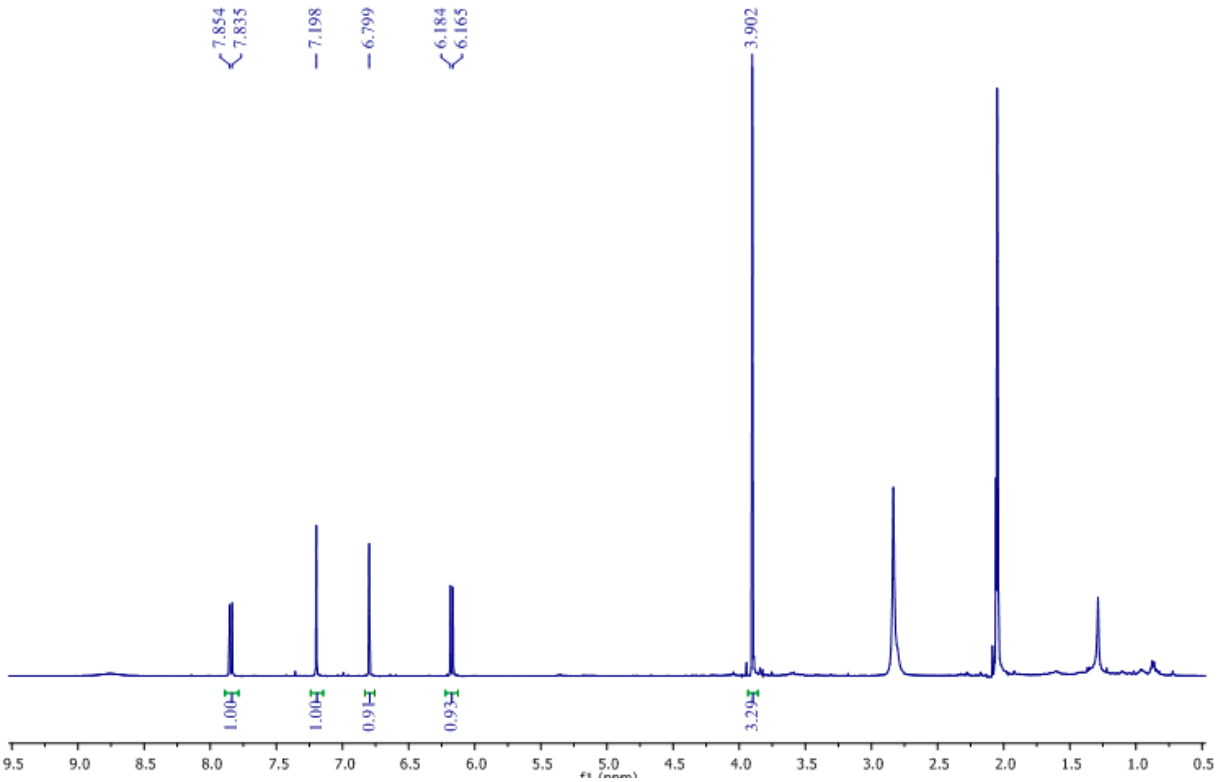

Figure S1. ^{1}H-NMR spectrum of substance 1 (scopoletin) in acetone-d_6

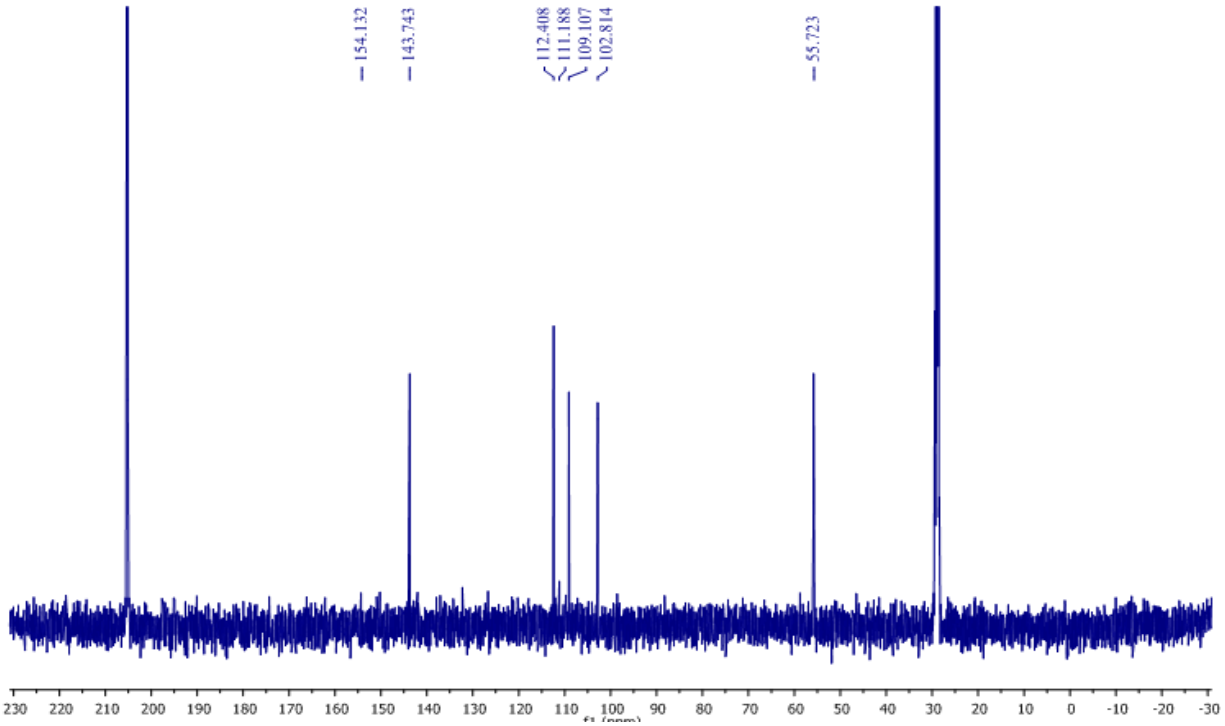

