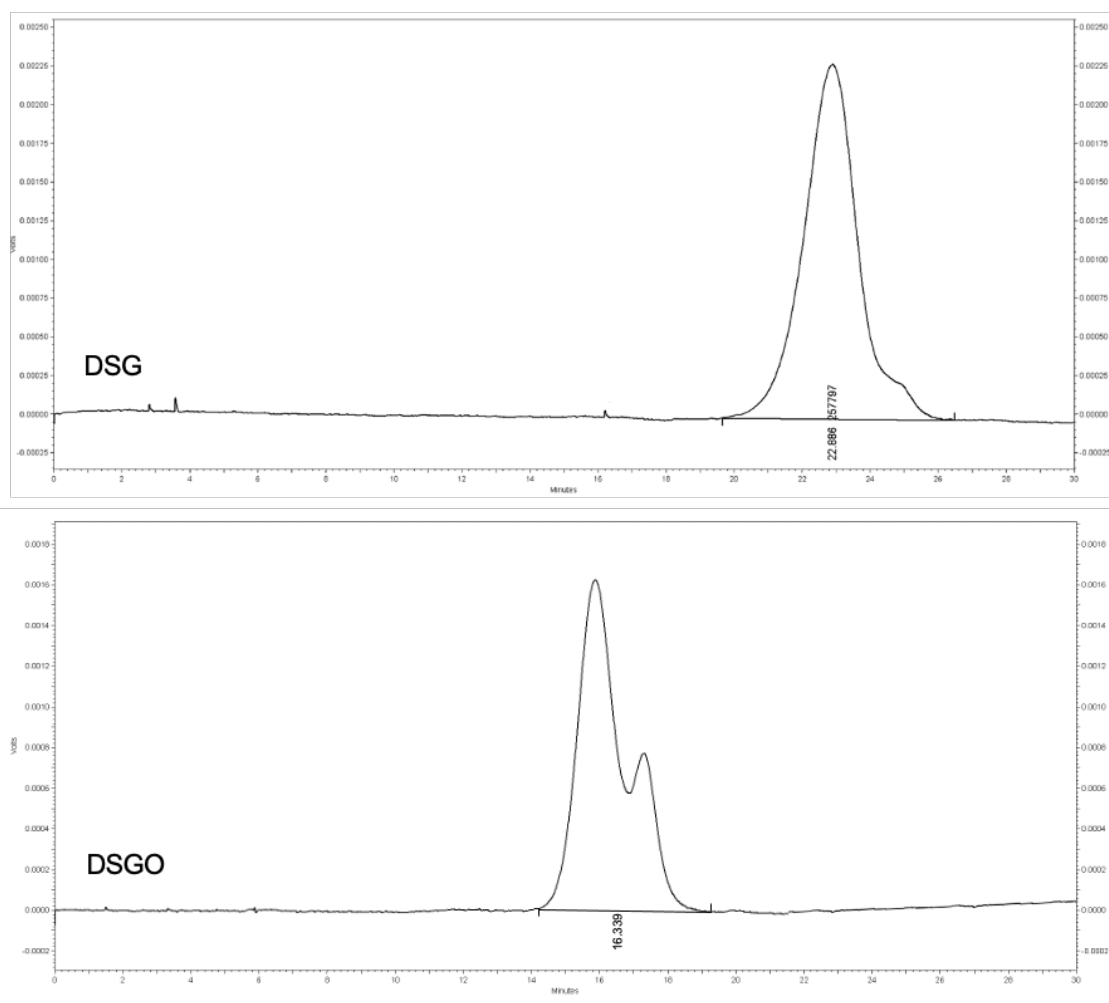
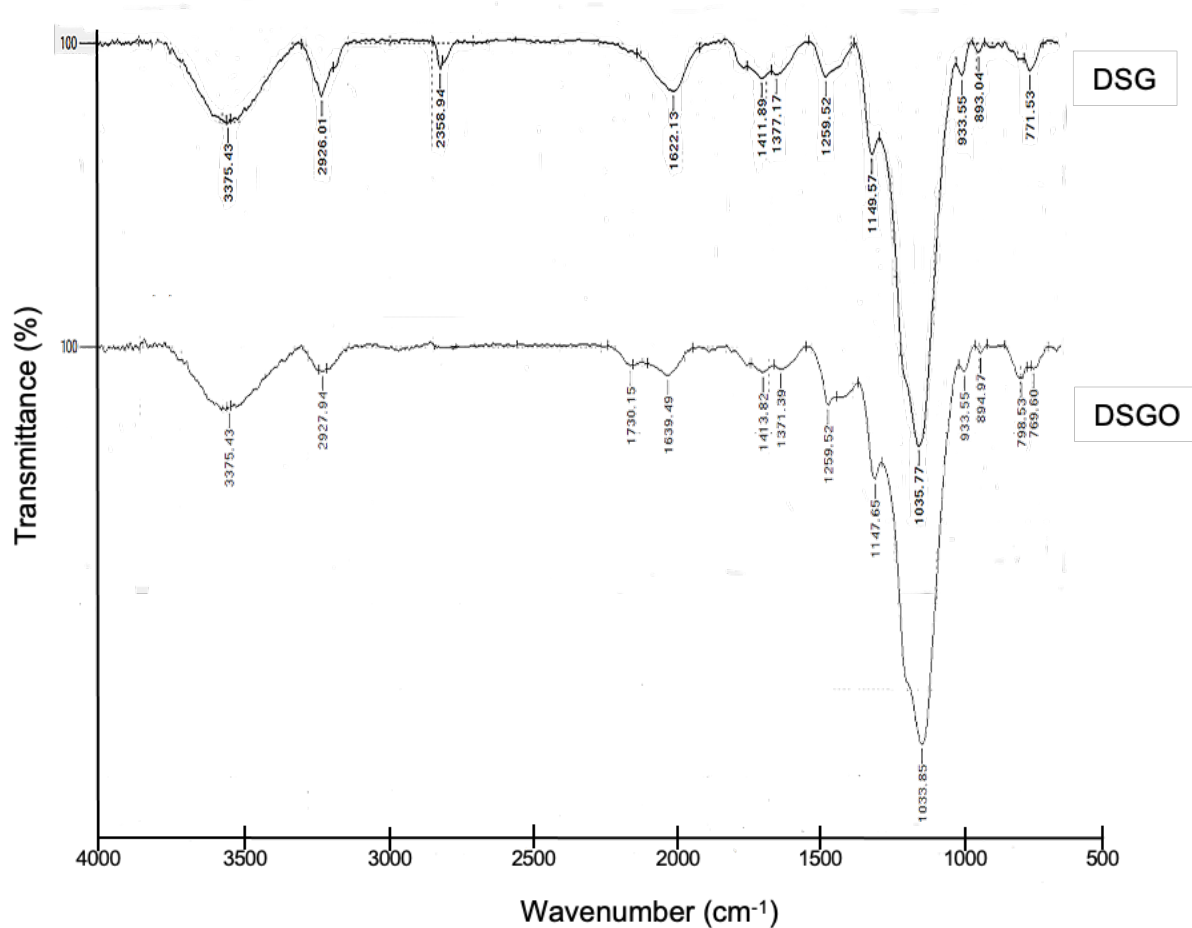


## **Supplementary data**

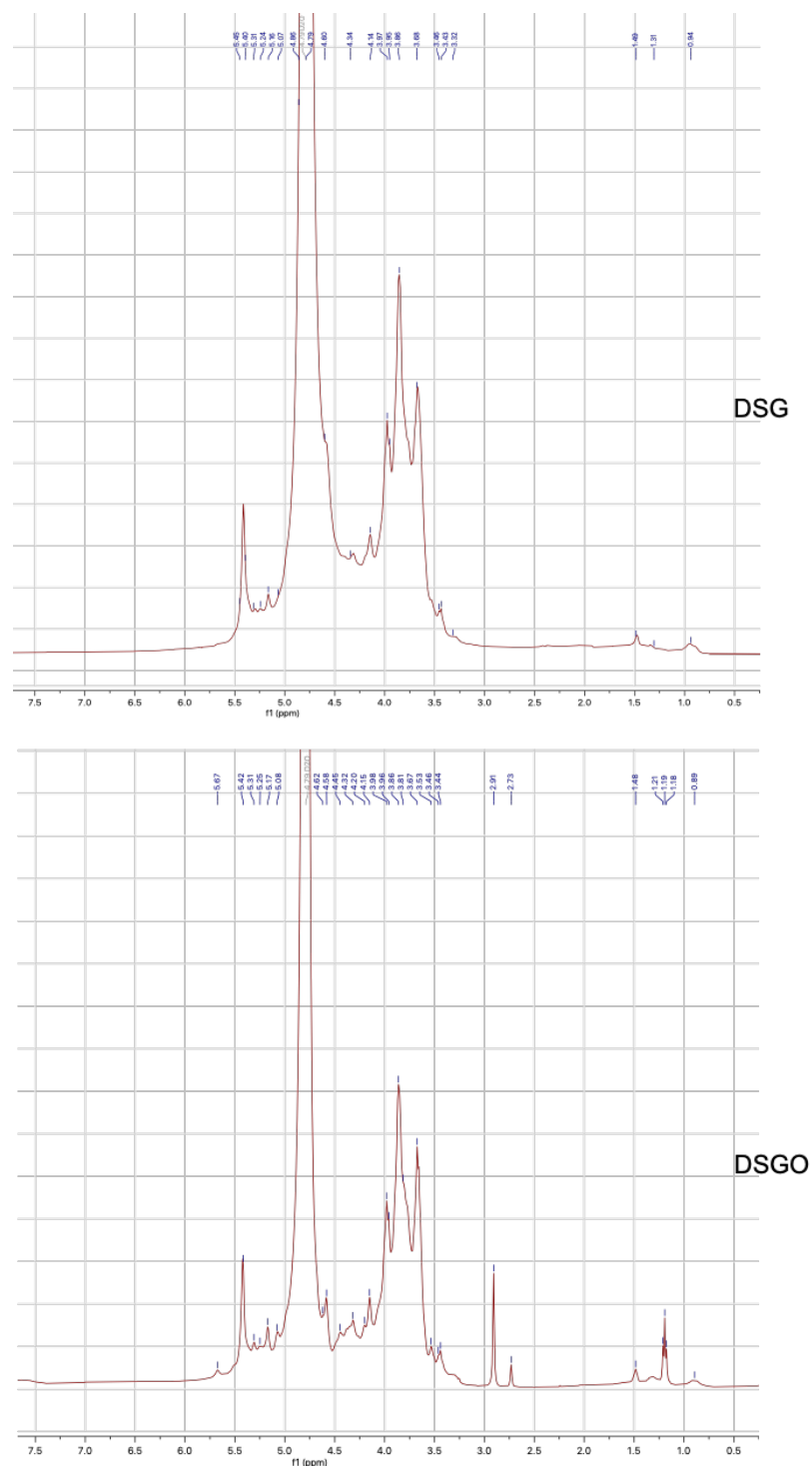
**Sulfated galactan derivative from *Gracilaria fisheri* improves histopathology and alters wound healing-related proteins in the skin of excision rats**



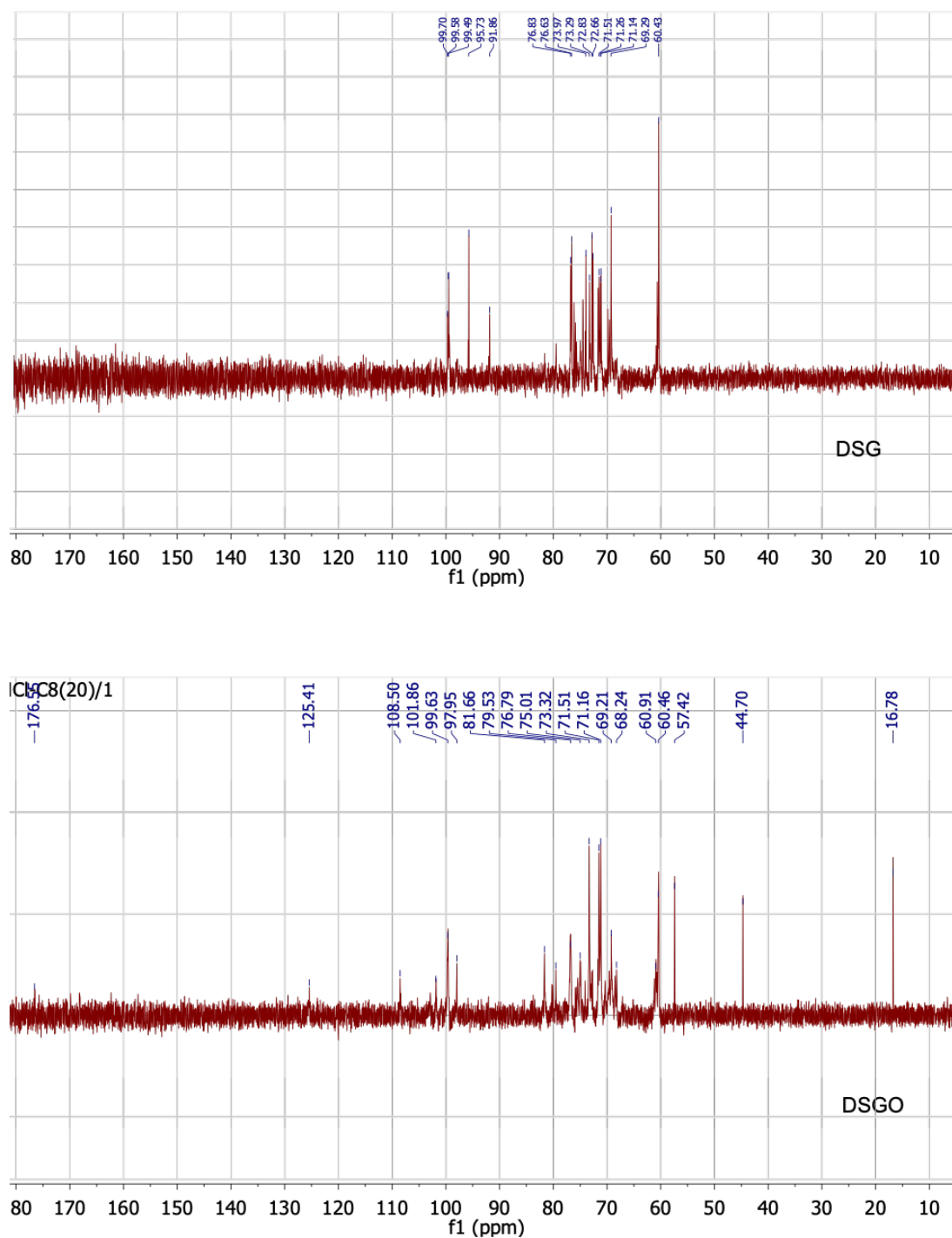
**Fig. S1.** GPC chromatogram of the compounds showing the different retention times of SG derivatives.



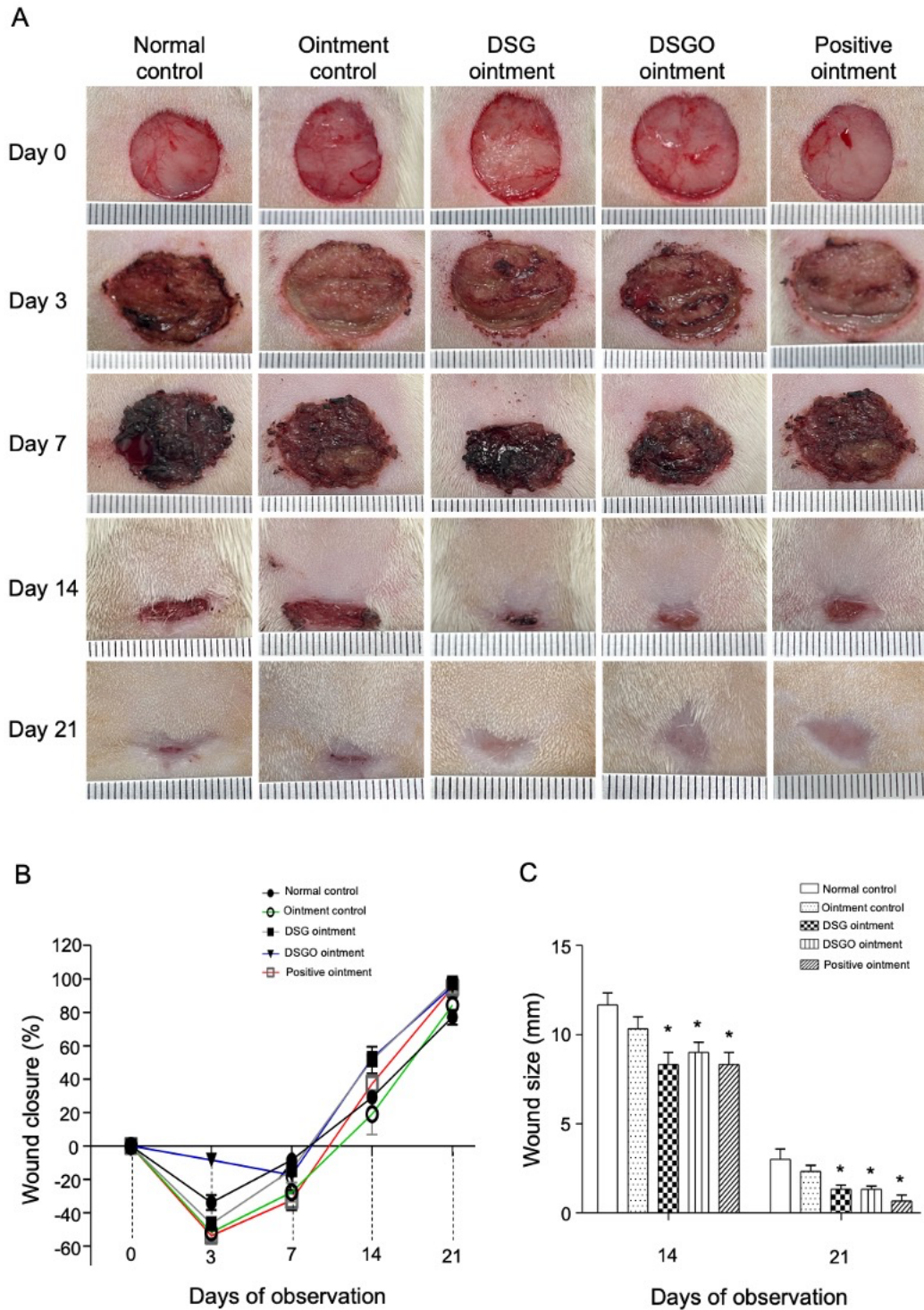
