Improving the antioxidant properties of Calophyllum inophyllum L. seed oil from French Polynesia: development and biological applications of ethanol-soluble resin extracts

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Abstract: Tamanu oil (TO) from *Calophyllum inophyllum L.* has long been used for its numerous properties in traditional medicine. With the aim to investigate the intrinsic antioxidant and pharmacological activities of the complex pool of constituents contained in the resin part of TO, extraction with methanol and ethanol were undertaken to give MeTO and EtTO extracts, this latter being further partitioned into neutral (NTR) and acidic (ATR)

fractions. Further LPLC/HPLC separations led to sixteen pure metabolites. For two of them, calanolide D and 12-oxocalanolide A, we report here their first identification from a natural source. Extracts, subfractions and metabolites were evaluated for their antioxidant, anti-inflammatory, antimicrobial (*Staphylococcus aureus*) and antimycobacterial (*Mycobacterium tuberculosis H37RV*) properties, and their protective effect on *t*BuOOH-exposed cells and UV-exposed rat skin slices. Data showed that NTR and ATR resin fractions gathering the main amounts of bioactive compounds exhibited enhanced antioxidant and anti-inflammatory activities as compared to the lipid phase of TO. Antimicrobial activity was highlighted for NTR, while ATR was more cytoprotective in cells and rat tissues. All together, data suggest that ethanol-soluble fractions enriched in phenolics, pyranocoumarin derivatives and flavonoids could be of interest for further development of new and better bioavailable medicinal preparation.

Keywords: *Calophyllum inophyllum*, Tamanu oil, ethanol soluble extracts, lipophilic antioxidants, phenolics, pyranocoumarins, antimicrobial activity, anti-inflammatory activity, UV protection.

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[1]H NMR spectra of isolated or identified phytoconstituents of Tamanu resins