Figure S2. ^{13}C-NMR spectrum of substance 1 (scopoletin) in acetone-d_6

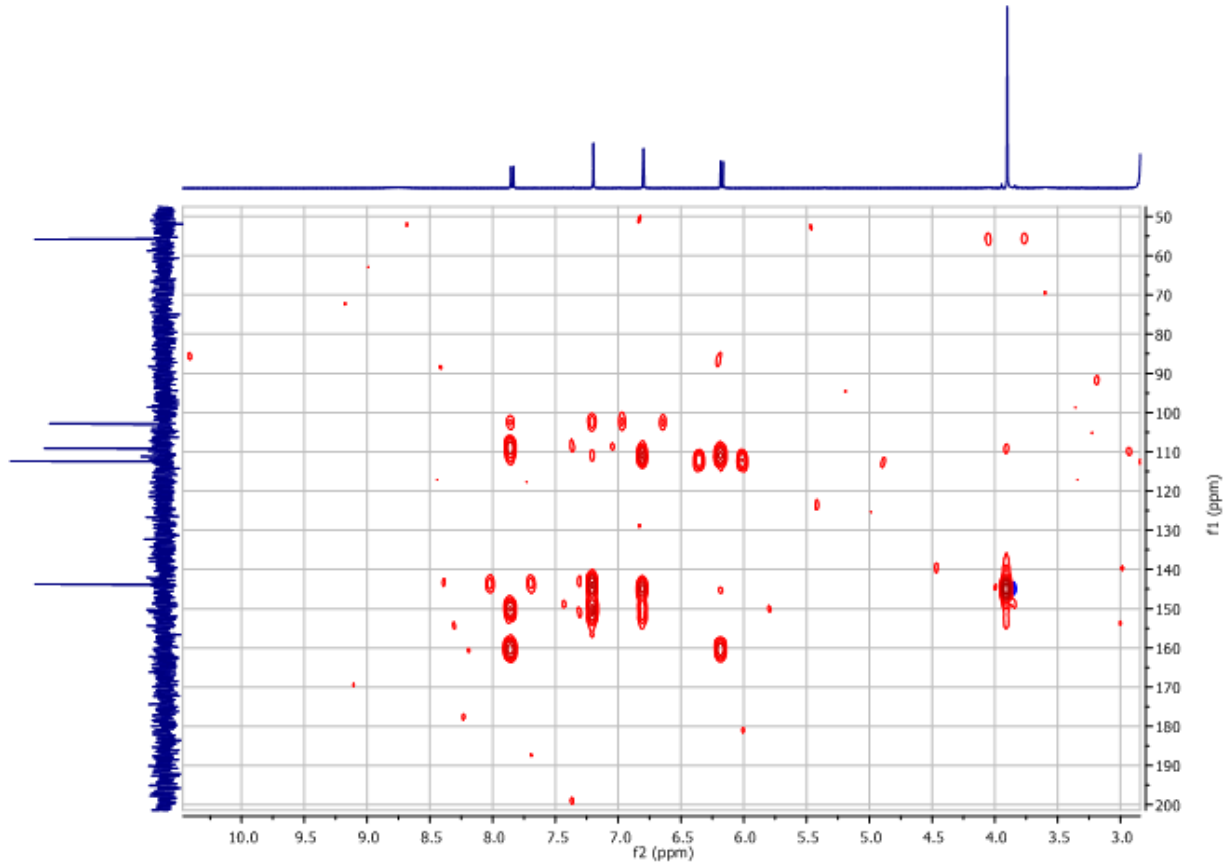

Figure S3. HMBC spectrum of substance 1 (scopoletin) in acetone-d_6

