**Supplementary Material 1**

**Authentication and Quantitative Analysis of CX**

Morphological authentication of the raw product showed that it appeared pale yellow-brown. Starch granules were abundant, exhibiting various shapes including elliptical, elongated oval, near-spherical, oval, or kidney-shaped, with diameters ranging from 5 - 16 μm and an average length of approximately 21 μm. The hilum appeared as punctate, elongated fissure, or a herringbone pattern. Calcium oxalate crystals were present within thin-walled cells, appearing as rounded aggregates or cluster-like crystalline formations, with diameters between 10 - 25 μm. Cork cells were deep yellow-brown, polygonal in surface view, and exhibited micro-wavy bending. Oil chambers were mostly ruptured. The primary vessels were spiral vessels, with some reticulate and ladder-type vessels, with 14 - 50 μm in diameter. All of the features conformed to the 2020 Chinese Pharmacopoeia standards.

Quantitative analysis indicated that the ferulic acid content in Chuanxiong was 0.13% in average, which was consistent with the 2020 Chinese Pharmacopoeia [21] (see Supplementary Table 1-6 for details and chromatograms generated through HPLC in Figs. 1–33).

The calibration curve was established with the regression equation Y = 1.4193X - 0.0603, with a correlation coefficient r = 0.9999. The linear relationship between ferulic acid concentration (0.8-40 μg/mL) and peak area demonstrated an excellent linearity.

**Supplementary Table 1 Linear regression of ferulic acid solution (n=6)**

|  |  |  |
| --- | --- | --- |
| Sample number | Content of ferulic acid（μg/mL） | Peak area |
| 1 | 0.8 | 1.2001 |
| 2 | 1.6 | 2.0537 |
| 3 | 16 | 22.6222 |
| 4 | 24 | 33.8822 |
| 5 | 32 | 45.8202 |
| 6 | 40 | 56.4290 |



**Supplementary Fig. 1. Chromatogram of ferulic acid solution (No. 1)**



**Supplementary Fig. 2. Chromatogram of ferulic acid solution (No. 2)**



**Supplementary Fig. 3. Chromatogram of ferulic acid solution (No. 3)**



**Supplementary Fig. 4. Chromatogram of ferulic acid solution (No. 4)**



**Supplementary Fig. 5. Chromatogram of ferulic acid solution (No. 5)**



**Supplementary Fig. 6. Chromatogram of ferulic acid solution (No. 6)**

The RSD calculated in the precision test was 0.58%, indicating that the precision of the methodology for the measurement of ferulic acid was convinced.

**Supplementary Table 2 Precision test for measurement of ferulic acid (n=6)**

| Sample number | Peak area | Average peak area | RSD(%) |
| --- | --- | --- | --- |
| 1 | 13.1557 | 13.0421 | 0.58 |
| 2 | 12.9841 |
| 3 | 13.0685 |
| 4 | 13.0154 |
| 5 | 12.9477 |
| 6 | 13.0814 |



**Supplementary Fig. 7. Chromatogram of the precision test (No. 1)**



**Supplementary Fig. 8. Chromatogram of the precision test (No. 2)**



**Supplementary Fig. 9. Chromatogram of the precision test (No. 3)**



**Supplementary Fig. 10. Chromatogram of the precision test (No. 4)**



**Supplementary Fig. 11. Chromatogram of the precision test (No. 5)**



**Supplementary Fig. 12. Chromatogram of the precision test (No. 6)**

The RSD calculated in the stability test was 0.40%, indicating that the stability of the ferulic acid solution was well enough within 10 hours.

**Supplementary Table 3 Stability test for the rerulic acid solution**

| Standing time（h） | Peak area | Average peak area | RSD（%） |
| --- | --- | --- | --- |
| 0 | 19.2653 | 19.1513 | 0.40 |
| 2 | 19.2284 |
| 4 | 19.1321 |
| 6 | 19.1079 |
| 8 | 19.0974 |
| 10 | 19.0768 |



**Supplementary Fig. 13. Chromatogram of the stability test (0h)**



**Supplementary Fig. 14. Chromatogram of the stability test (2h)**



**Supplementary Fig. 15. Chromatogram of the stability test (4h)**



**Supplementary Fig. 16. Chromatogram of the stability test (6h)**



**Supplementary Fig. 17. Chromatogram of the stability test (8h)**



**Supplementary Fig. 18. Liquid Chromatogram of the stability experiment (10h)**

The RSD calculated in the repeatability test was 0.40%, indicating that the methodology was in a well repeatability.