Figure S1: [1]H NMR spectra of Inocalophyllin B

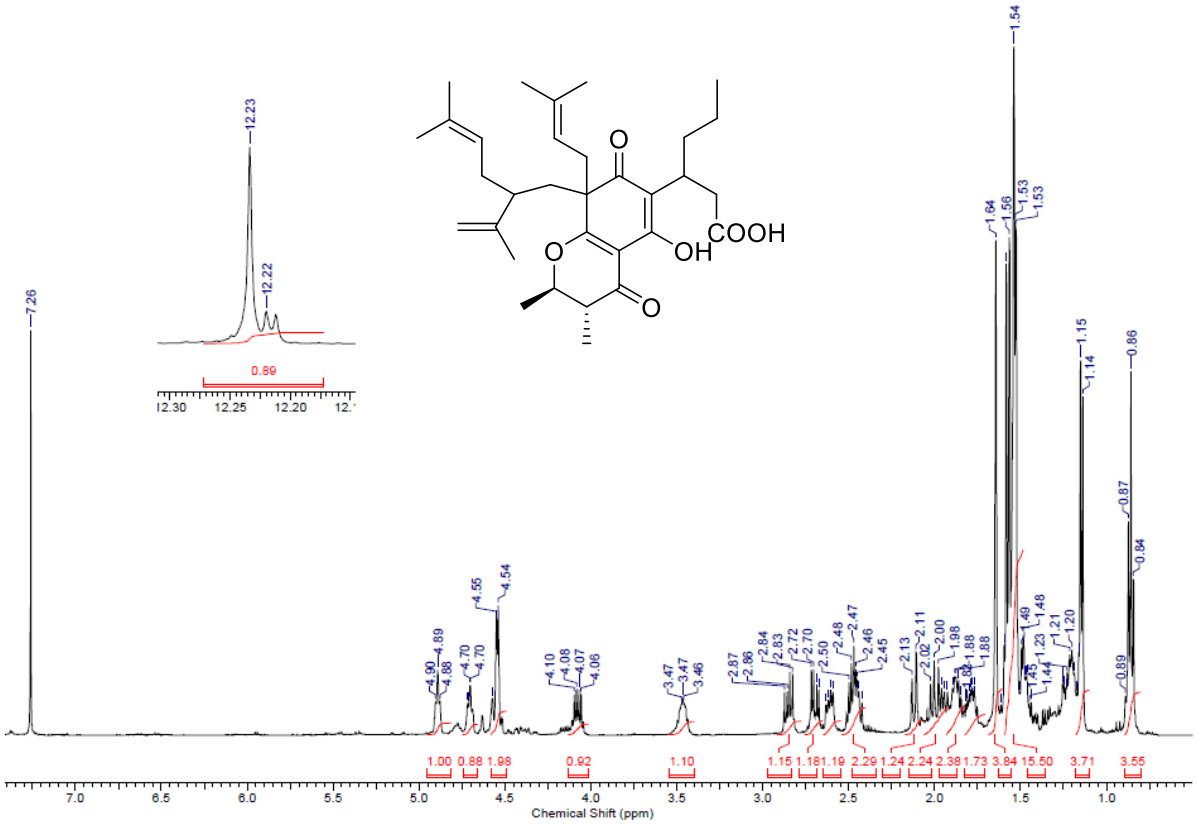

Figure S2: ^{1}H NMR spectra of Inophyllum C

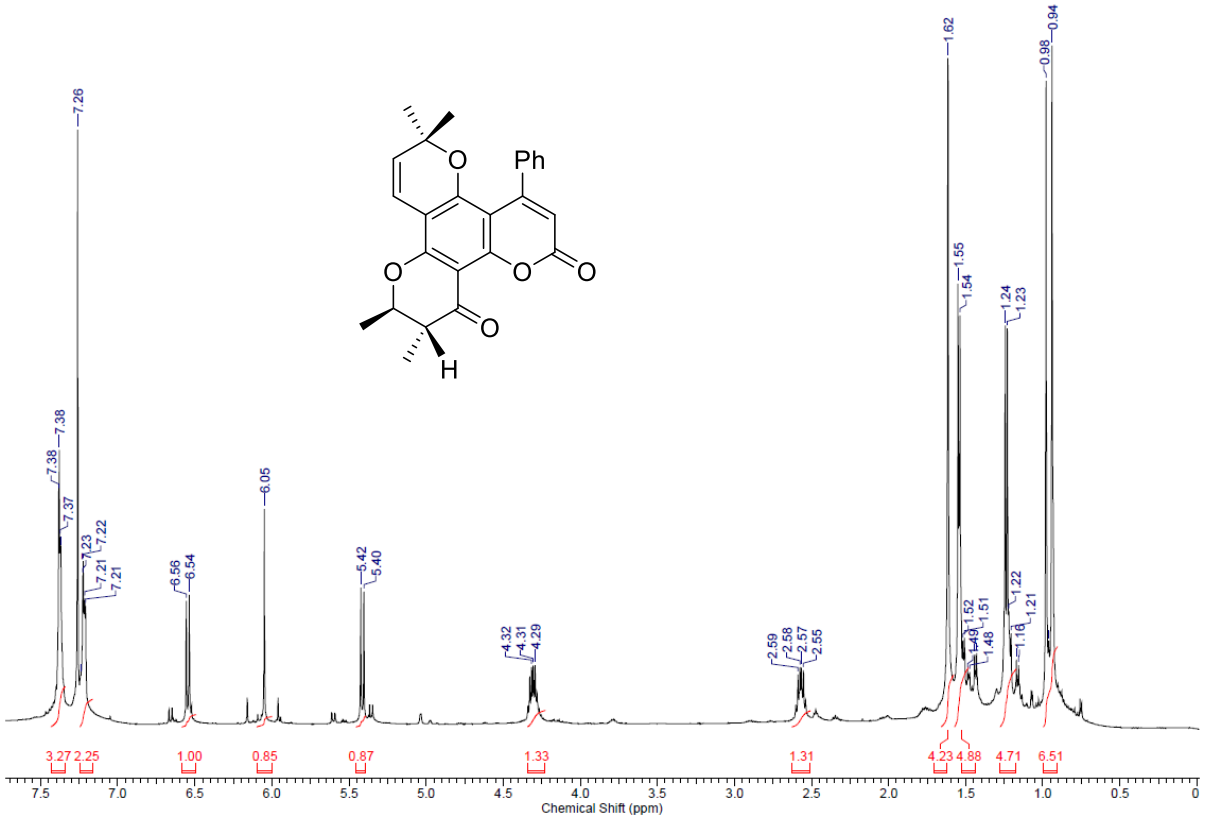