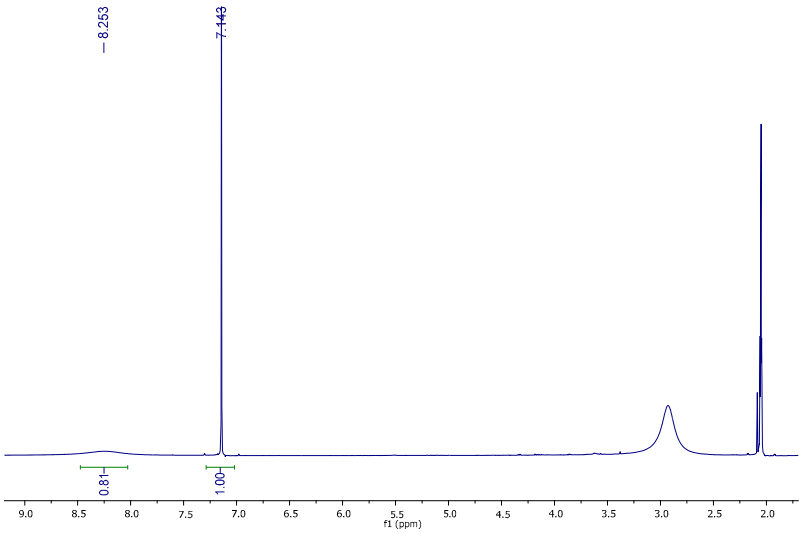

Figure S4. ^{1}H-NMR spectrum of substance 2 (gallic acid) in acetone-d_6

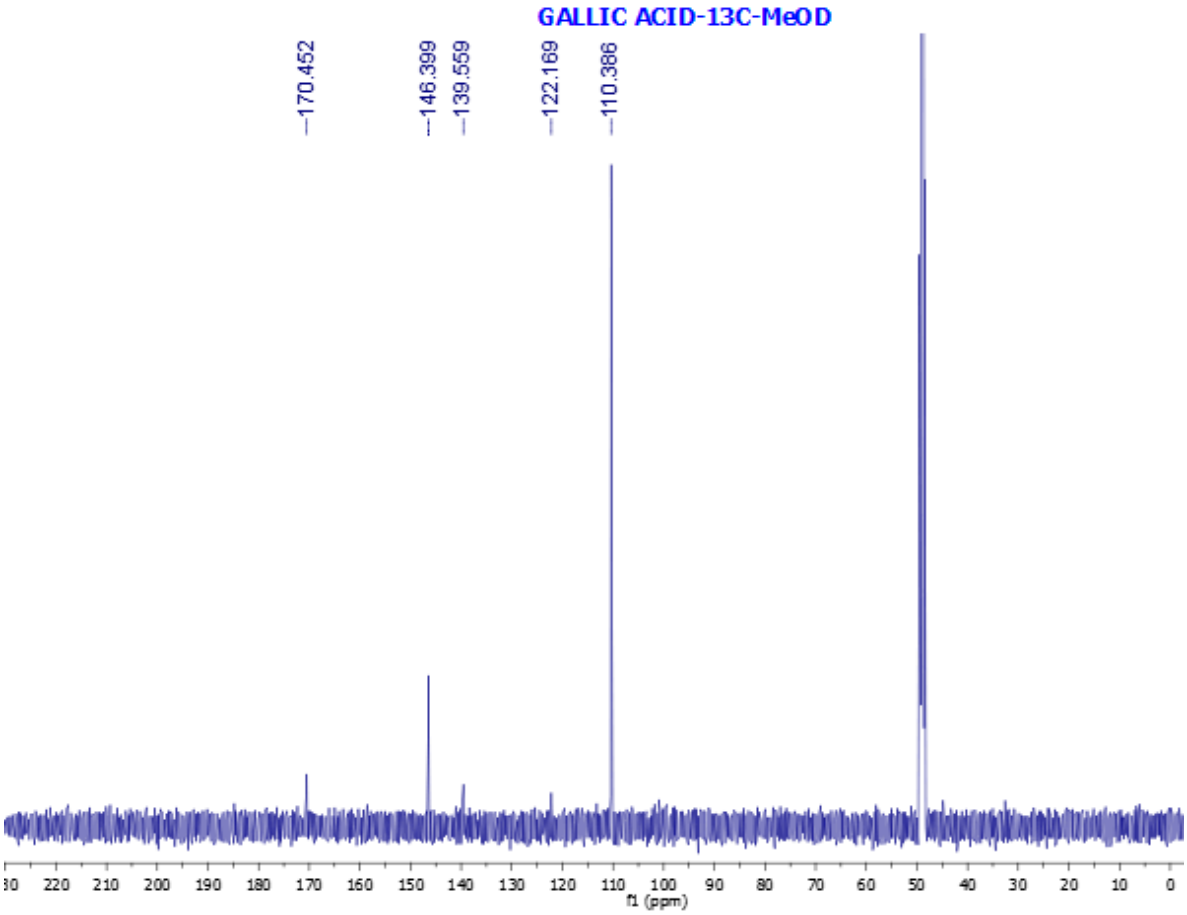

Figure S5. ^{13}C-NMR spectrum of substance 