Response to Reviewer 1 Comments

This manuscript reports the synthesis of naringin hydrochalcone by one-pot hydrolysis-hydrogenation of naringin with Pd/C+NaOH catalyst and H2 under mild conditions. The experimental work seems correct and the manuscript is easy-to-follow. The results are of interest, since they allow the synthesis of this artificial sweetener in just one step instead of the current two-step synthesis. However, some issues should be addressed before publication:

Point 1: Characterization: Does the value of the Scherrer equation from the XRD match the experimental average particle size observed? Peaks in the XRD are quite broad, which usually indicate smaller particles that could not be seen within the TEM resolution. What about commercially available Pd/C? It should be similarly active as a catalyst.

Response 1:

1. the value of the Scherrer equation from the XRD:\[ L = \frac{K\lambda}{\beta \cos \theta} \]

   Where \( \lambda \) is the X-ray wavelength in nanometer (nm), \( \beta \) is the peak width of the diffraction peak profile at half maximum height resulting from small crystallite size in radians and \( K \) is a constant related to crystallite shape, normally taken as 0.89.

   \[ L_{40.1} = \frac{0.89(0.15405)}{0.36 \cos 20.05} = 0.405 \]

   The date is similar to the average particle size (0.43 nm) observed from TEM.

2. The activity of commercially available Pd/C

   The activity of commercially available Pd/C is similar to the synthetic Pd/C catalyst. Commercially available Pd/C was purchased from Aldrich. The experiment was measured under the optimal conditions: hydrogen reaction pressure of 2.5 MPa, reaction temperature of 45 °C, pH 12.0, and Pd/C catalyst loading of 10 molwt%. The yield using commercially available Pd/C is 84 wt%, which matched with the experiment result (85%) in this research.
Point 2: The reaction scheme should be included: Narginin to hydrochalcone, as well as the role of Pd/C-H2 and base during reaction, highlighting the selectivity of the reaction.

Response 2:

The reaction scheme is shown in Fig.1.

![Reaction Scheme](image)

Fig 1 the reaction scheme of hydrogenation of naringin

Point 3: Does the pH have any influence not only in the deprotonation of the alpha-carbon to the ketone but also in the phenol functionalities? What is the exact nature of narginin at this pH, is it deprotonated?

Response 3:

The role of NaOH on the reaction is to open heterocycles of naringin for forming the corresponding chalcone intermediate. If the pH is lower than 11, the heterocycles cannot be opened. And if the pH is too high, the glycoside bonds on naringin may be destroyed, the corresponding chalcone intermediate cannot be formed.

Point 4: Characterization of the product naringin hydrochalcone should be given.

Response 4:

The product naringin hydrochalcone was characterized by IR absorption (Fig. 1). IR absorption at 3390 cm\(^{-1}\)(-OH), 2923.84 cm\(^{-1}\)(-CH3), 1631 cm\(^{-1}\)(conjugated -C=O), 1513 cm\(^{-1}\),1438 cm\(^{-1}\) and 817 cm\(^{-1}\) (aromatic nucleus) were indicative of a hydroxylated dihydrochalcone, similar with the result of Tang et al\(^{[2]}\).
Fig. 1 IR absorption of naringin hydrochalcone

Point 5: Some typos: Section 2.3 “heterogeneous catalyst”; page 4 “Table 1”

Response 5:
The typos had been corrected in the manuscript.

References:
