

Supporting Information

Selenium nanoparticles combined with Calycosin treated sepsis through synergistic anti-inflammatory and antioxidant effects

Bin Lu^{†1, 3}, Kun Zhang^{†2}, Qingrong Dong^{†3}, Lan Wei², Jia Shi², Fang Liu², Taigang Liang^{2*}, Jiangfeng Du^{3, 4*}

¹ Department of Anesthesiology, Third Hospital of Shanxi Medical University, Shanxi Bethune Hospital, Shanxi Academy of Medical Sciences, Tongji Shanxi Hospital, 030032, Shanxi Province, China

² School of Pharmacy, Medicinal Basic Research Innovation Center of Chronic Kidney Disease, Ministry of Education, Shanxi Provincial Key Laboratory of Drug Synthesis and Novel Pharmaceutical Preparation Technology, Shanxi Medical University, Taiyuan, 030001, Shanxi Province, China

³ Department of Medical Imaging, Shanxi Key Laboratory of Intelligent Imaging and Nanomedicine, First Hospital of Shanxi Medical University, Taiyuan, 030001, Shanxi Province, China

⁴ Key Laboratory of Cellular Physiology at Shanxi Medical University, Ministry of Education, Taiyuan 030001, Shanxi Province, China

* Corresponding author.

Email addresses: Ltaigang@163.com (T. G. Liang); dujf@sxmu.edu.cn (J. F. Du).

[†] These authors contributed equally to this work.

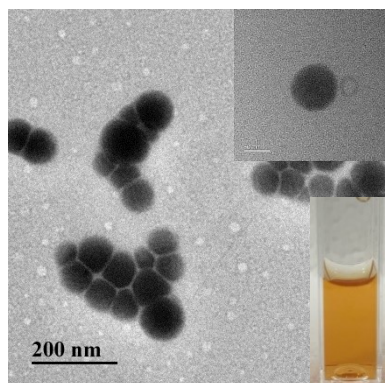


Figure S1. TEM image of BS. Scale bars for 200 nm (In the top right corner is HRTEM image of BS (Scale bars for 50 nm) and in the lower right corner is BS solution)).

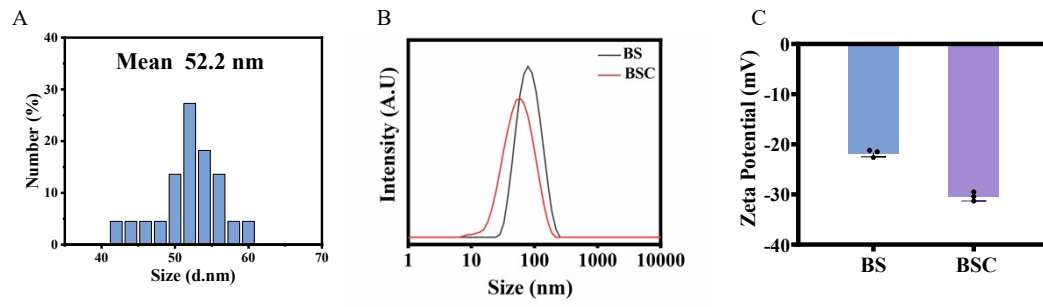


Figure S2. (A) The corresponding size distribution of BSC analyzed by Nano measure software. (B) The diameter distribution of BS and BSC detected by dynamic light scattering (DLS); (C) The average zeta potential of BS and BSC.

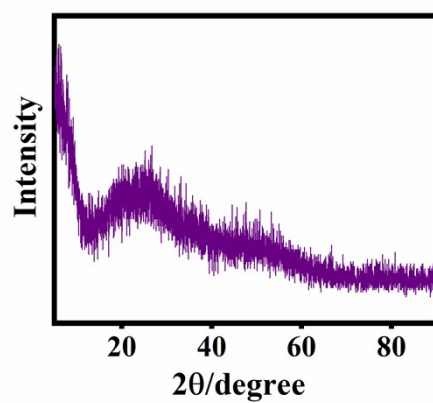


Figure S3. The XRD patterns of BS.