**Supplementary Table 4 Results of repeatability test for the measurement of ferulic acid (n=6)**

| Sample number | Peak area | Ferulic acid content (%) | Average content (%) | RSD（%） |
| --- | --- | --- | --- | --- |
| 1 | 18.5935 | 0.130 | 0.130 | 0.40 |
| 2 | 18.5488 | 0.130 |
| 3 | 18.7939 | 0.131 |
| 4 | 18.6693 | 0.130 |
| 5 | 18.4968 | 0.130 |
| 6 | 18.6878 | 0.131 |



**Supplementary Fig. 19. Chromatogram of the repeatability test (No. 1)**



**Supplementary Fig. 20. Chromatogram of the repeatability test (No. 2)**



**Supplementary Fig. 21. Chromatogram of the repeatability test (No. 3)**



**Supplementary Fig. 22. Chromatogram of the repeatability test (No. 4)**



**Supplementary Fig. 23. Chromatogram of the repeatability test (No. 5)**



**Supplementary Fig. 24. Chromatogram of the repeatability test (No. 6)**

The results of the standard solution addition and sample recovery test showed that the average recovery rate was 99.80% and the RSD was 0.31%.

**Supplementary Table 5 Results of the recovery rate test (n=6)**

| Sample amount (mg) | Measured ferulic acid in sample  (mg) | Addition of ferulic acid  (mg) | Total measured ferulic acid  (mg) | Recovery rate (%) | Average recovery rate  (%) | RSD(%) |
| --- | --- | --- | --- | --- | --- | --- |
| 506.9 | 0.6590 | 0.38 | 1.041 | 100.19 | 99.80 | 0.31 |
| 505.7 | 0.6574 | 1.035 | 99.77 |
| 506.0 | 0.6578 | 1.032 | 99.44 |
| 503.0 | 0.6539 | 1.030 | 99.62 |
| 505.5 | 0.6572 | 1.039 | 100.17 |
| 507.6 | 0.6599 | 1.036 | 99.62 |



**Supplementary Fig. 25. Chromatogram of the recovery rate test (No. 1)**



**Supplementary Fig. 26. Chromatogram of the recovery rate test (No. 2)**



**Supplementary Fig. 27. Chromatogram of the recovery rate test (No. 3)**



**Supplementary Fig. 28. Chromatogram of the recovery rate test (No. 4)**



**Supplementary Fig. 29. Chromatogram of the recovery rate test (No. 5)**



**Supplementary Fig. 30. Chromatogram of the recovery rate test (No. 6)**

The content determination result showed that the content of ferulic acid was 0.13%, which complied with the criterion of the 2020 Edition of the Chinese Pharmacopoeia.

**Supplementary Table 6 Determination of ferulic acid content in samples (n=3)**

|  |  |  |  |
| --- | --- | --- | --- |
| Sample number | Peak area | Ferulic acid content (%) | Average(%) |
| 1 | 18.5937 | 0.130 | 0.130 |
| 2 | 18.6014 | 0.130 |
| 3 | 18.6211 | 0.129 |



**Supplementary Fig. 31. Chromatogram of CX sample (No. 1)**



**Supplementary Fig. 32. Chromatogram of CX sample (No. 2)**



**Supplementary Fig. 33. Chromatogram of CX sample (No. 3)**

**Authentication and Quantitative Analysis of Ganoderma lucidum (GL)**

Morphological authentication of the raw product revealed that the powder exhibited dark brown. The mycelium appeared aggregated into clumps, pale brown, characterized by fine, elongated, slightly curved hyphae with septation, with 2.5 - 6.5 μm in diameter. Spores were brown, ovoid, with a flat apex, and possessed a colorless outer wall with wart-like projections on the inner wall, with 8 - 12 μm in length and 5 - 8 μm in width, all consistent with the criterion set in 2020 edition of the Chinese Pharmacopoeia [21].

The calibration curve was established through spectrophotometer, with the regression equation y = 5.6414x + 0.0831 (R² = 0.9960), demonstrating a fine linearity within the concentration range of 0.02 - 0.1 mg given the standard reference solution of oleanolic acid. Quantitative analysis indicated that the total triterpenoid and sterols content in GL is 0.97% calculated in terms of oleanolic acid, which is higher than the criterion 0.50% set in the 2020 edition of Chinese Pharmacopoeia [21] (see Supplementary Tables 7–10 for details).

