A fluorescence method based on N, S-doped carbon dots for detection of ammonia in aquaculture water and freshness of fish

Supporting information

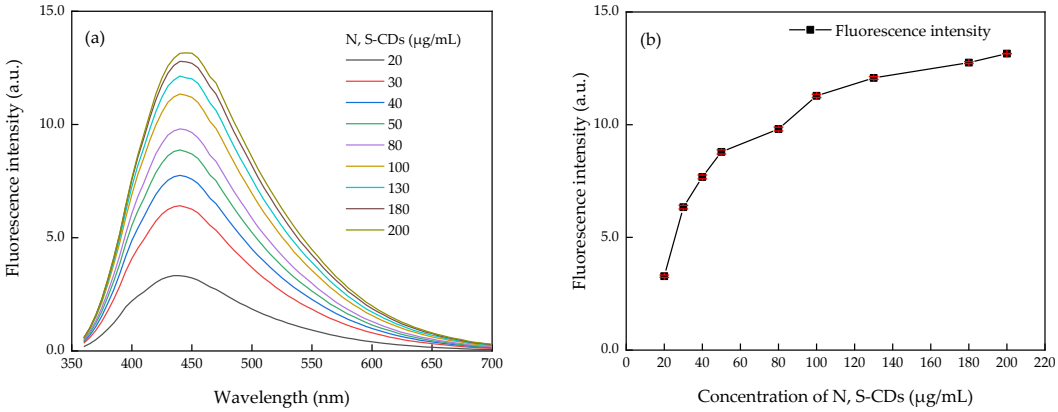

Figure S1 Fluorescence intensity of different concentration of CDs (a) and the plots curve at 445nm, concentration of CDs: 20, 30, 40, 50, 80, 100, 130, 180, 200, unit: μg/mg.

The fluorescent intensity of N, S-CDs is positively correlated with the concentration, as shown in Figure S1. Considering the fluorescence intensity and the amount of raw materials, we chose 100 ug/mL as the reaction concentration of N, S-CDs.

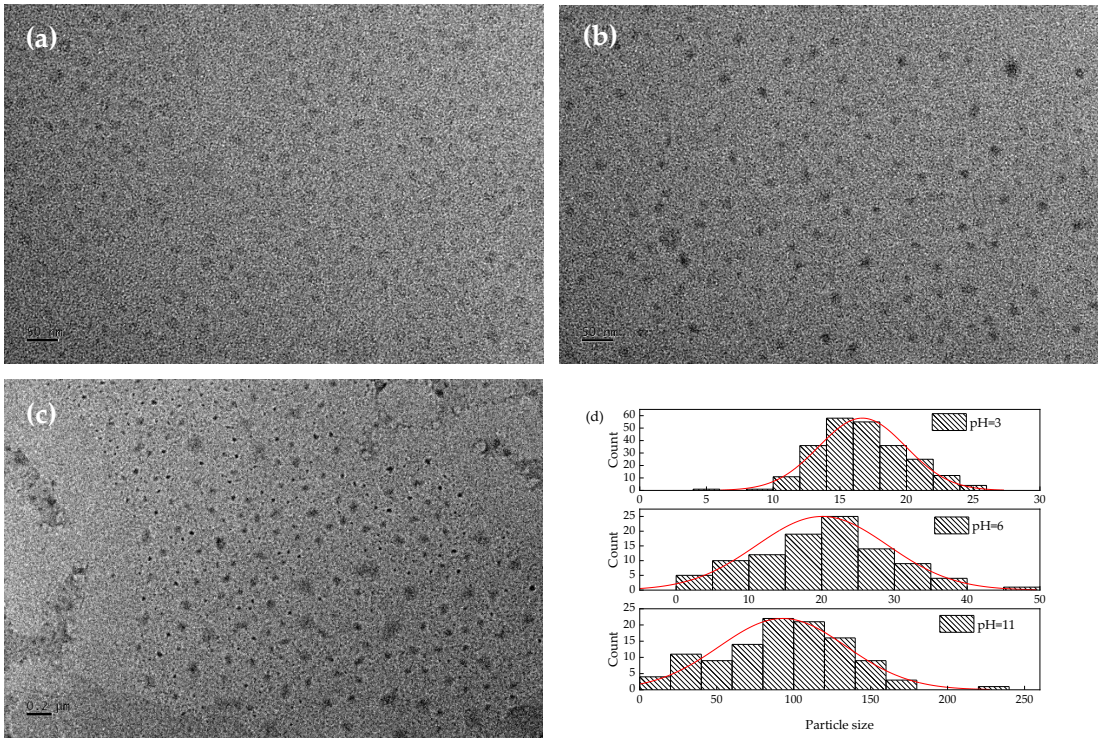

Figure S2 TEM images of N, S-CDs in pH of 3 (a), 6 (b) and 11 (c) and the distribution of particle

size (d).

The significantly decreased fluorescence at pH 11.0 may be caused by the aggrega-tion-induced quenching. It can be seen from Figure S2 that with pH increased, CDs was aggregated. At pH 6.0, the aggregation was not obvious, the particle size of the CDs increased a little compared with at pH 3.0; while at pH 11.0, N, S-CDs were signifi-cantly agglomerated as shown in TEM picture in Figure S2 (c), and the particle size also significantly increased, which was consistent with the change the fluorescence intensity of N, S-CDs at different pH. Studies [19] have shown that aggregation can cause fluo-rescence quenching. Therefore, aggregation may be the main reason of fluorescence quenching in pH=11.

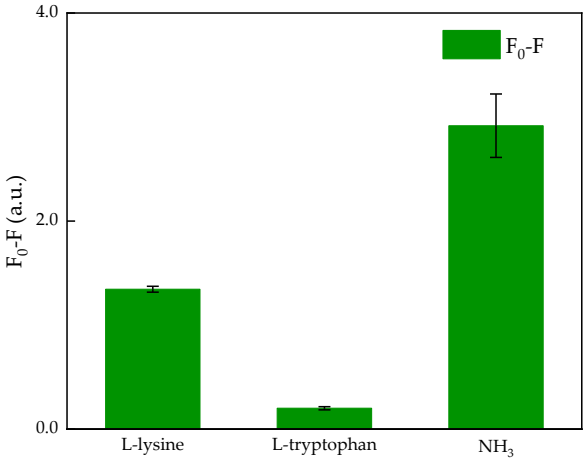

Figure S3 The fluorescence responses of CDs to L-lysine and L-tryptophan in the concentration of 20 mmol/L.

It can be seen from Figure S3 that L-tryptophan have almost no effect on the fluorescence intensity of N, S-CDs, while L-lysine can cause the fluorescence quenching of 12% in the concentration of 20 mmol/L. However, free amino acids changed with fish rot are non-volatile at room temperature. Therefore, the generation of free amino acids won't effect on the results.