High or Low Temperature Extraction, Which Is More Conducive to Triphala Aginst Chronic Pharyngitis?

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Research

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Abstract

Background

Triphala is a world famous herbal formula, its therapeutic effect on chronic pharyngitis has been confirmed in the majority of patients in China. However, the effects of current industrial extraction methods on its anti chronic pharyngitis components and activities are still unclear

Methods:

The network pharmacology was used to analyze the material basis, targets and pathways of Triphala for chronic pharyngitis. HPLC were used to compare the fingerprint profile and content of components between the two extracts. The antioxidant and anti chronic pharyngitis activities of the two extracts were compared by DPPH assay and ammonia induced chronic pharyngitis model in rats.

Results:

The network pharmacology results showed that the active ingredients of Triphala for chronic pharyngitis are epigallocat echin 3 gallate catechin , epicatechin , epicatechin gallate , g allocatechin , quercetin luteolin leucodelphinidin and other flavonoids, phenolic acids such as gallic acid and ellagic acid, alkaloids such as ellipticine , cheilanthifoline, and hydrolyzed tannins such as corilagin and chebulic acid . The high temperature reflux extract and the low temperature decompressing inner ebullition extract have extremely significant differences in the fingerprint profile. Among them, the content of 8 active ingredients of gallic acid, ellagic acid, chebulic acid , catechin, epicatechin, corilagin, quercetin, and epicatechin gallate in the reflux extract is 1.1 to 5.3 times as much as decompressing inner ebullition extract. The free radical scavenging ability of reflux extract is significantly stronger than that of decompression extract ($p<0.01$), and it has a repairing effect on pharyngeal mucosal damage (reducing keratinization or hyperplasia of mucosal epithelium, reducing inflammatory cell infiltration and bleeding), and reducing IL 1β (P 0.05), IL 6 (p 0.05), TNF α overexpression ability is stronger than the decompressing inner ebullition extract.

Conclusions:

gallic acid, ellagic acid, chebulic acid , catechin, epicatechin, corilagin and epicatechin gallate are the basic aglycones or oligomers of tannin. and high temperature reflux extraction can significantly promote temperature reflux extraction can significantly promote tthe occurrence of the he occurrence of the hydrolysis of tannins significantly increases the content of hydrolysis of tannins significantly increases the content of these components, and the these components, and the antianti–chronic pharyngitis activity is enhanced. chronic pharyngitis activity is enhanced. It is suggested that high temperature It is suggested that high temperature reflux extraction should be used in the treatment of chronic phreflux extraction should be used in the treatment of chronic pharyngitis.aryngitis.