**Supplementary Table 7 Results of precision test for oleanolic acid measurement (n=6)**

|  |  |  |  |
| --- | --- | --- | --- |
| Sample number | Absorbance | Average absorbance | RSD (%) |
| 1 | 0.304 | 0.302 | 0.99 |
| 2 | 0.304 |
| 3 | 0.302 |
| 4 | 0.302 |
| 5 | 0.301 |
| 6 | 0.301 |

**Supplementary Table 8 Results of stability test for oleanolic acid**

|  |  |  |  |
| --- | --- | --- | --- |
| Sanding time (min) | Absorbance | Average absorbance | RSD (%) |
| 0 | 0.301 | 0.302 | 0.99 |
| 5 | 0.302 |
| 10 | 0.302 |
| 15 | 0.304 |
| 20 | 0.303 |
| 30 | 0.302 |

**Supplementary Table 9 Results of recovery rate test for GL samples (n=6)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sample number | Sample amout（g） | Triterpene and sterols content（mg） | Addition amount（mg） | Measured amount（mg） | Recovery rate（%） | Average rate (%) | RSD（%） |
| 1 | 1.03 | 0.021 | 0.02 | 0.040 | 97.56 | 99.19 | 4.92 |
| 2 | 1.13 | 0.022 | 0.02 | 0.042 | 100.00 |
| 3 | 1.10 | 0.021 | 0.02 | 0.042 | 102.44 |
| 4 | 1.04 | 0.021 | 0.02 | 0.040 | 97.56 |
| 5 | 1.06 | 0.021 | 0.02 | 0.040 | 97.56 |
| 6 | 1.14 | 0.022 | 0.02 | 0.042 | 100.00 |

**Supplementary Table 10 Results of measurement of triterpene and sterols in GL (n=6)**

|  |  |  |  |
| --- | --- | --- | --- |
| Sample number | Total triterpene and sterols content（g/100g） | Average content（g/100g） | RSD (%) |
| 1 | 0.973 | 0.971 | 1.75 |
| 2 | 0.965 |
| 3 | 0.976 |
| 4 | 0.980 |
| 5 | 0.968 |
| 6 | 0.963 |

**Supplementary Material 2**

**Supplementary Table 1 Main active constituents of CX**

|  |  |  |
| --- | --- | --- |
| Order | Compound | MolID |
| 1 | Mandenol | MOL001494 |
| 2 | Myricanone | MOL002135 |
| 3 | Perlolyrine | MOL002140 |
| 4 | wallichilide | MOL002157 |
| 5 | sitosterol | MOL000359 |
| 6 | FA | MOL000433 |

**Supplementary Table 2 Main active constituents of GL**

|  |  |  |
| --- | --- | --- |
| Order | Compound | Mol ID |
| 1 | methyl (4R)-4-[(5R,10S,13R,14R,17R)-4,4,10,13,14-pentamethyl-3,7,11,15-tetraoxo-2,5,6,12,16,17-hexahydro-1H-cyclopenta[a]phenanthren-17-yl]pentanoate | MOL011129 |
| 2 | campesta-7,22E-dien-3beta-ol | MOL011137 |
| 3 | 5alpha-Lanosta-7,9(11),24-triene-15alpha,26-dihydroxy-3-one | MOL011140 |
| 4 | ergosta-4,6,8(14),22-tetraene-3-one | MOL011159 |
| 5 | ergosta-7,9(11),22-trien-3β,5α,6α-triol | MOL011168 |
| 6 | ganoderal B | MOL011171 |
| 7 | ganolucidic acid E | MOL011256 |
| 8 | Lucialdehyde B | MOL011267 |
| 9 | (4R)-4-[(5R,7S,10S,13R,14R,17R)-7-hydroxy-3,11,15-triketo-4,4,10,13,14-pentamethyl-1,2,5,6,7,12,16,17-octahydrocyclopenta[a]phenanthren-17-yl]valeric acid | MOL011270 |
| 10 | lucidone A | MOL011287 |
| 11 | methyl (4R)-4-[(5R,7S,10S,13R,14R,15S,17R)-7,15-dihydroxy-4,4,10,13,14-pentamethyl-3,11-dioxo-2,5,6,7,12,15,16,17-octahydro-1H-cyclopenta[a]phenanthren-17-yl]pentanoate | MOL011309 |
| 12 | Cerevisterol | MOL000279 |
| 13 | ergosta-7,22E-dien-3beta-ol | MOL000282 |
| 14 | beta-sitosterol | MOL000358 |