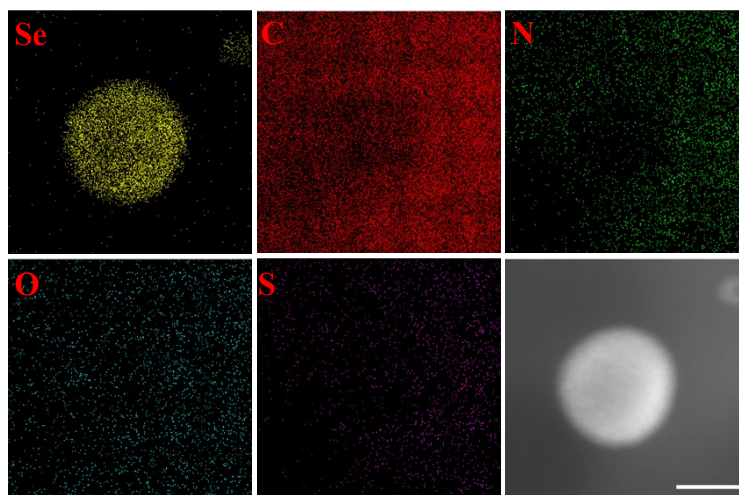


Figure S4. Element mappings of BSC including Se ,C ,N ,O and S signals (Scale bars for 50 nm).

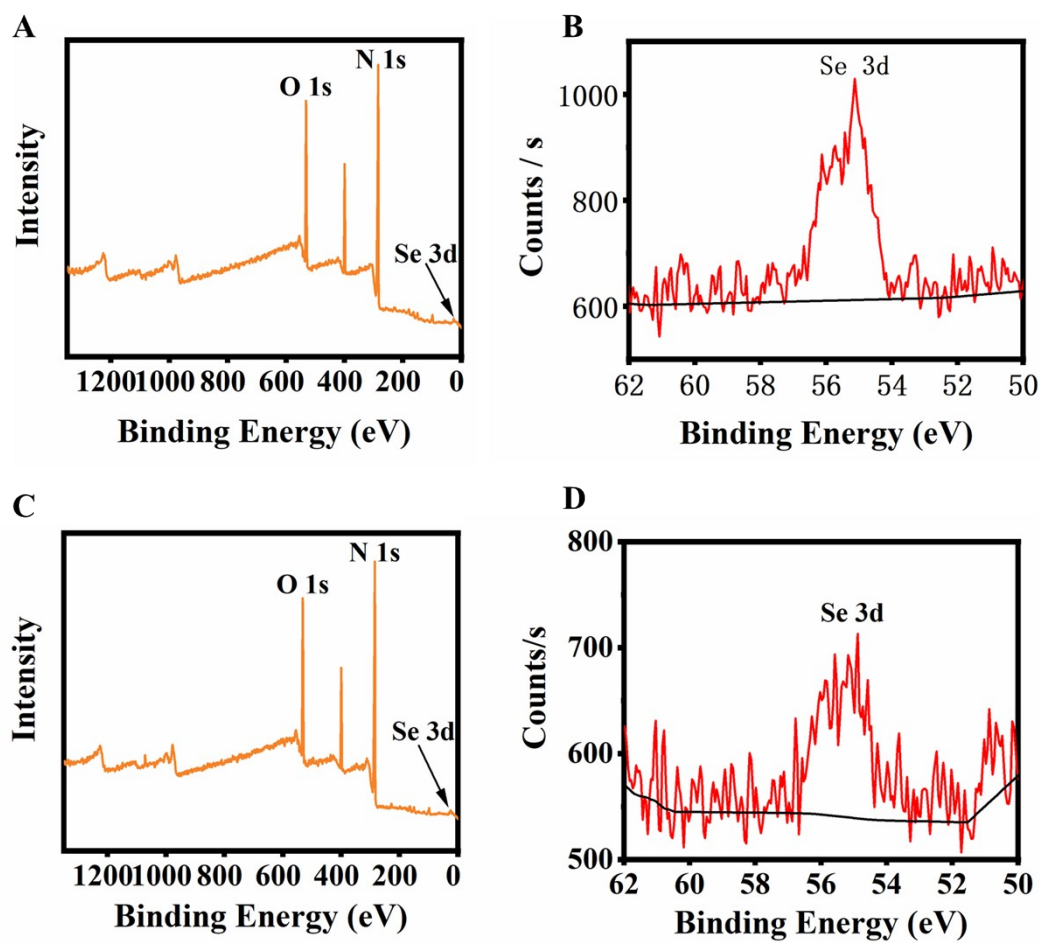


Figure S5. (A) and (B) are the XPS mapping of BSC. (C) and (D) are the XPS mapping of BSC with H₂O₂ in presence GSH.