Figure S3: ^{1}H NMR spectra of Inophyllum E

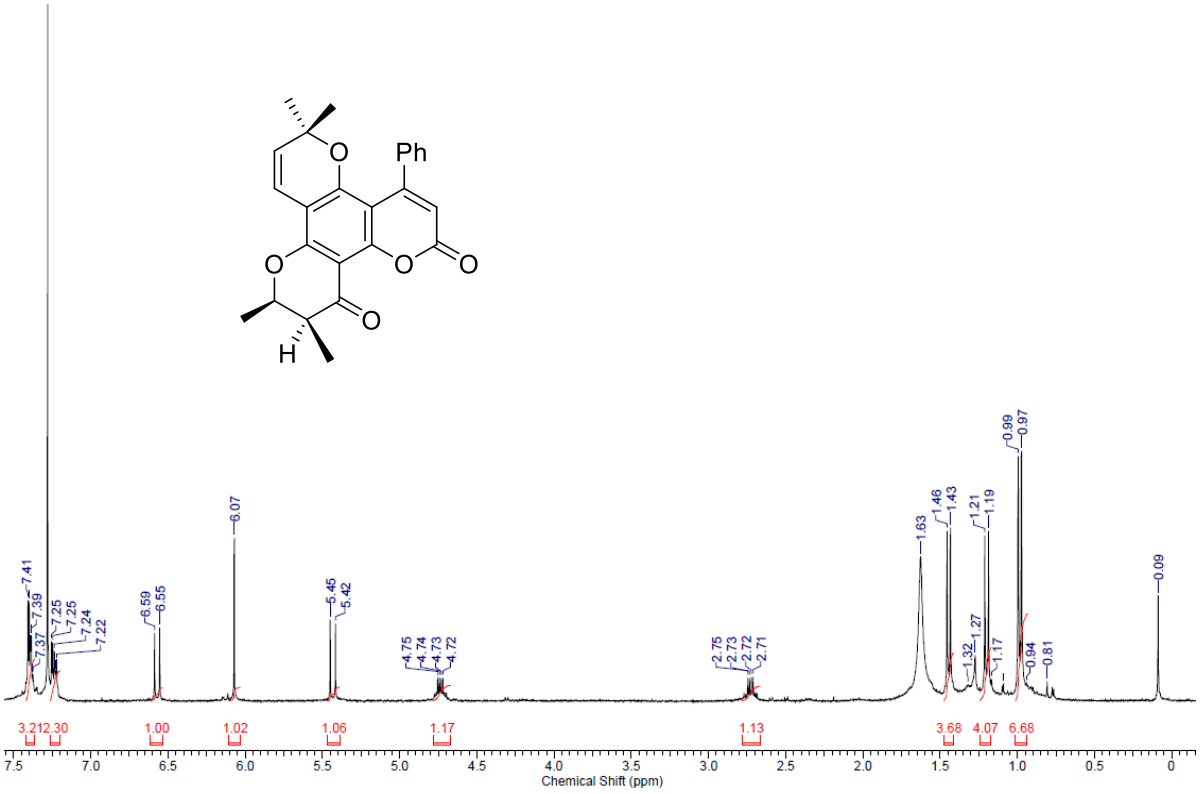

Figure S4: ^{1}H NMR spectra of Inophyllum P

