Supplementary Information

Pre-treatment in Hot Glycerol for Facile and Green Separation of Chitin from Prawn Shell Waste

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Number of pages: ten (S1-S10)

Number of figures: 13 (thirteen)

Number of Tables: 0 (zero)

Figure S1. Photographs of **RAW-P**, **RAW-P** after pre-treatment in glycerol (**G-PRS**) and chitin (**HTC-P**)

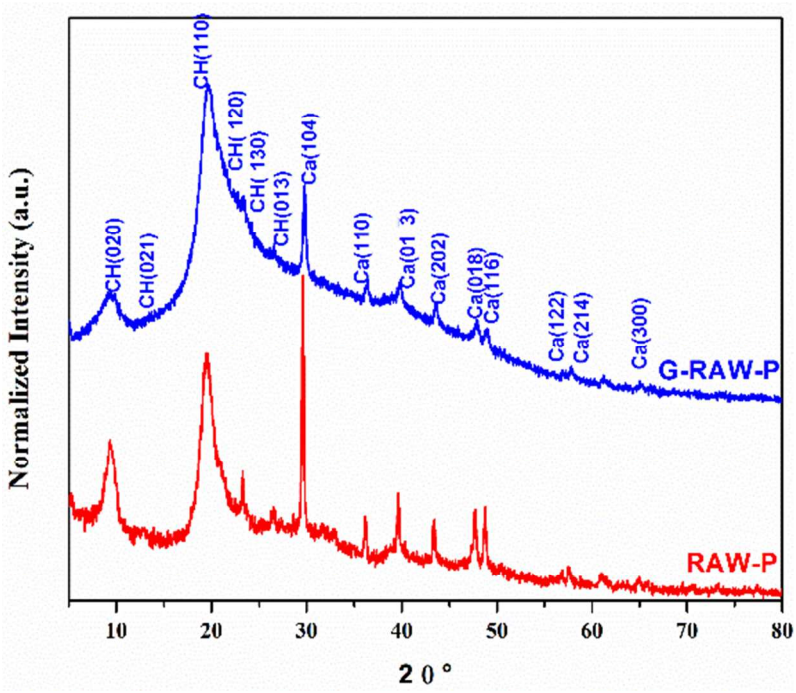

Figure S2. PXRD pattern of **RAW-P** beforev(bottom) and after soaking in glycerol **G-RAW-P** (top). CH-Chitin C- calcite.

The relative lowering of the intensity of (020) peak as well as the broadening of the (020) and (110) peaks after soaking in glycerol (**G-RAW-P**) indicted the plasticization effect of glycerol.

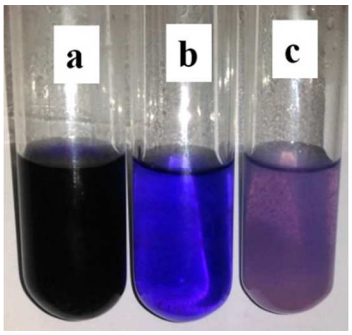

Figure S3. Qualitative ninhydrin test for amino acids. Photographs of a) filtrate obtained after pre-treatment of **RAW-P** with glycerol for 5 minutes at 200 °C in the preparation of **G-PRS**; b) 100 µL of BSA [200 mg in 10 mL of water] heat treated in glycerol for 5 minutes at 200 °C; c) BSA dissolved in water.

Bovine serum albumin (BSA) was heat treated with glycerol under the same experimental conditions as used for **RAW-P**. The depolymerisation of protein was anticipated to result in an increase in the concentration of amino acids. In addition to that, complete dissolution of protein was observed in hot glycerol treated BSA while coagulation was observed in untreated BSA suggesting that depolymerization of protein may be taking place in hot glycerol.

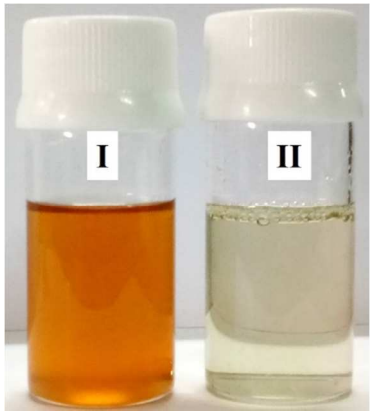

Figure S4. Photographs of glycerol (**I**) after three pre-treatments of **RAW-P** and (**II**) after treatment of (**I**) with activated charcoal (1 g of charcoal for 25 mL) followed by filtration.

