Supporting Information

Enhanced phototherapy activity by employing a nanosilica-coumarin-acifluorfen conjugate as the supplementary light source generator

Junfan Niu, Jingyue Tang, Gang Tang, Zhiyuan Zhou, Rong Tang, Jiale Yang, Na Jiang, Jianqiang Li, and Yongsong Cao*

College of Plant Protection, China Agricultural University, Beijing, China

*Corresponding author: NO.2 Yuanmingyuan West Road, China Agricultural University, Beijing, China, 100193

Telephone number: 86-10-62734302 (O), 86-10-62734302 (FAX)

Email: caoysong@126.com, caoys@cau.edu.cn

Number of pages: 7

Number of texts: 3

Number of figures: 3

Text S1. The content analysis of acifluorfen in Silica-ACI and Silica-HCA-ACI

First, 1 mL of filtrate collected during the previous preparation was diluted to appropriate concentration with acetonitrile. Then, the concentration of acifluorfen acid (ACI) or HCA-ACI in filtrate was detected by HPLC and the content of acifluorfen in Silica-ACI and Silica-HCA-ACI was calculated as follows: $(0.05 - a \times C_1 \times V_1) / (0.55 - a \times C_1 \times V_1) \times 100\%$ and $(0.05 - b \times C_2 \times V_2) / (0.55 - b \times C_2 \times V_2) \times 344.65 / 563.82 \times 100\%$, respectively. Where a and b represent the dilution multiples of filtrate containing acifluorfen and HCA-ACI respectively, C_1 and C_2 represent the concentration of acifluorfen acid and HCA-ACI detected by HPLC in filtrate respectively, and V_1 and V_2 represent the total volume of filtrate containing acifluorfen acid and HCA-ACI respectively.

Text S2. The growth method of *Amaranthus retroflexus* and soybean

Amaranthus retroflexus and soybean seedlings were grown in the greenhouse of China Agricultural University, located in the Haidian district of Beijing. Average day/night temperature was about 26/15 °C, and humidity was at 60−80% during experiments. *Amaranthus retroflexus* seeds were sown in plastic pots (12 cm in diameter) filled with nutrition soil and vermiculite (3/1, v/v), the seedlings were thinned to 10 uniform plants per pot within 10 days after emergence. Soybean seeds were sown in plastic pots filled with nutrition soil and vermiculite (3/1, v/v), and each pot contained 3 seeds.

Text S3. ^{1}H NMR spectra of HCA-ACI

2-(7-((5-(2-Chloro-4-(trifluoromethyl)phenoxy)-2-nitrobenzoyl)oxy)-2-oxo-2H-chromen-4-yl)acetic acid (HCA-ACI). White solid; 61% yield. ^{1}H NMR (300.13 MHz; DMSO; Me_4Si) δ ppm = 4.01 (s, 2H, CH_2), 6.41 (s, 1H, CH), 7.33 (dd, *J* = 8.70, 2.31 Hz, 1H, CH), 7.44 (m, 1H, CH), 7.47 (d, *J* = 2.76 Hz, 1H, CH), 7.64 (d, *J* = 8.07 Hz, 1H, CH), 7.72 (d, *J* = 8.76 Hz, 1H, CH), 7.84 (d, *J* = 2.76 Hz, 1H, CH), 7.89 (dd, *J* = 8.43, 1.59 Hz, 1H, CH), 8.20 (d, *J* = 1.65 Hz, 1H, CH), 8.33 (d, *J* = 9.09 Hz, 1H, CH).