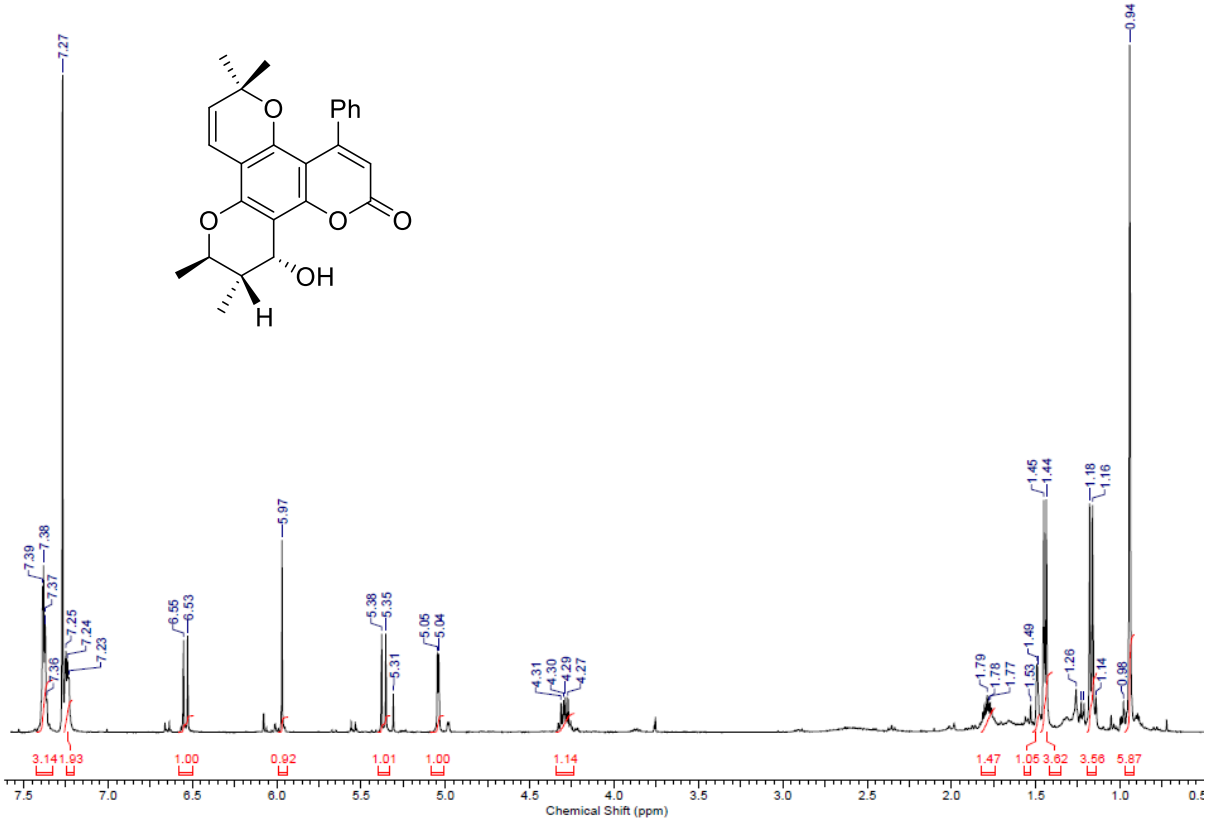

Figure S5: ^{1}H NMR spectra of Calophyllolide

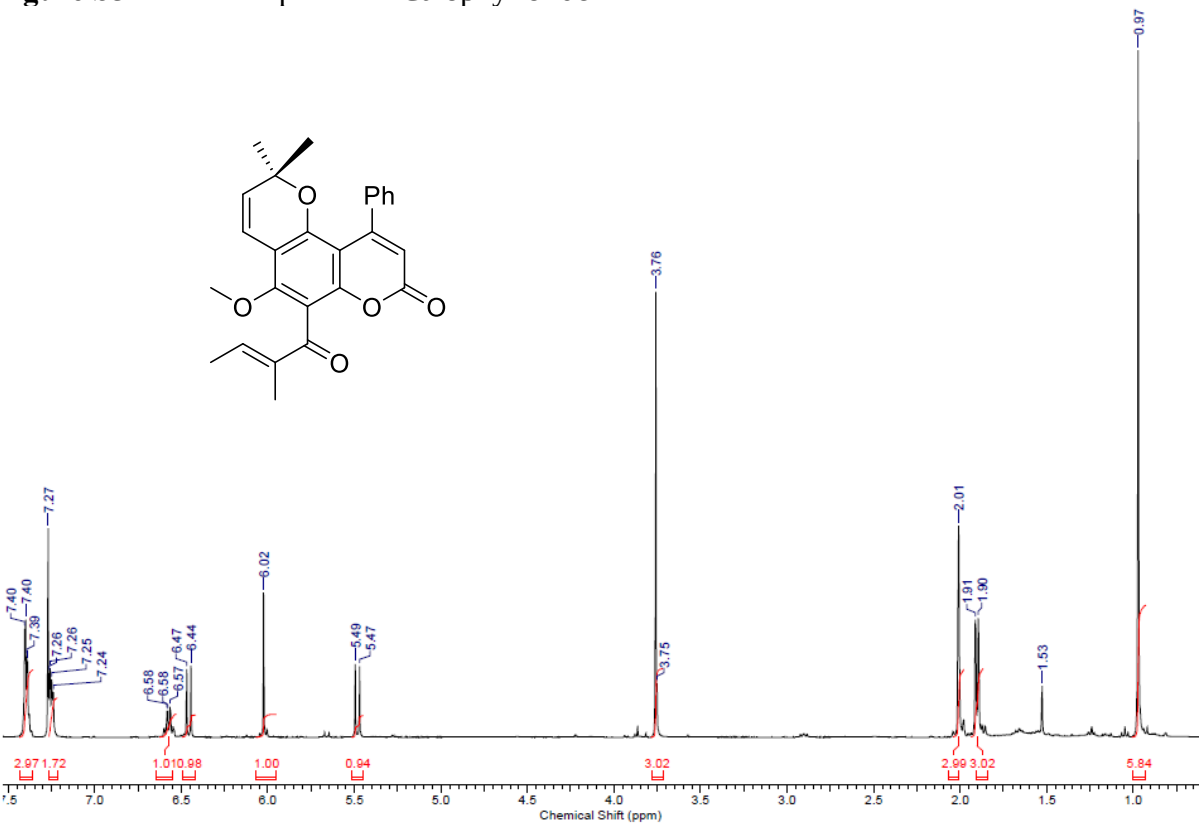

Figure S6: ^{1}H NMR spectra of 12-oxocalanolide A