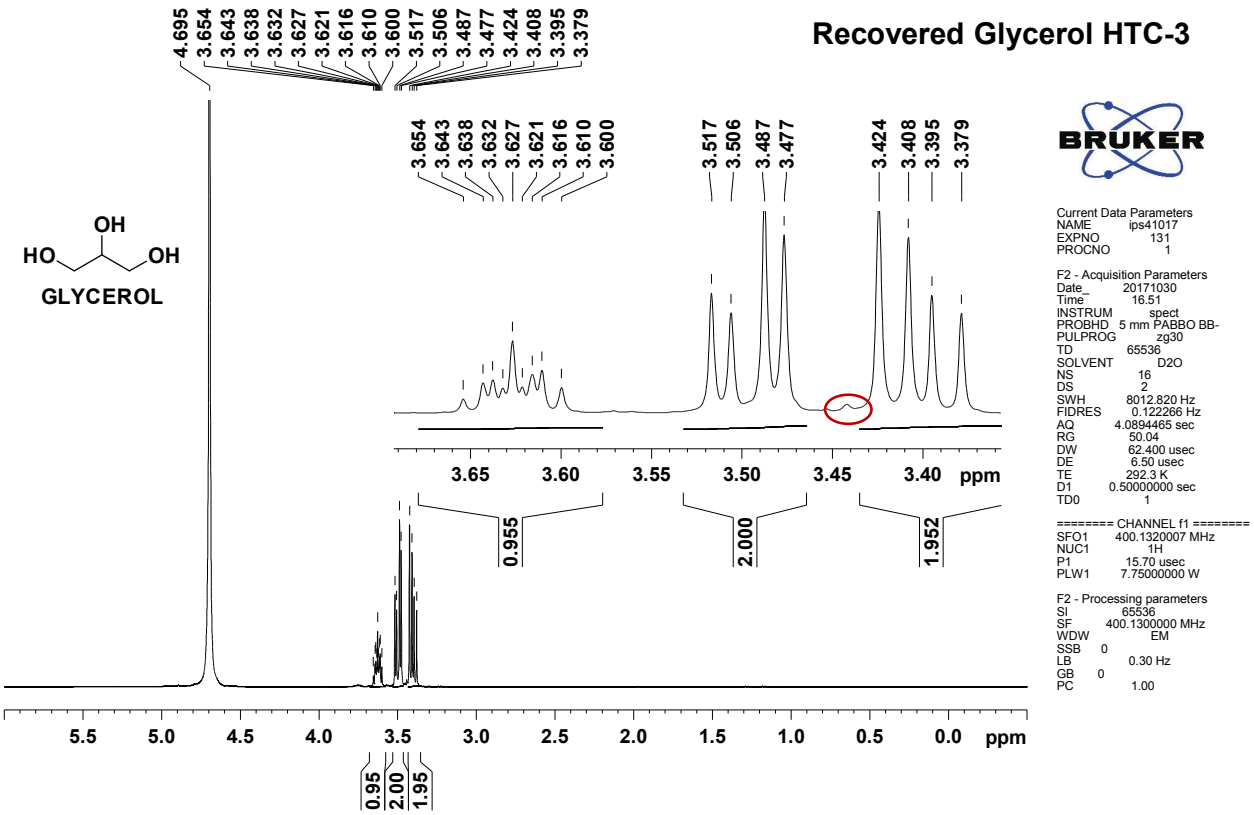

Figure S5. ^{1}H NMR spectrum of glycerol (in D_2O) obtained after three cycles of pre-treatment of **RAW-P** followed by treatment with activated charcoal.