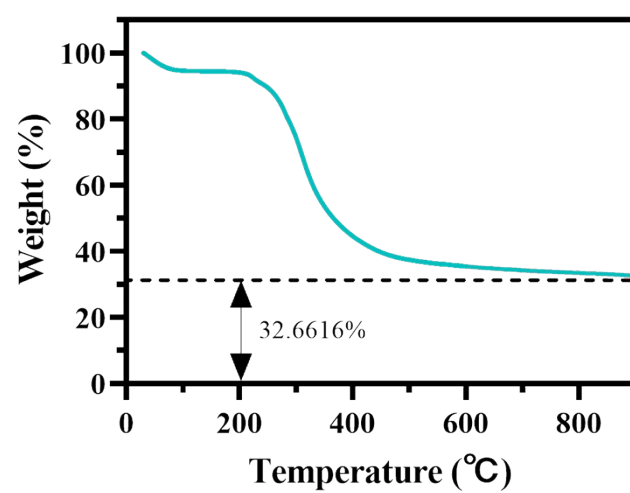


Figure S6. The thermogravimetric analysis results of BSC

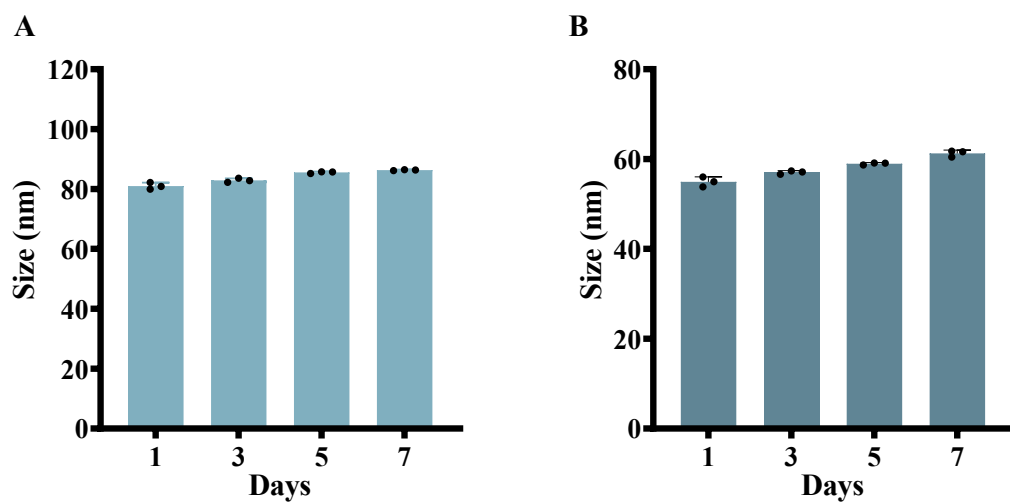


Figure S7. The stability of BS (A) and BSC (B) in H₂O.

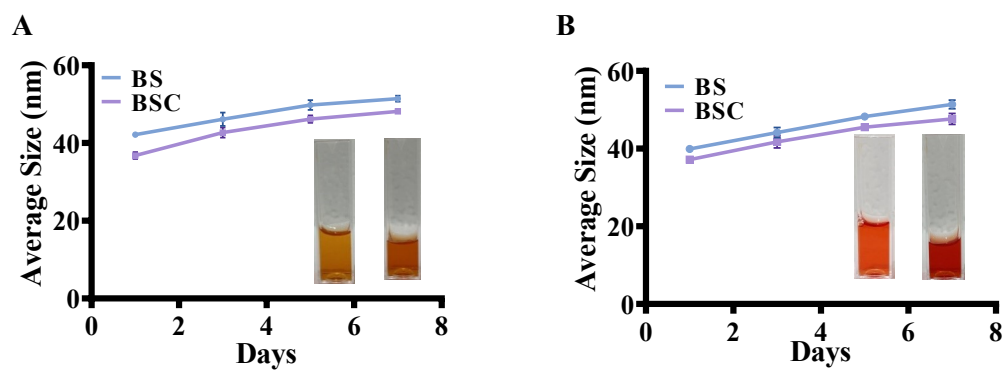


Figure S8. The stability of BS and BSC in PBS (A) and DMEM (B).