**Fig. S2.** FTIR analysis of SG derivatives showing the absorbance peaks approximately 3400 (O-H stretching), 2900 (C-H stretching), 1780-1670 (C=O stretching), 1411 (COO-symmetric stretching), 1249 (S=O antisymmetric stretching), 1149 (RO-SO<sub>3</sub><sup>-</sup> stretching), 1080-1040 (Skeleton of galactose), 940-930 (C-O-C of 3,6-anhydro-L-galactose), 900-890 (Agar specific characteristic band), 867 (L-galactose 6-sulfate), 845 (B-D-galactose 4-sulfate), 825-820 (D-galactose 6-sulfate). In DSGO, the absorbance peak at 1722 cm<sup>-1</sup> indicated the carbonyl group the C=O stretching of octanoyl ester (Rudtanatip et al., 2022).



**Fig. S3.** <sup>1</sup>H-NMR (400 MHz, D<sub>2</sub>O) analysis of SG derivatives showing the signals correspond to β-D-galactose units at δ 4.55 (H-1), 3.63 (H-2), 3.75 (H-3), 4.12 (H-4), 3.73 (H-5), 3.82 (H-6) and the signals correspond to 3,6 α-L-anhydrogalactose units at δ 5.14 (H-1), 4.13 (H-2), 4.53 (H-3), 4.66 (H-4), 4.56 (H-5), 4.19 (H-6). The proton signals correspond to octanoic acid structure at δ 2.91, 1.21, 1.20 and 1.16 (Rudtanatip et al., 2022).



**Fig. S4.**  $^{13}\text{C}$ -NMR (100 MHz,  $\text{D}_2\text{O}$ ) analysis of SG derivatives showing the signals correspond to  $\beta$ -D-galactose units at  $\delta$  102.5 (C-1), 70.6 (C-2), 82.2 (C-3), 68.7 (C-4), 75.3 (C-5), 61.4 (C-6) and the signals correspond to 3,6  $\alpha$ -L-anhydrogalactose units at 98.3 (C-1), 70.9 (C-2), 80.1 (C-3), 77.4 (C-4), 75.6 (C-5), 69.8 (C-6). The carbon signals correspond to octanoic acid structure at  $\delta$  176.50, 57.43, 44.70, and 16.76 (Rudtanatip et al., 2022).



**Fig. S5.** Wound healing activity of normal control, ointment control, DSG ointment, DSGO ointment and positive ointment (0.01% silver sulfadiazine) on the excision wound rats. (A) Wound photographs at days 0, 3, 7, 14 and 21 after wound formation. (B) Percentage of wound closure on wound area at days 0, 3, 7, 14 and 21 after wound formation. (C) Wound size (mm in diameter) on wound area at days 14 and 21 after wound formation. \* indicates a significant difference compared to control ( $p < 0.05$ ).