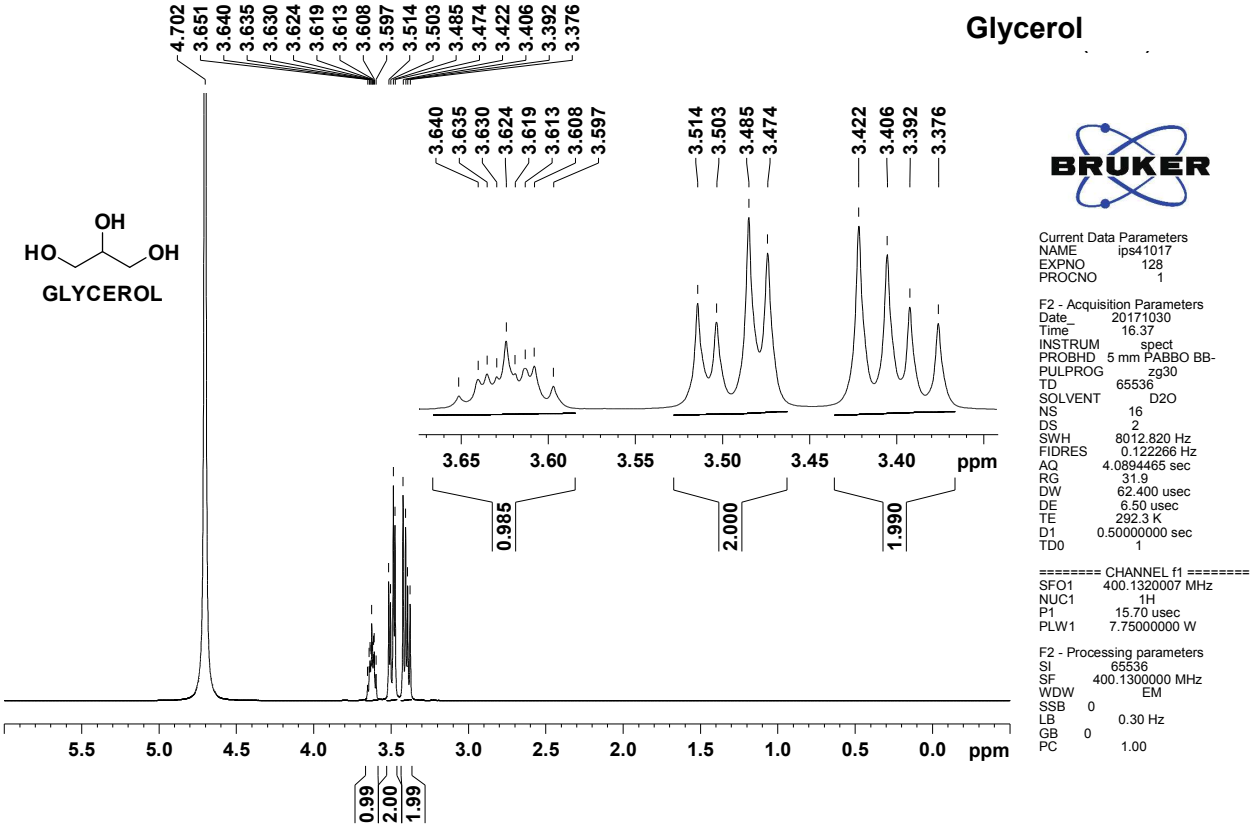

Figure S6. ^{1}H NMR spectrum of glycerol (in D_2O).

