**Metal ions drive the directional self-assembly of glycyrrhetinic acid into a multifunctional sustained-release supramolecular hydrogel**

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Self-assembling food functional factor formed without structural modification and able to act as carriers are of interest for food applications. A lack of knowledge about self-assembly of food functional factors limits current application. Here, a self-assembling hydrogel of glycyrrhetinic acid, a functional factor in licorice, was formed with a uniformly organized nanotube or ribbon structure driven by divalent metal ions (Ca2+, Mg2+, Cu2+, Zn2+, Mn2+, etc), utilizing noncovalent electrostatic, hydrophobic interactions, and metal carboxyl group cross-linking. This assembly hydrogel resulted in an almost 100% drug loading capacity. Meanwhile, the hydrogel had good biological safety, retained the advantages of anti-inflammatory and anti-*Helicobacter pylori* of glycyrrhetinic acid, and solved the shortcomings of short gastrointestinal retention ability and water insolubility of single small molecule. Overall, these findings raise the possibility that this self-assembled glycyrrhetinic acid hydrogels could be used to treat gastrointestinal disorders such as gastritis and ulcerative colitis, either by themselves or by oral administration as a delivery vehicle in combination with other functional factors. In addition, we also hope that this self-assembly method can further expand the application of glycyrrhetinic acid in food medicine and other fields.