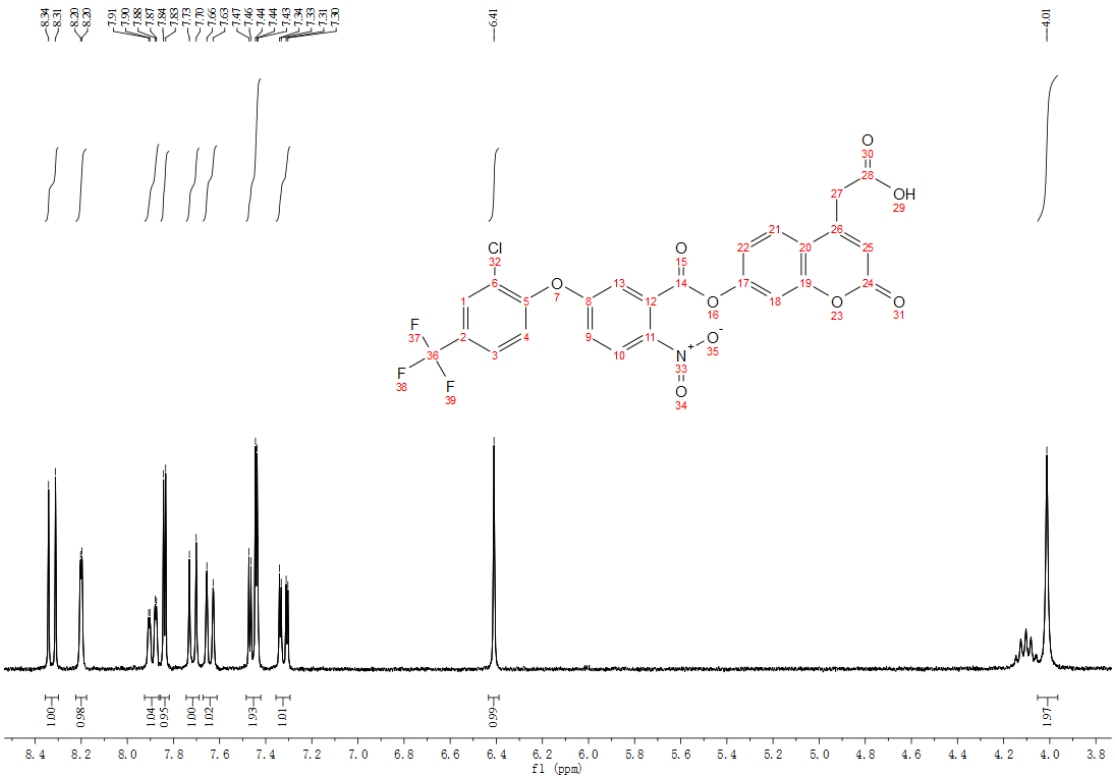

Fig. S1. ^{1}H spectra of HCA-ACI (300.13 MHz, DMSO).

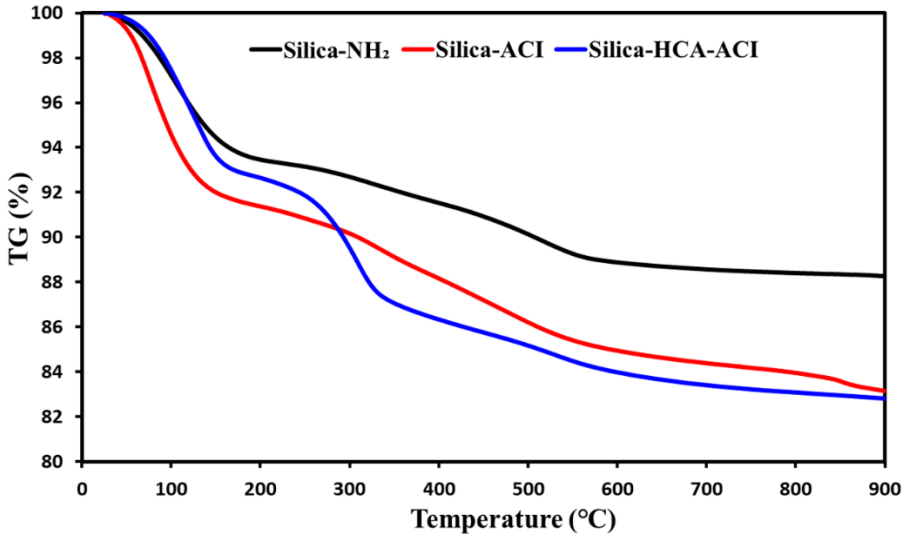

Fig. S2. TGA curves of Silica-NH_2, Silica-ACI, and Silica-HCA-ACI.

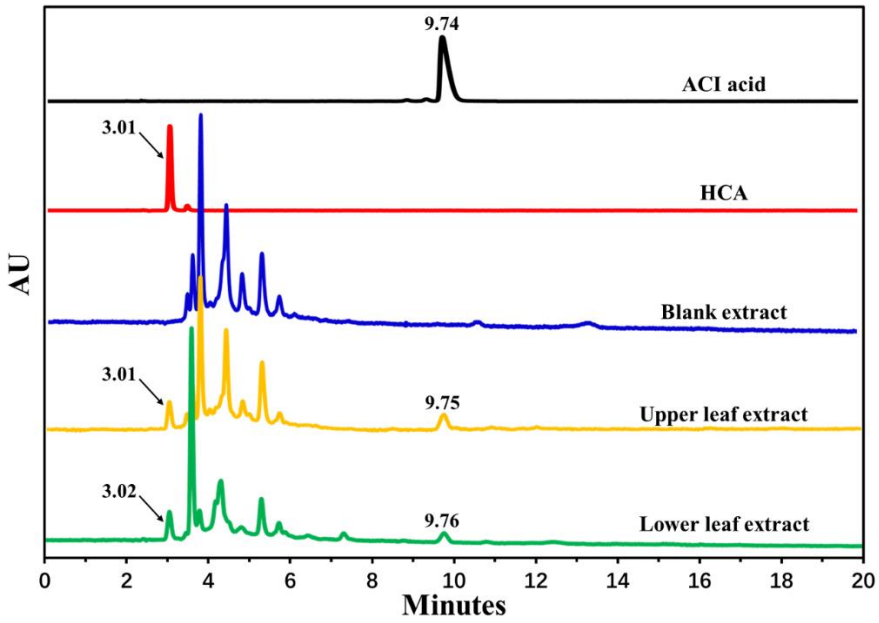

Fig. S3. HPLC chromatograms of acifluorfen acid (ACI), HCA, blank extract of leaf, upper leaf extract after treating lower leaf with Silica-HCA-ACI, and lower leaf extract after treating upper leaf with Silica-HCA-ACI.