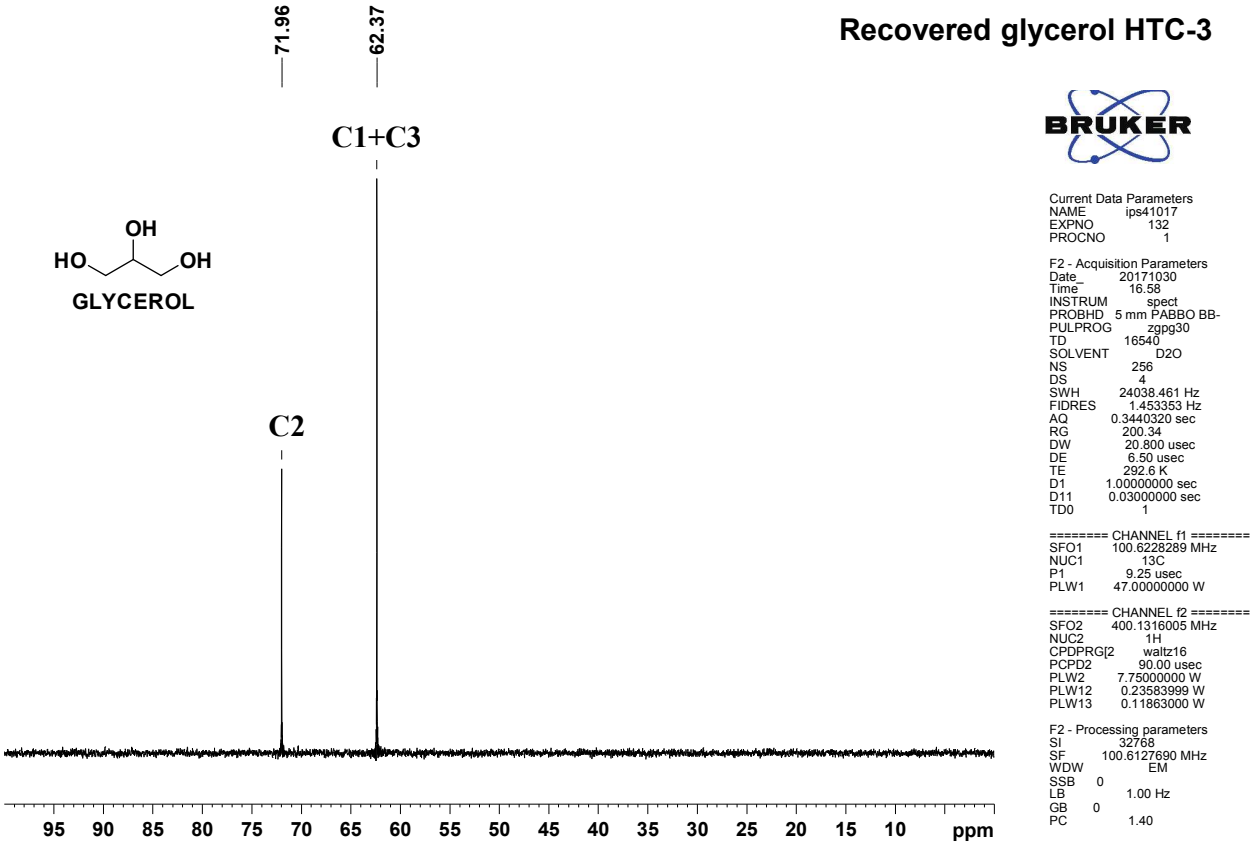

Figure S7. ^{13}C NMR spectrum of recovered glycerol (in D_2O).