2 (gallic acid) in acetone-d_6

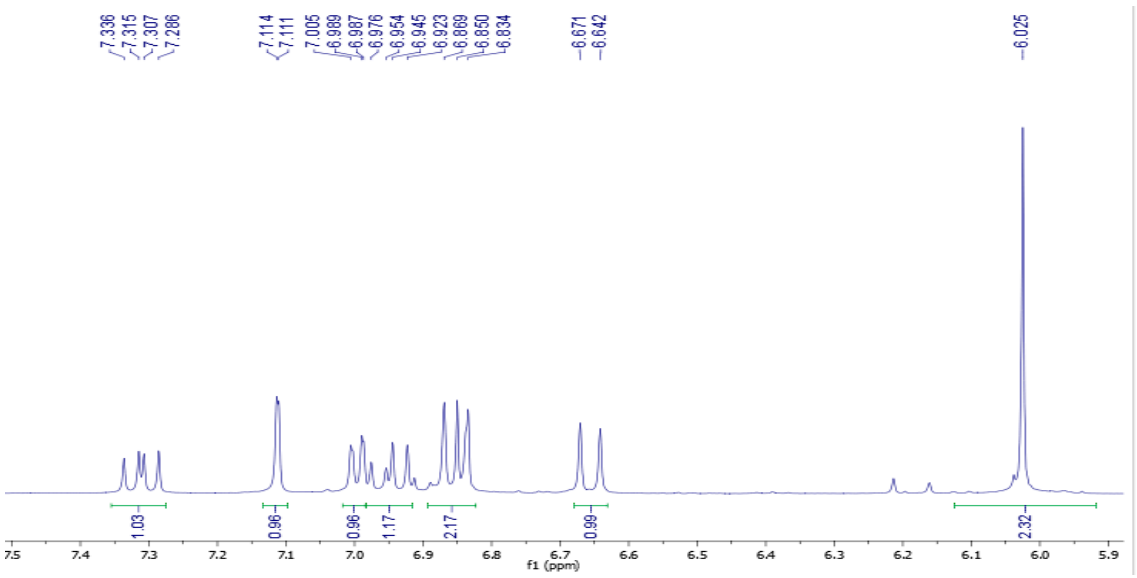

Figure S6. ^{1}H-NMR spectrum of substance 3 (piperic acid) in acetone-d_6

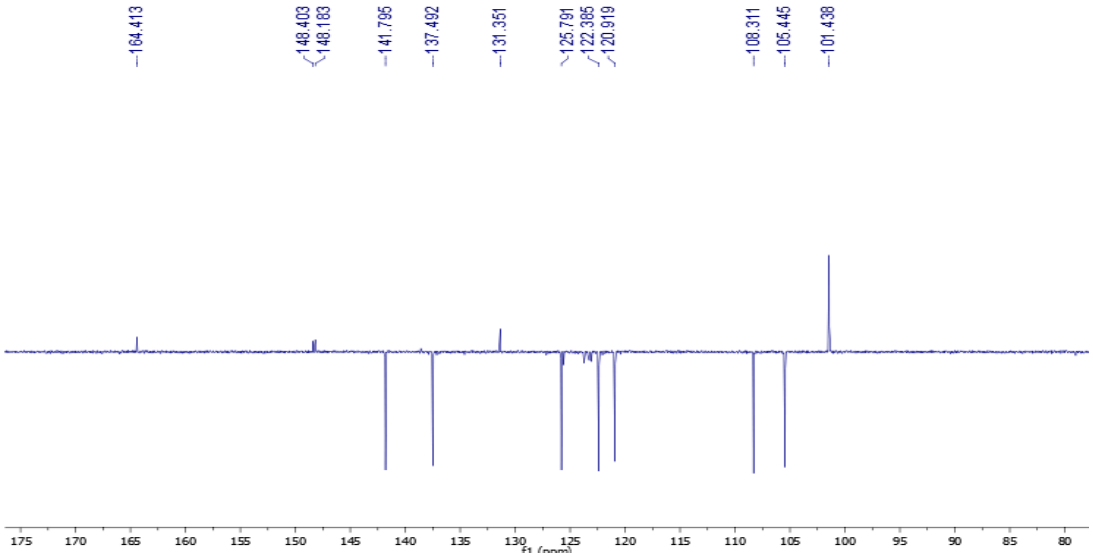