**Supplementary Table 3 Targets of CX constituents**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MolID | Target name | | | | | | |
| MOL001494 | PTGS1 | PTGS2 | Ncoa2 |  |  |  |  |
| MOL002135 | NOS2 | PTGS1 | F2 | KCNH2 | ESR1 | Ar | SCN5A |
| ADRB2 | ESR2 | DPP4 | MAPK14 | GSK3B | HSP90AA1 | CDK2 |
| PPARG | PTGS2 | F7 | KDR | RXRA | PDE3A | Chek1 |
| IGHG1 | PIM1 | CCNA2 | Ncoa1 |  |  |  |
| MOL002140 | F2 | PTGS2 | RXRA | PKIA |  |  |  |
| MOL002157 | PTGS2 | NR3C2 | NR3C1 | Ncoa2 |  |  |  |
| MOL000359 | PGR | NR3C2 | Ncoa2 |  |  |  |  |
| MOL000433 | F2 | GSK3B | CDK2 |  |  |  |  |

**Supplementary Table 4 Targets of GL constituents**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MolID | Target name | | | | | | |
| MOL011129 | NR3C2 |  |  |  |  |  |  |
| MOL011137 | PGR | NR3C2 | Ncoa2 |  |  |  |  |
| MOL011140 | NR3C2 |  |  |  |  |  |  |
| MOL011159 | PGR |  |  |  |  |  |  |
| MOL011168 | NR3C2 |  |  |  |  |  |  |
| MOL011171 | PGR | Ncoa2 |  |  |  |  |  |
| MOL011256 | NR3C2 |  |  |  |  |  |  |
| MOL011267 | PGR |  |  |  |  |  |  |
| MOL011270 | NR3C2 |  |  |  |  |  |  |
| MOL011287 | NR3C2 | Ncoa1 |  |  |  |  |  |
| MOL011309 | NR3C2 |  |  |  |  |  |  |
| MOL000279 | NR3C2 |  |  |  |  |  |  |
| MOL000282 | PGR |  |  |  |  |  |  |
| MOL000358 | PTGS1 | DRD1 | CHRM3 | KCNH2 | CHRM1 | SCN5A | Bcl2 |
| PTGS2 | Gabra2 | CHRM4 | PDE3A | HTR2A | GABRA5 | ADRA1D |
| GABRA3 | PGR | CHRM2 | ADRA1B | ADRB2 | CHRNA2 | SLC6A4 |
| OPRM1 | GABRA1 | PON1 | JUN | HSP90AA1 | PIK3CG | CHRNA7 |
| PKIA | Ncoa2 | MAP2 | Bax | CASP3 | Casp8 | CASP9 |
| PRKCA | TGFB1 |  |  |  |  |  |

**Supplementary Table 5 Mutual targets of CX and GL**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRD1 | CHRM3 | CHRM1 | Bcl2 | Gabra2 | CHRM4 | HTR2A | GABRA5 | ADRA1D | GABRA3 |
| CHRM2 | ADRA1B | CHRNA2 | SLC6A4 | OPRM1 | GABRA1 | PON1 | JUN | PIK3CG | CHRNA7 |
| MAP2 | Bax | CASP3 | Casp8 | CASP9 | PRKCA | TGFB1 | PTGS1 | PTGS2 | Ncoa2 |
| NOS2 | F2 | KCNH2 | ESR1 | Ar | SCN5A | PPARG | F7 | KDR | RXRA |
| PDE3A | ADRB2 | ESR2 | DPP4 | MAPK14 | GSK3B | HSP90AA1 | CDK2 | Chek1 | IGHG1 |
| PIM1 | CCNA2 | Ncoa1 | PKIA | NR3C2 | NR3C1 | PGR |  |  |  |