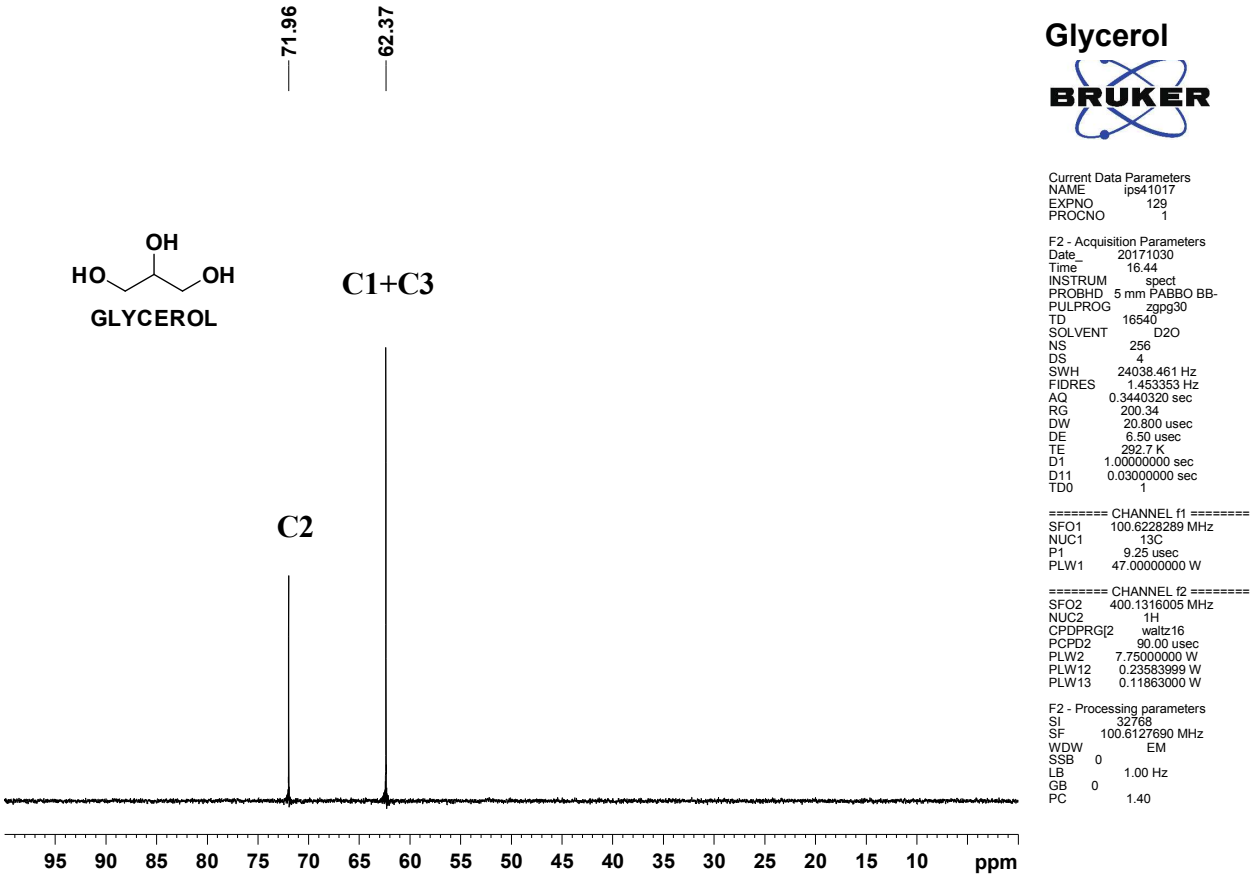

Figure S8. ^{13}C NMR spectrum of glycerol (in D_2O).

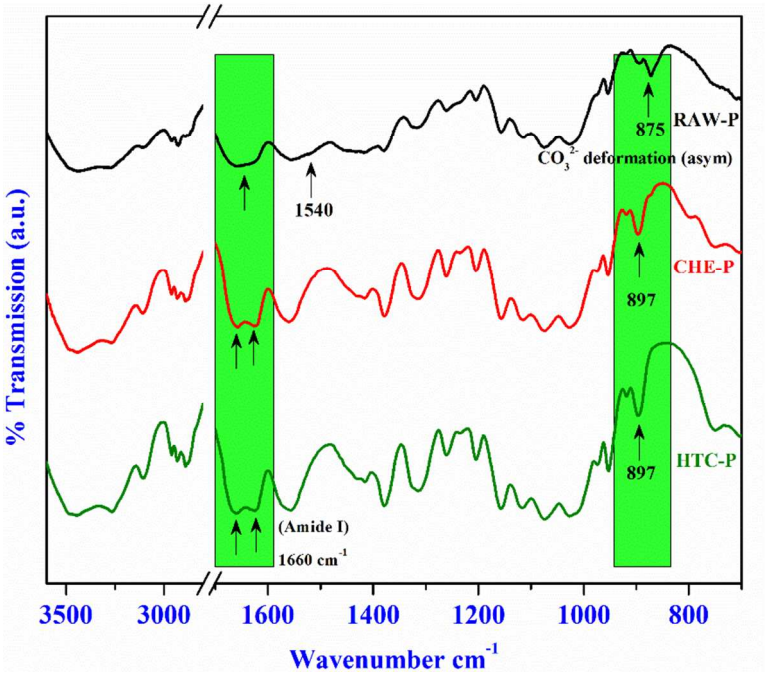

Figure S9. FT-IR spectra of, chitin isolated by the present method (**HTC-P**); chitin isolated by the chemical method (**CHE-P**); and **RAW-P**.

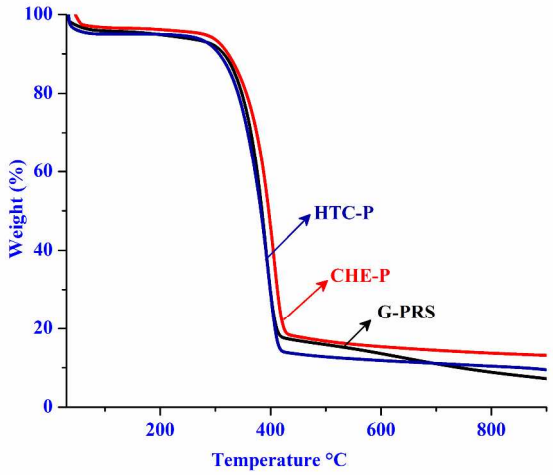

Figure S10. Thermogravimetric analysis of chitin. **HTC-P**: separated by the method reported here from **RAW-P**; **G-PRS**: separated from **RAW-P** by hot glycerol treatment followed by grinding and rinsing with water; **CHE-P**: separated by the conventional chemical method.