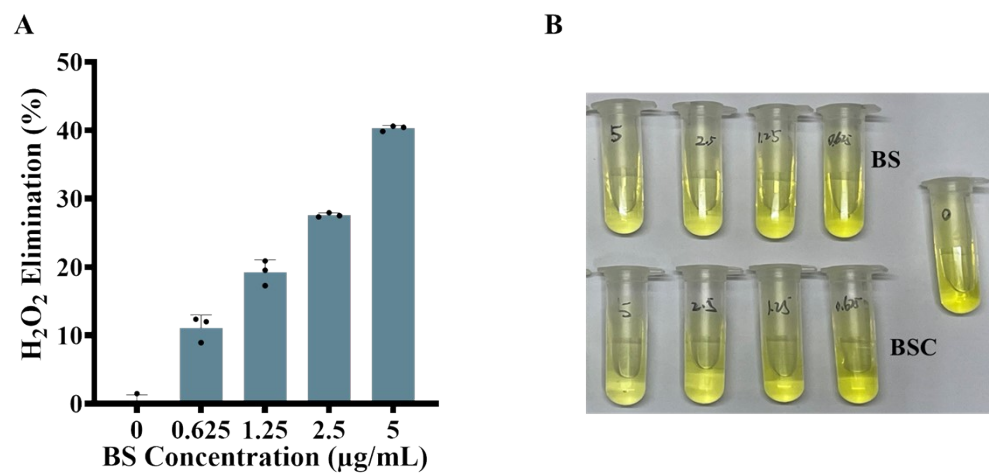


Figure S9. (A) Different concentrations of BS simulate GPX to clear H₂O₂; (B) The picture shows the color change of the solution including BS and BSC.

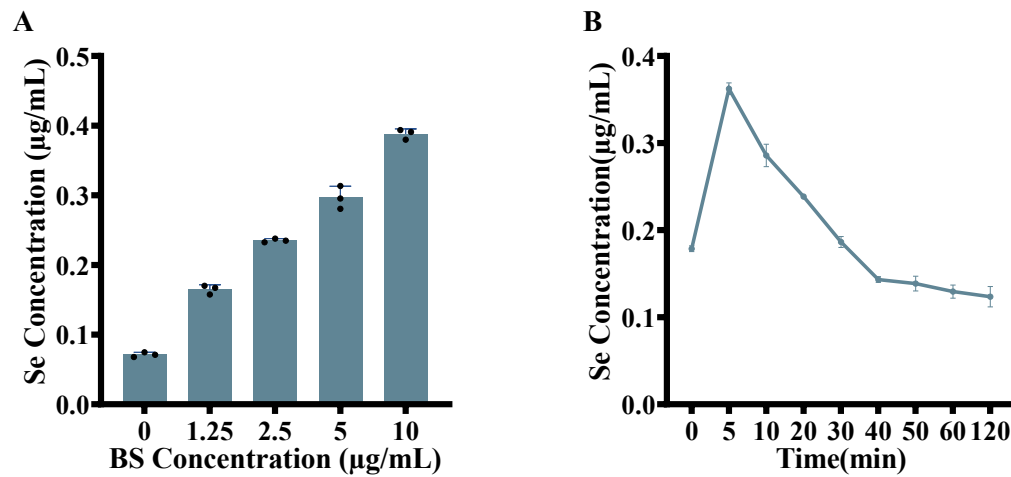


Figure S10. (A) Se concentration in the supernatant after the reaction of BS at different concentrations; (B) Se concentration in the supernatant after reaction of BS at different time points.

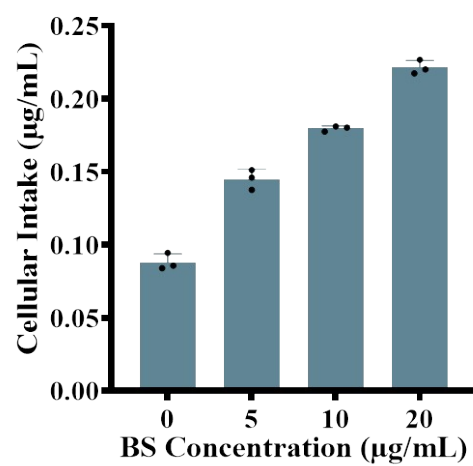


Figure S11. Uptake of BS at different concentrations by RAW264.7 cells.