**Supplementary Table 6 Intersection between targets of the drugs and the diseases**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CX-HTN | PTGS1 | PTGS2 | NOS2 | F2 | KCNH2 | ESR1 | AR | SCN5A | PPARG |
| KDR | PDE3A | ADRB2 | ESR2 | DPP4 | MAPK14 | GSK3B | HSP90AA1 | CDK2 |
| PIM1 | CCNA2 | NCOA1 | NR3C2 | NR3C1 | PGR | F7 | IGHG1 |  |
| GL-HTN | NR3C2 | PGR | NCOA1 | PTGS1 | DRD1 | CHRM3 | KCNH2 | CHRM1 | SCN5A |
| PTGS2 | CHRM4 | PDE3A | HTR2A | ADRA1D | CHRM2 | ADRA1B | ADRB2 | CHRNA2 |
| OPRM1 | GABRA1 | PON1 | JUN | HSP90AA1 | PIK3CG | CHRNA7 | FGFR4 | MAP2 |
| CASP3 | CASP8 | CASP9 | PRKCA | TGFB1 | BCL2 | SLC6A4 | BAX |  |
| CX-OS | PTGS1 | PTGS2 | NCOA2 | NOS2 | F2 | KCNH2 | ESR1 | HSP90AA1 | AR |
| F7 | KDR | RXRA | PDE3A | ADRB2 | ESR2 | DPP4 | PPARG | MAPK14 |
| CDK2 | CHEK1 | PIM1 | CCNA2 | NCOA1 | NR3C2 | NR3C1 | GSK3B | PGR |
| SCN5A |  |  |  |  |  |  |  |  |
| GL-OS | NR3C2 | PGR | NCOA2 | NCOA1 | PTGS1 | DRD1 | CHRM3 | KCNH2 | CHRM1 |
| BCL2 | PTGS2 | GABRA2 | PDE3A | HTR2A | GABRA3 | CHRM2 | ADRA1B | ADRB2 |
| OPRM1 | GABRA1 | PON1 | JUN | HSP90AA1 | PIK3CG | CHRNA7 | FGFR4 | MAP2 |
| CASP3 | CASP8 | CASP9 | PRKCA | TGFB1 | SCN5A | SLC6A4 | BAX |  |

**Supplementary Table 7 The top five docked drug-target pairs for the diseases**

|  |  |  |
| --- | --- | --- |
|  | GL | CX |
| HTN | PTGS2 | HSP90AA1 |
| JUN | ESR1 |
| CASP3 | PTGS2 |
| TGFB1 | PPARγ |
| HSP90AA1 | CDK2 |
| OS | PTGS2 | ESR1 |
| JUN | PTGS2 |
| CASP3 | HSP90AA1 |
| HSP90AA1 | PPARγ |
| TGFB1 | NR3C1 |

**Supplementary Table 8 Intersection of KEGG enrichment analysis results for HTN intervention with CX and GL**

|  |
| --- |
| Pathways in cancer |
| Chemical carcinogenesis - receptor activation |
| Estrogen signaling pathway |
| Breast cancer |
| IL-17 signaling pathway |
| Prostate cancer |
| Regulation of lipolysis in adipocytes |
| VEGF signaling pathway |
| Leishmaniasis |
| Lipid and atherosclerosis |
| Small cell lung cancer |
| Endocrine resistance |

**Supplementary Table 9 Intersection of KEGG enrichment analysis results for OS intervention with CX and GL**

|  |
| --- |
| Pathways in cancer |
| Chemical carcinogenesis - receptor activation |
| Estrogen signaling pathway |
| Thyroid hormone signaling pathway |
| Breast cancer |
| Small cell lung cancer |
| IL-17 signaling pathway |
| Prostate cancer |
| Lipid and atherosclerosis |
| Non-alcoholic fatty liver disease |
| Regulation of lipolysis in adipocytes |
| VEGF signaling pathway |
| PI3K-Akt signaling pathway |
| Leishmaniasis |
| Endocrine resistance |

**Supplementary Table 10 Intersection of GOBP enrichment analysis results for HTN intervention with CX and GL**

|  |
| --- |
| nuclear receptor-mediated steroid hormone signaling pathway |
| signal transduction |
| response to estradiol |
| positive regulation of protein import into nucleus |
| positive regulation of nitric oxide biosynthetic process |
| negative regulation of smooth muscle contraction |
| positive regulation of cell population proliferation |
| response to xenobiotic stimulus |
| G protein-coupled receptor signaling pathway |
| cyclooxygenase pathway |
| cellular response to hypoxia |
| progesterone receptor signaling pathway |
| membrane depolarization during action potential |
| ventricular cardiac muscle cell action potential |
| response to hypoxia |
| positive regulation of MAPK cascade |
| prostaglandin biosynthetic process |
| regulation of ventricular cardiac muscle cell membrane repolarization |
| angiogenesis |

**Supplementary Table 11 Intersection of GOBP enrichment analysis results for OS intervention with CX and GL**

|  |
| --- |
| response to estradiol |
| signal transduction |
| positive regulation of protein import into nucleus |
| positive regulation of nitric oxide biosynthetic process |
| cellular response to Thyroglobulin triiodothyronine |
| negative regulation of smooth muscle contraction |
| response to xenobiotic stimulus |
| G protein-coupled receptor signaling pathway |
| response to hypoxia |
| positive regulation of MAPK cascade |