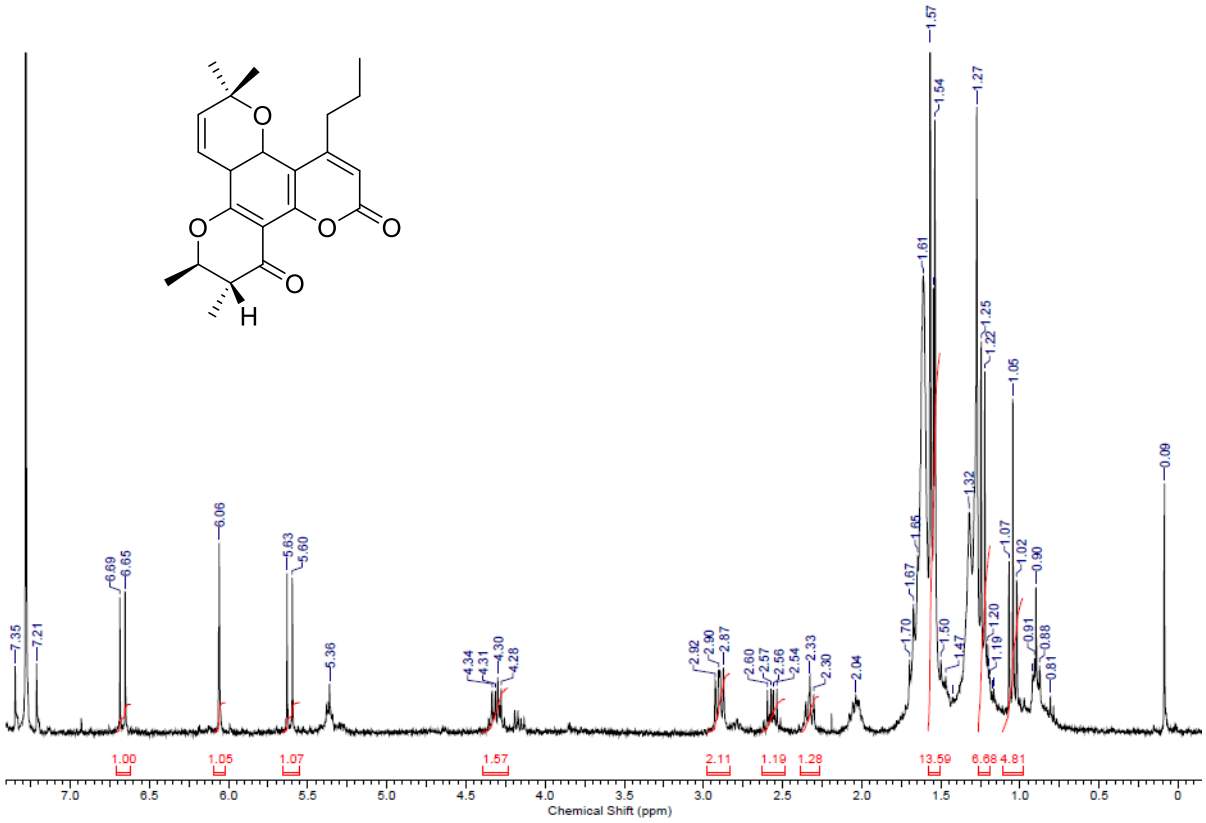

Figure S7: ^{1}H NMR spectra of Calanolide A

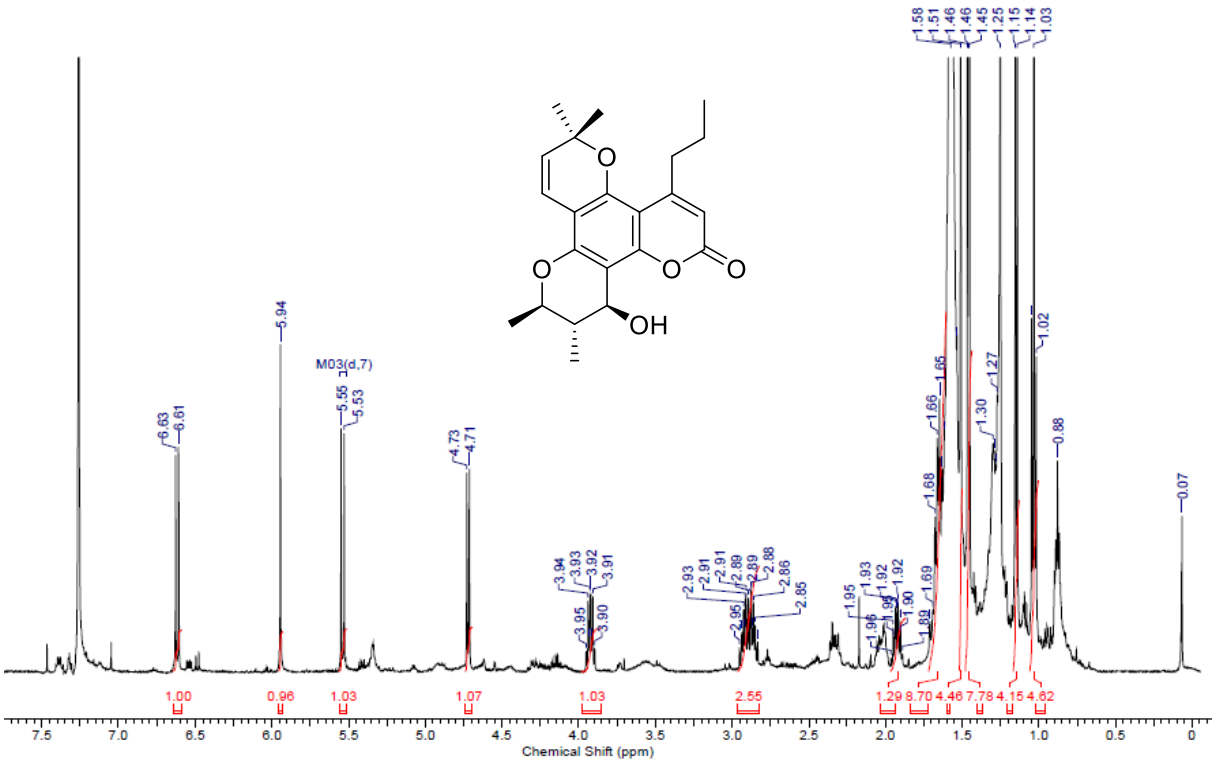