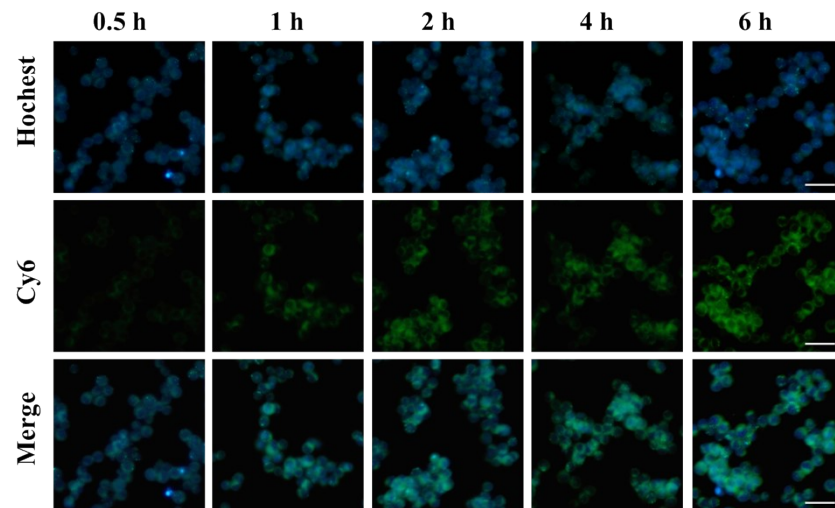


Figure S12. Fluorescent images of BS taken by RAW264.7 cells at different times (Scale bars for 50 μm)

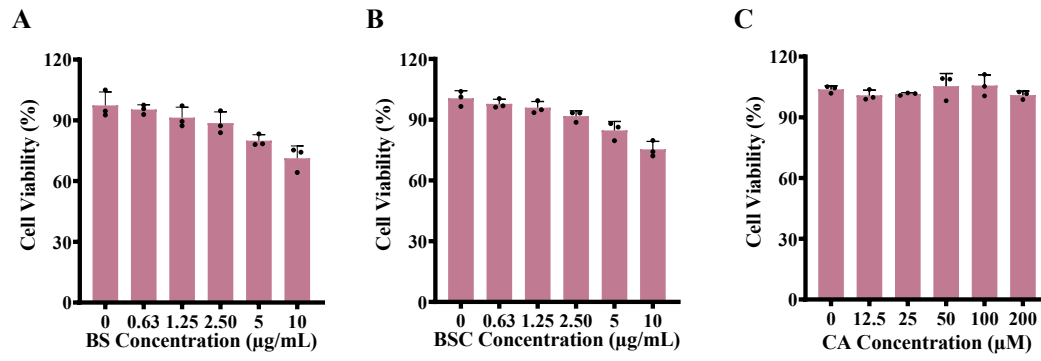


Figure S13. Relative viabilities of RAW264.7 cells after being exposed to BS (A) ,BSC (B) and CA (C) with different concentrations for 24 h.