Figure S7. JMOD of substance 3 (piperic acid) in acetone-d_6

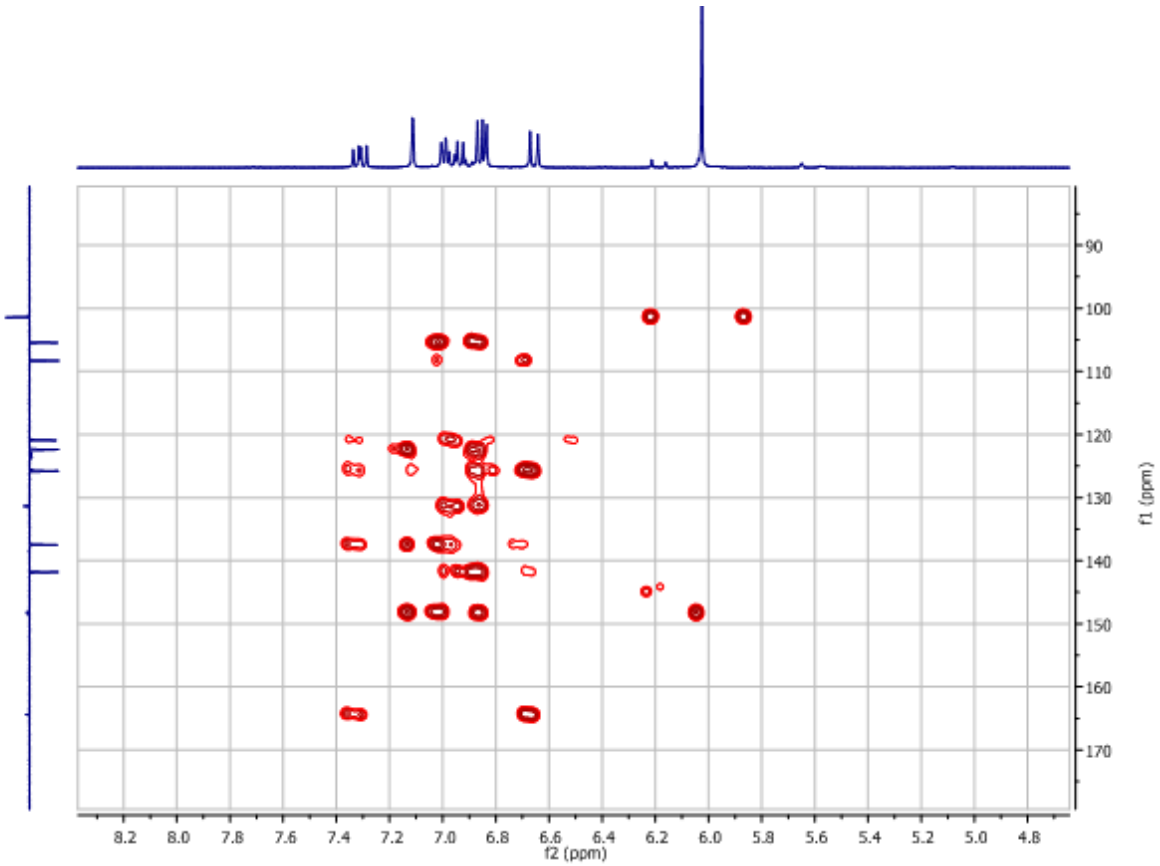

Figure S8. HMBC spectrum of substance 3 (piperic acid) in acetone-d_6