Figure S8: ^{1}H NMR spectra of Calanolide D

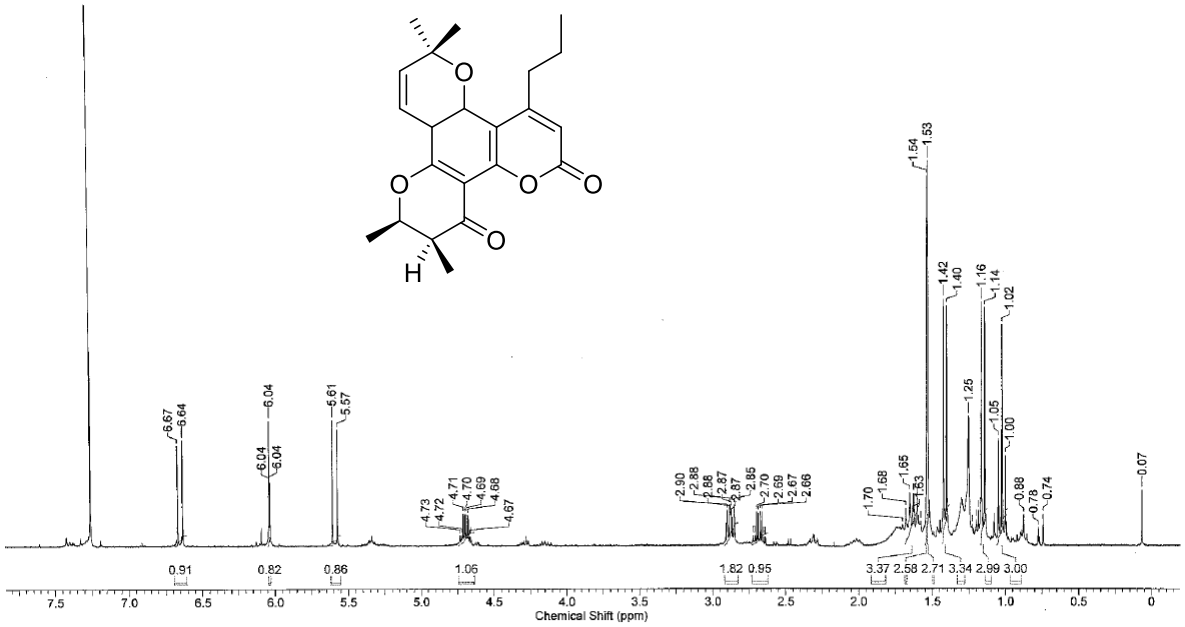

Figure S9: ^{1}H NMR spectra of Calanolide GUT70

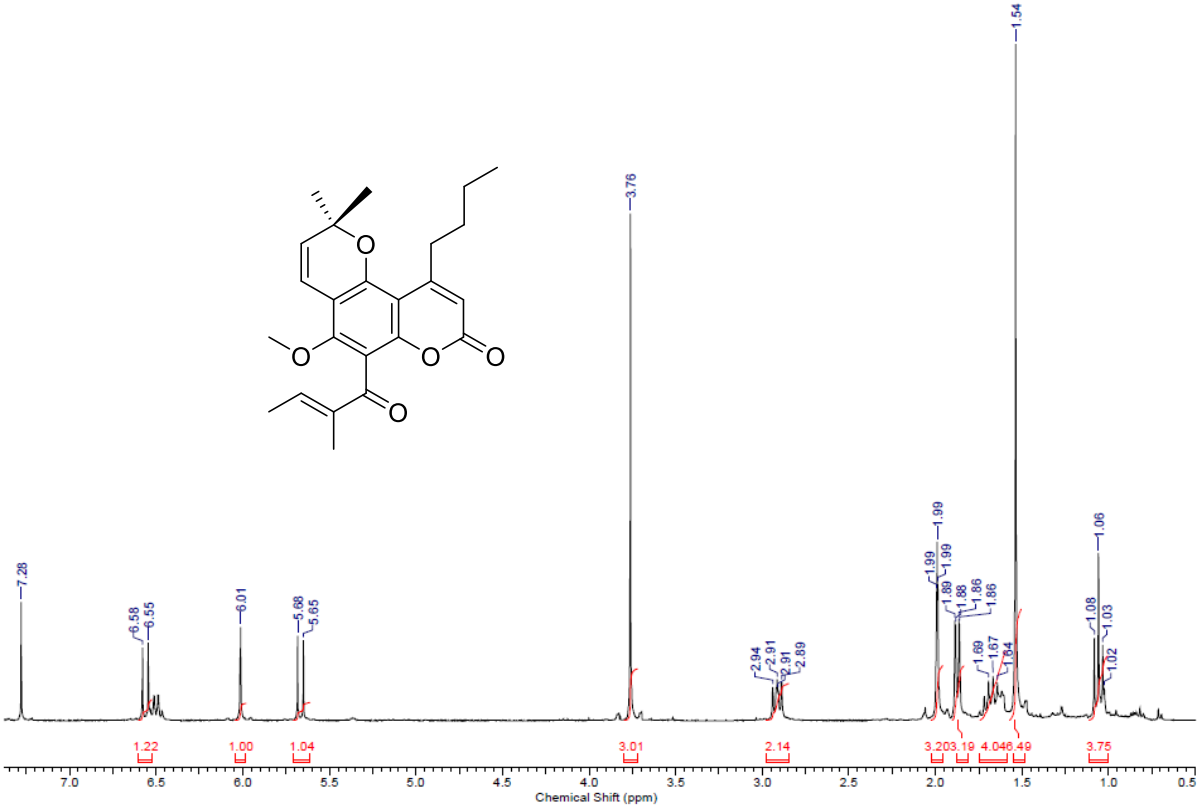