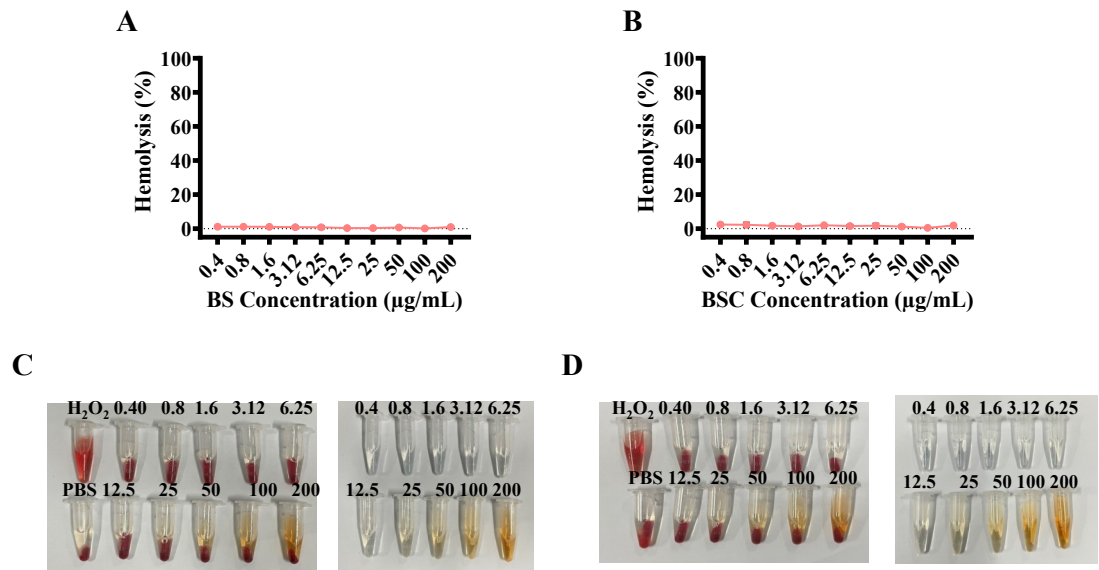


Figure S14. (A) and (B) show the blood compatibility of BS and BSC at 1 h, respectively. (C) and (D) are the centrifugation solutions of BS and BSC mixed with red blood cells, respectively. (The left image shows the hemolysis activity images of BS and BSC, respectively. The right image is a blank comparison of BS and BSC, respectively).

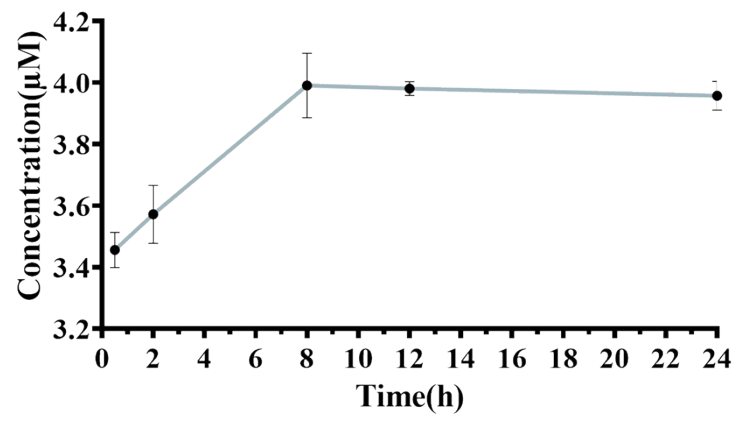


Figure S15. The in vitro release behavior of CA from BSC at different time points (0.5h, 2h, 8h, 12h and 24h).

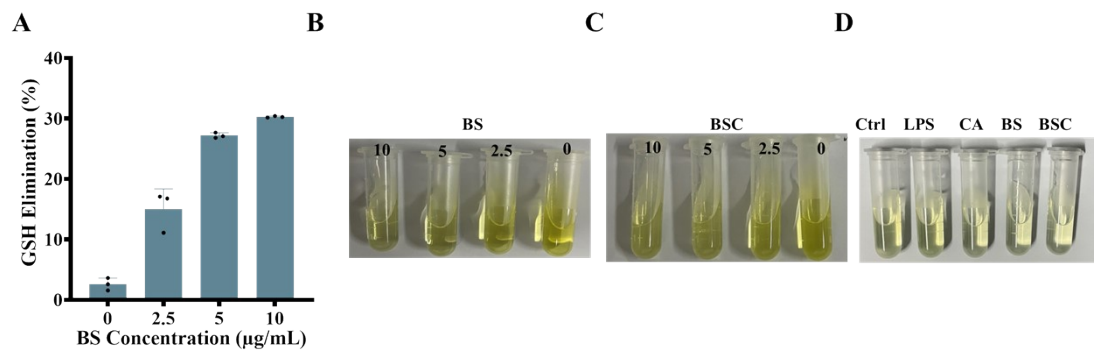


Figure S16. (A) Effects of BS on GPX activity in RAW264.7 cells at different concentrations; (B) The picture shows the color change of the solution including BS; (C) The picture shows the color change of the solution including BSC; (D) The picture shows the color change of the solution including BSC under inflammatory conditions.

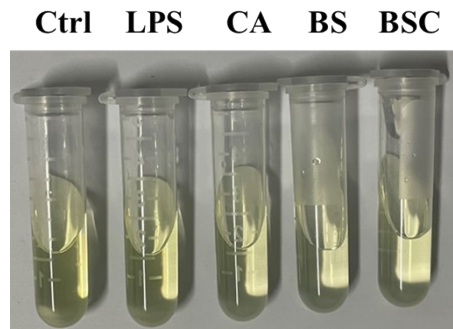


Figure S17. The picture shows the effect of BSC on serum GPX activity in sepsis mice.