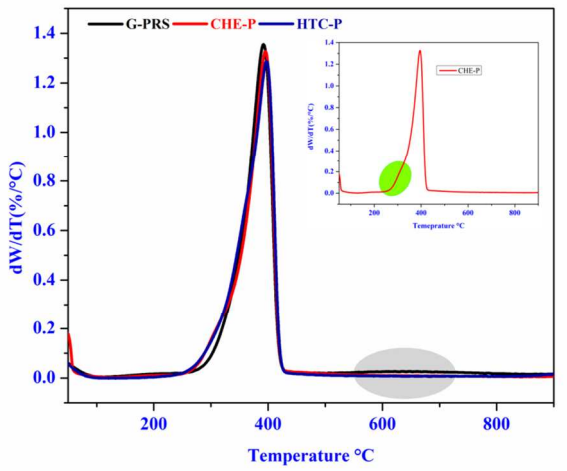

Figure S11. Differential thermogravimetric analysis of chitin separated from prawn shell. Hot glycerol treatment followed by grinding and rinsing with water (**G-PRS**); chemical method (**CHE-P**); and hot glycerol treatment followed by grinding in the presence of citric acid followed by rinsing with water (**HTC-P**).

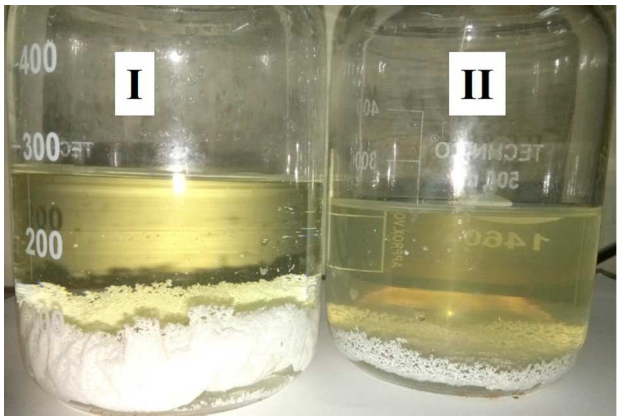

Figure S12. Photographs of calcium citrate crystals obtained by demineralization of **RAW-P** using citric acid (**I**) and in the process of hot glycerol pre-treatment followed by grindingwith citric acid **G-PRS** (**II**).

5 g of **RAW-P** was demineralized with 2.2 g of citric acid and **G-PRS** treated with 0.96 g of citric acid at room temperature for 30 minutes. The filtrates were kept at room temperature, overnight, for crystallization.

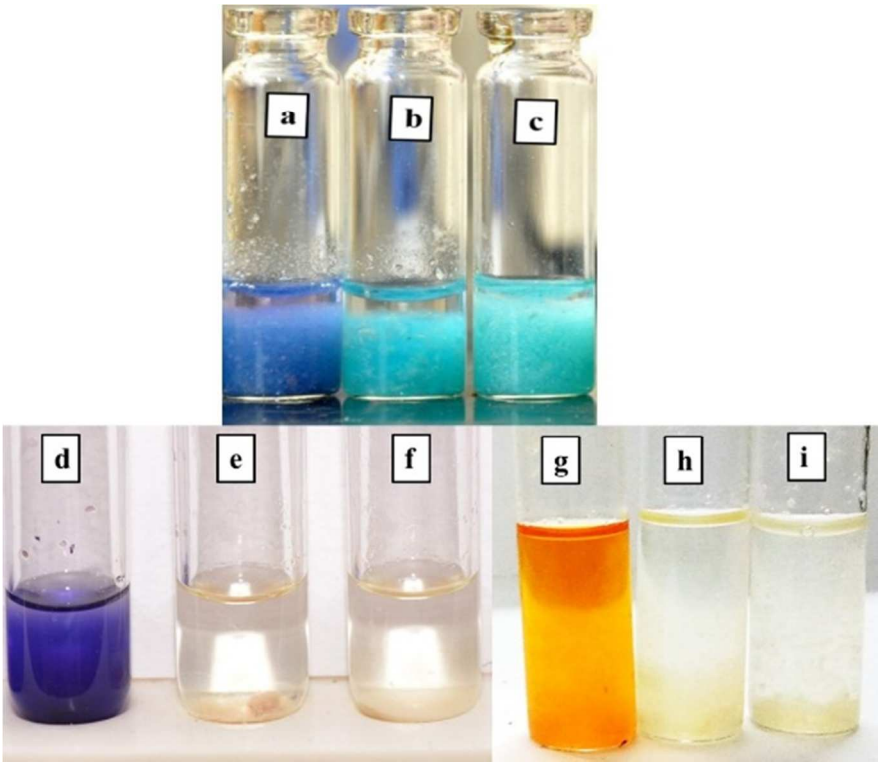

Figure S13. Photographs of samples of **RAW-P**, **CHE-P** and **HTC-P** after different tests. Biuret test (**a,b,c**), ninhydrin test (**d,e,f**) and xanthoprotic test (**g,h,i**).