Characterization of the secondary structure of peptides

FT-IR is a common method to characterize the secondary structure of proteins or peptides, which is mainly located in the amide I region (1600-1700 cm^{-1})[1]. Figure 1 shows the spectrum of Amide I before and after the reaction between KF-8 and H_2O_2. 13 main bands related to KF-8 were observed in the amide I area. And Table 1 showed the secondary structural percentage before and after the reaction of KF-8 with H_2O_2 assigned to amide I region. The secondary structure before and after the reaction of KF-8 with H_2O_2 is mainly β-sheet structure. After adding H_2O_2, the content of β-sheet structure of KF-8 changed from 48.75% to 46.6%. The content of random coil structure changed from 12.58% to 11.18%. The content of α-helix and β-turn structure changed from 16.27% to 16.07% and from 18.52% to 17.76%, respectively. In the secondary structure of proteins, β-sheet is a common regular secondary structure[2]. It can play a role in stabilizing the structure[3]. The results show that the secondary structure of KF-8 is relatively stable and will not react with H_2O_2.

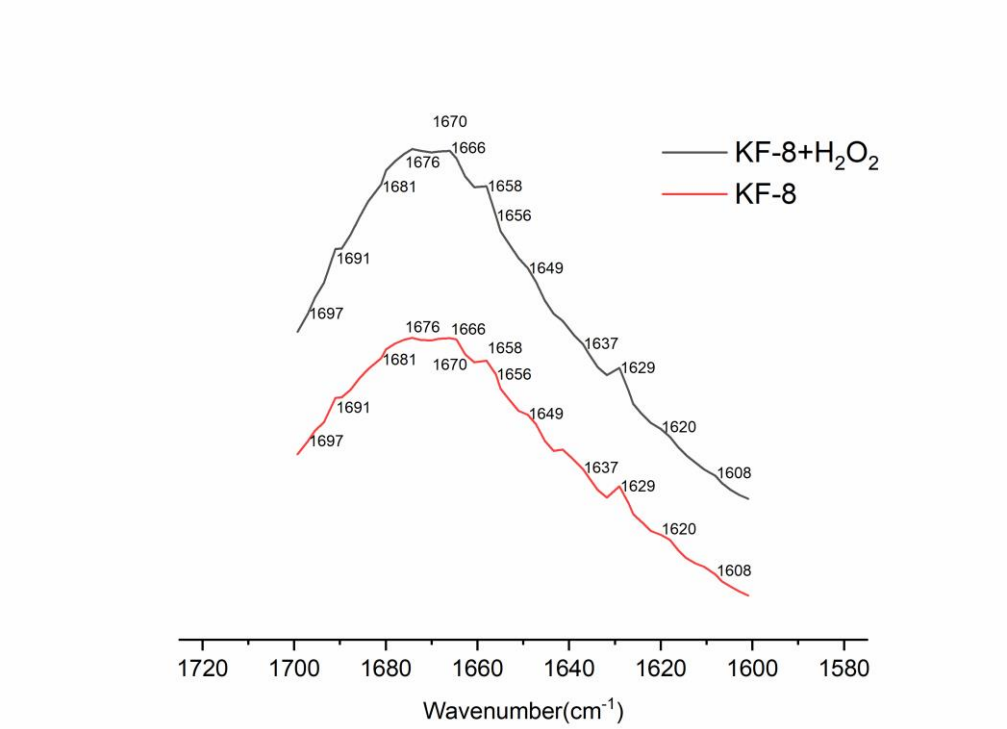

Figure 1 Deconvoluted FTIR spectra before and after the reaction of KF-8 with H_2O_2

Table 1 Secondary structure contents before and after the reaction of KF-8 with H_2O_2

Structure		β-sheet	Random coil	α-helix	β-turn
Wavenumber (cm^{-1})		1618-1640 1670-1690	1640-1650	1650-1660	1660-1670
Structure percentage(%)	KF-8	48.75±1.27[a]	12.58±0.31[a]	16.27±0.48[a]	18.52±0.48[a]
	KF-8+H_2O_2	46.60±0.06[a]	11.18±0.01[b]	16.07±0.05[a]	17.76±0.04[a]

Different letters in the same column indicate significant differences in $P < 0.05$.

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2. Z. H. Song, X. Chen, X. R. You, K. Q. Huang, A. Dhinakar, Z. P. Gu and J. Wu, Self-assembly of peptide amphiphiles for drug delivery: the role of peptide primary and secondary structures, *Biomater. Sci.*, 2017, **5**, 2369-2380.
3. C. L. Ge, H. Ye, F. Wu, J. L. Zhu, Z. Y. Song, Y. Liu and L. C. Yin, Biological applications of water-soluble polypeptides with ordered secondary structures, *J. Mat. Chem. B*, 2020, **8**, 6530-6547.