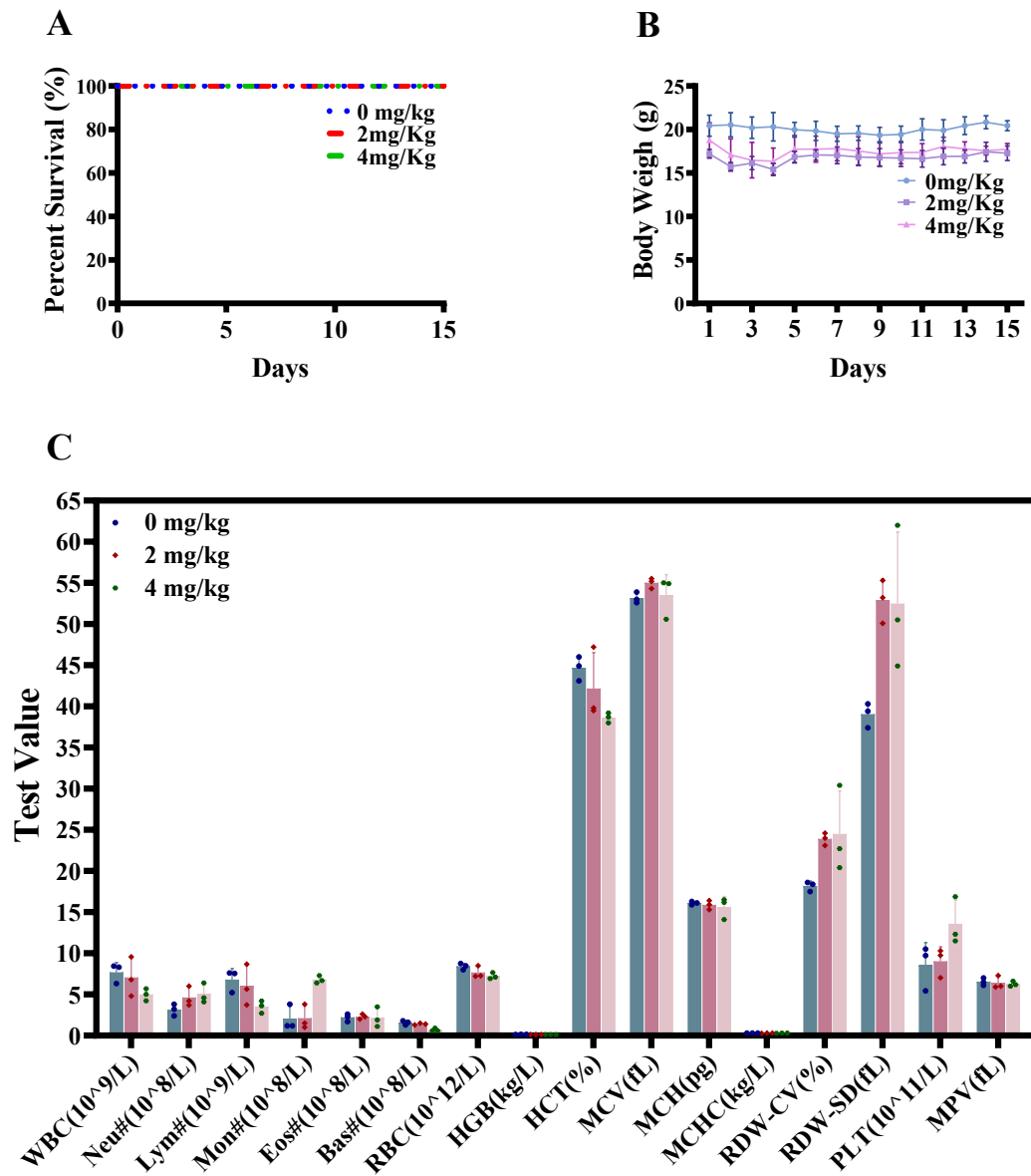


Figure S18. Toxicity of BSC. (A) The 15-day survival rate of mice injected with different concentrations of BSC (n=3); (B) Body weight changes of mice injected with different concentrations of BSC at 15 days (n=3); (C) Blood routine of mice injected with different concentrations of BSC 15 days later (n=3).