Figure S10: ^{1}H NMR spectra of Tamanolide

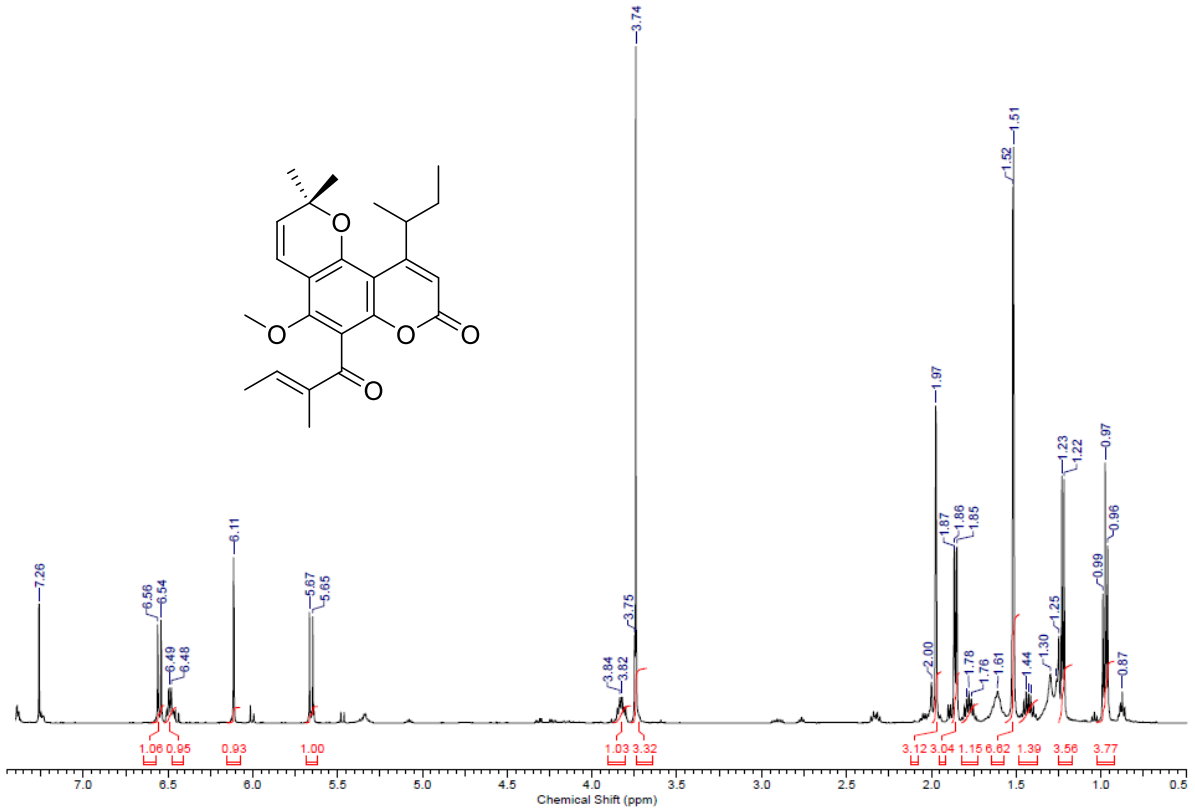

Figure S11: ^{1}H NMR spectra of Tamanolide D

