Supplementary Information

Thermoresponsive structured emulsions based on fibrillar self-assembly of natural saponin glycyrrhizic acid

Zhili Wan,1 Yingen Sun,1 Lulu Ma,1 Jian Guo,1 Jinmei Wang,1 Shouwei Yin,1 and Xiaoquan Yang*,1,2

1 Research and Development Center of Food Proteins, Department of Food Science and Technology, South China University of Technology, Guangzhou 510640, China
2 Guangdong Province Key Laboratory for Green Processing of Natural Products and Product Safety, South China University of Technology, Guangzhou 510640, China

AUTHOR INFORMATION

Xiaoquan Yang (*corresponding author)

E-mail: fexqyang@163.com; fexqyang@scut.edu.cn

Fax: (086) 20-87114263; Tel: (086) 20-87114262
Fig. S1 (A) Interfacial tension as a function of time (30 min) for the GA solutions (0, 0.025, 0.05, and 0.1 wt%) at the oil-water interface. (B) Lissajous plots of surface pressure versus deformation obtained during amplitude sweep (10%) of the oil-water interface stabilized by 0.1 wt% GA fibril solution.
Fig. S2 (A) Photographs (above) of GA solutions (0.1-4 wt%) after storage at room temperature (25 °C) for 12 h, and a transparent hydrogel is formed at the low GA fibril concentration of 0.5 wt% (marked by red arrows); AFM (below) height image with corresponding AFM peak force error image of a thin layer of the 1 wt % GA hydrogel. (B) Amplitude and (C) frequency sweeps for the hydrogels prepared at different GA fibril concentrations (1, 2, and 4 wt%). $G'$ and $G''$ are shown as filled and open symbols, respectively.
Fig. S3 Spread-like appearance and optical microscopy image (scale bar = 30 μm) of the emulsion gel (60 wt% olive oil) stabilized by 4 wt% GA fibril.
Fig. S4 Force-relative displacement curves (A) and yield force (hardness) values (B) for emulsion gels (60 wt% olive oil) stabilized by different GA fibril concentrations (1-4 wt%).
Fig. S5 Storage modulus ($G'$) and loss modulus ($G''$) of emulsion gels containing 60 wt% olive oil prepared using 1 (A) and 3 wt% (B) GA fibrils, measured during the heating (red line) and cooling (blue line) cycles. (Insets) Photographs of respective emulsion gels during heating and cooling. $G'$ and $G''$ are shown as filled and open symbols, respectively. (C) PLM images of the 4 wt% GA fibril-stabilized emulsion gel observed during heating and cooling processes.
Fig. S6 (A) Storage modulus ($G'$) and loss modulus ($G''$) versus frequency for emulsion gels (60 wt% olive oil) prepared at different GA fibril concentrations (1-4 wt%) during 30 days of storage at room temperature (25 °C). $G'$ and $G''$ are shown as filled and open symbols, respectively. Photographs of these emulsion gels at initial (0 day) and after 30 days of storage at room temperature (25 °C). (B) The dried oil products containing nearly 94 wt% liquid oil obtained by freeze-drying of the 4 wt% GA fibril-stabilized emulsion gel. (C) Storage modulus ($G'$) and loss modulus ($G''$) as a function of frequency for the 4 wt% GA fibril-stabilized emulsion gel (60 wt% olive oil) with β-carotene (0.1 wt% of oil) during storage for 30 days. Photographs of emulsion gels (60 wt% olive oil) prepared at different GA fibril concentrations (1-4 wt%) with β-carotene (0.1 wt% of oil) at initial (0 day) and after 30 days of storage at room temperature (25 °C).