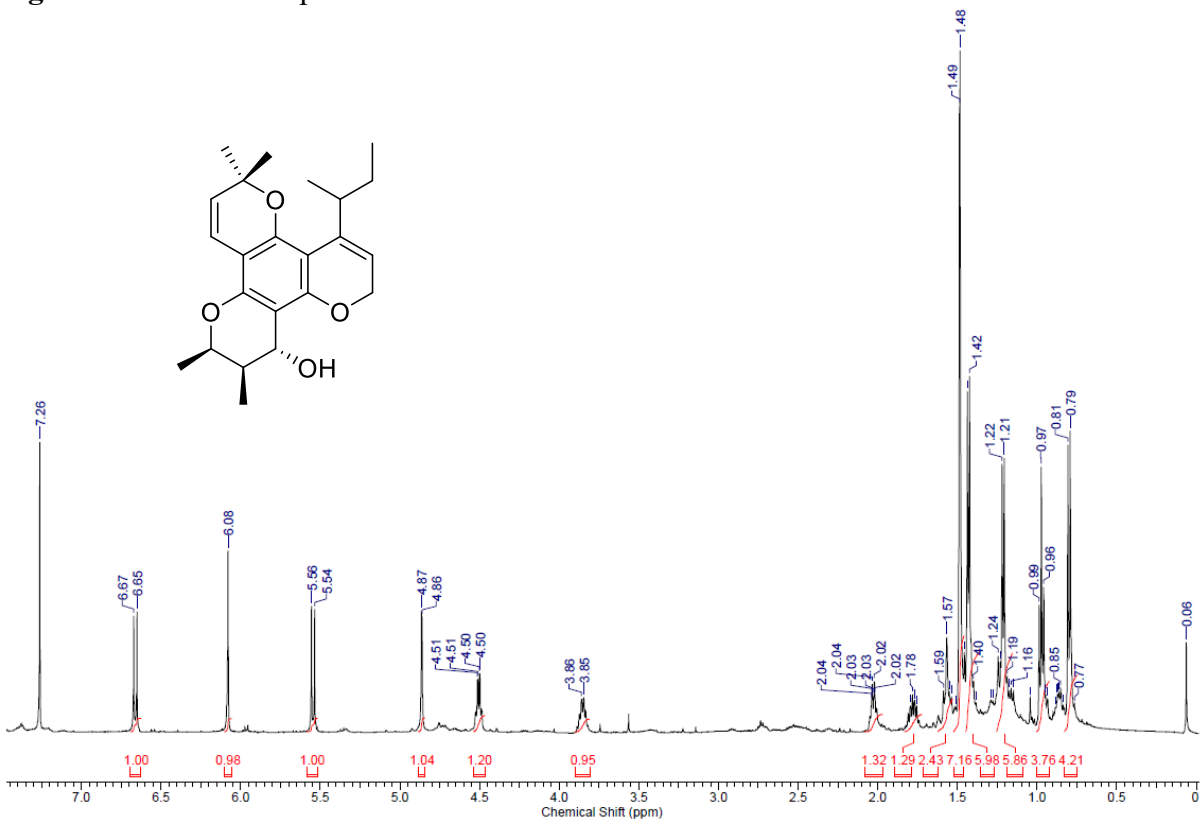

Figure S12: ^{1}H NMR spectra of Fraction D

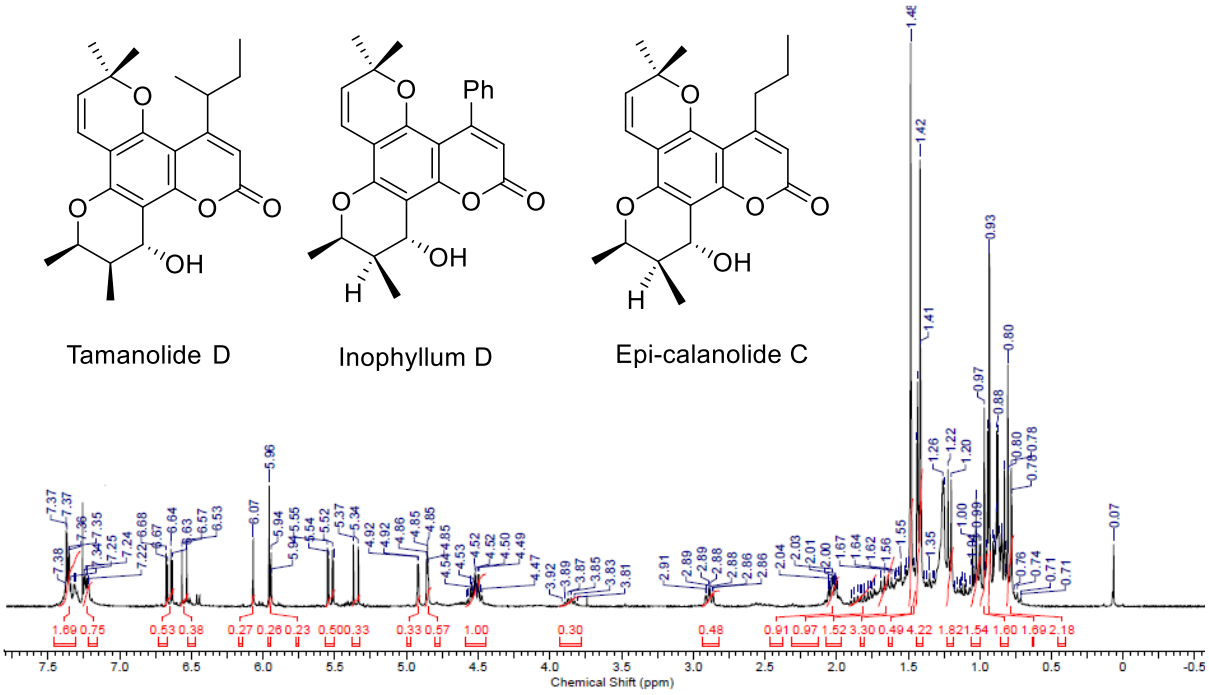

Figure S13: ^{1}H NMR spectra of Fraction P