Full Text

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Figures

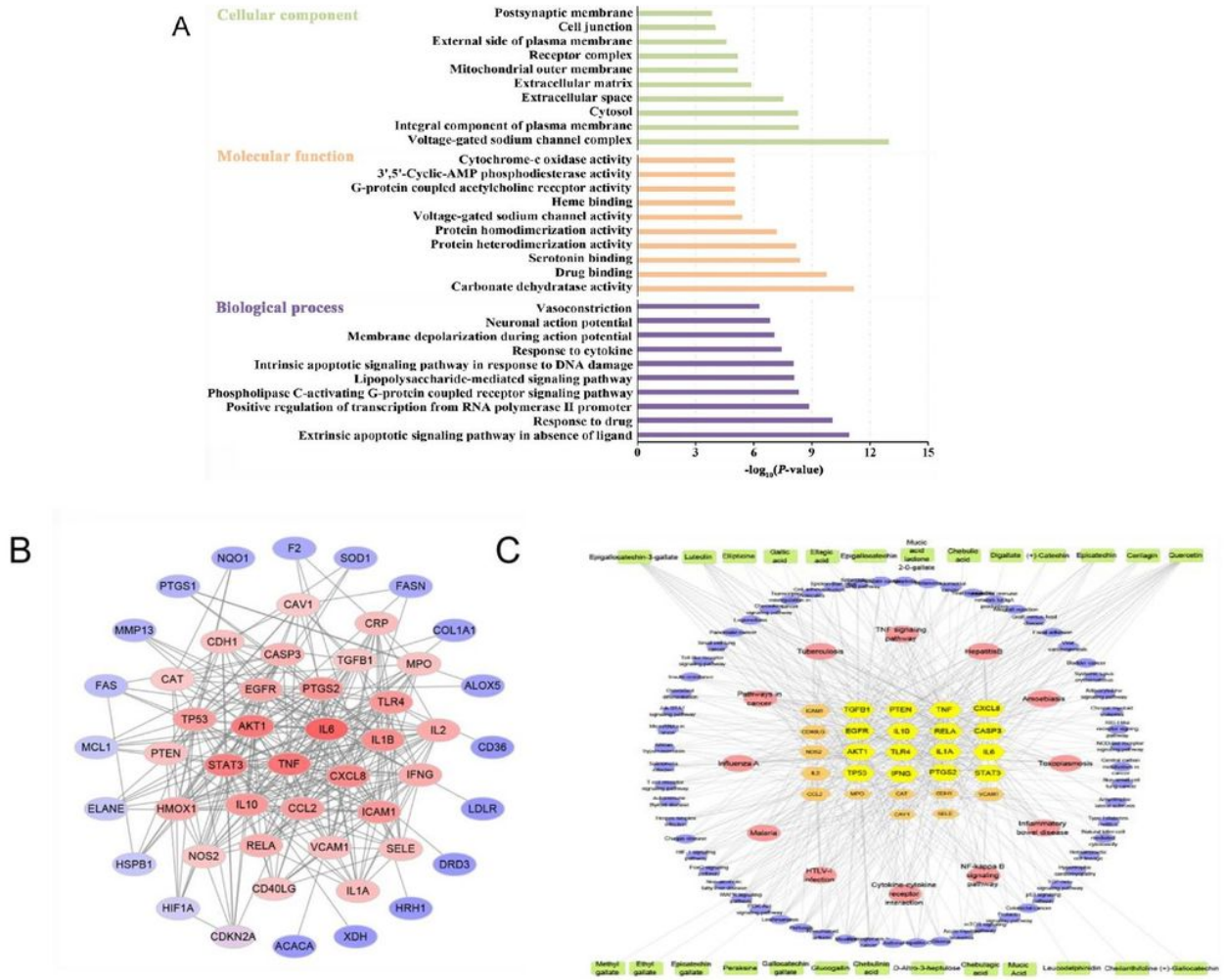

Figure 1

A. Go enrichment analysis of T riphala B. Interaction network of core targets in CP 300 treated by T riphala C. Component target pathway interaction network of T riphala treating 301 CP

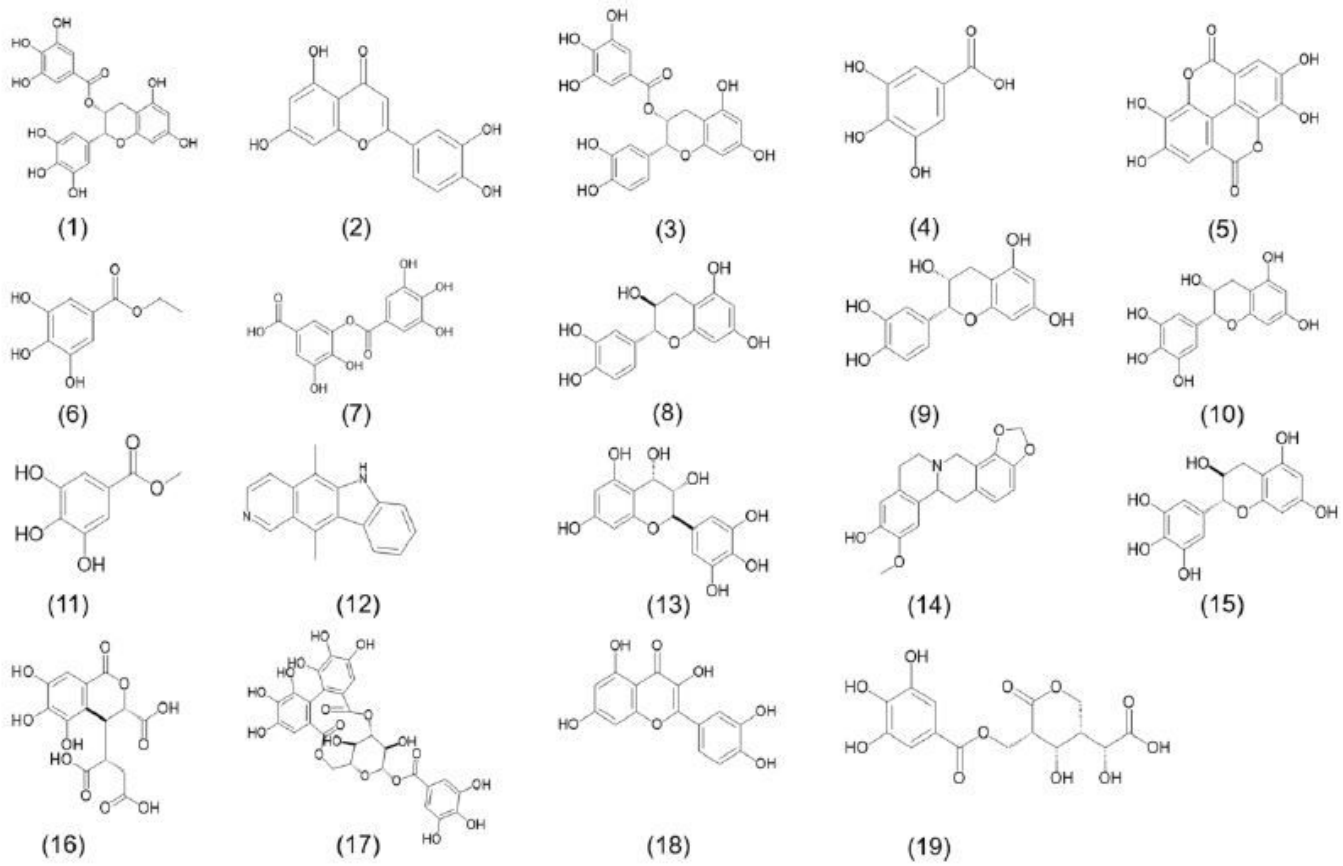

Figure 2

The main components influencing the treatment of CP with T riphala in network 347 pharmacology 1. epigallocatechin 3 gallate , 2. lu teolin , epicatechin gallate 4 gallic acid , 5. 348 ellagic acid 6. ethyl gallate , digallate 8 catechin , 9. epicatechin , 10. epigallocatechin 349 11. methyl gallate , 12. ellipticine , 13. leucodelphinidin , 14. cheilanthifoline 15. 350 gallocatechin , 1 6. chebulic acid , 17. corilagin , 1 8. quercetin , 19. mucic acid 1,4 lactone 351 2 0 gallate

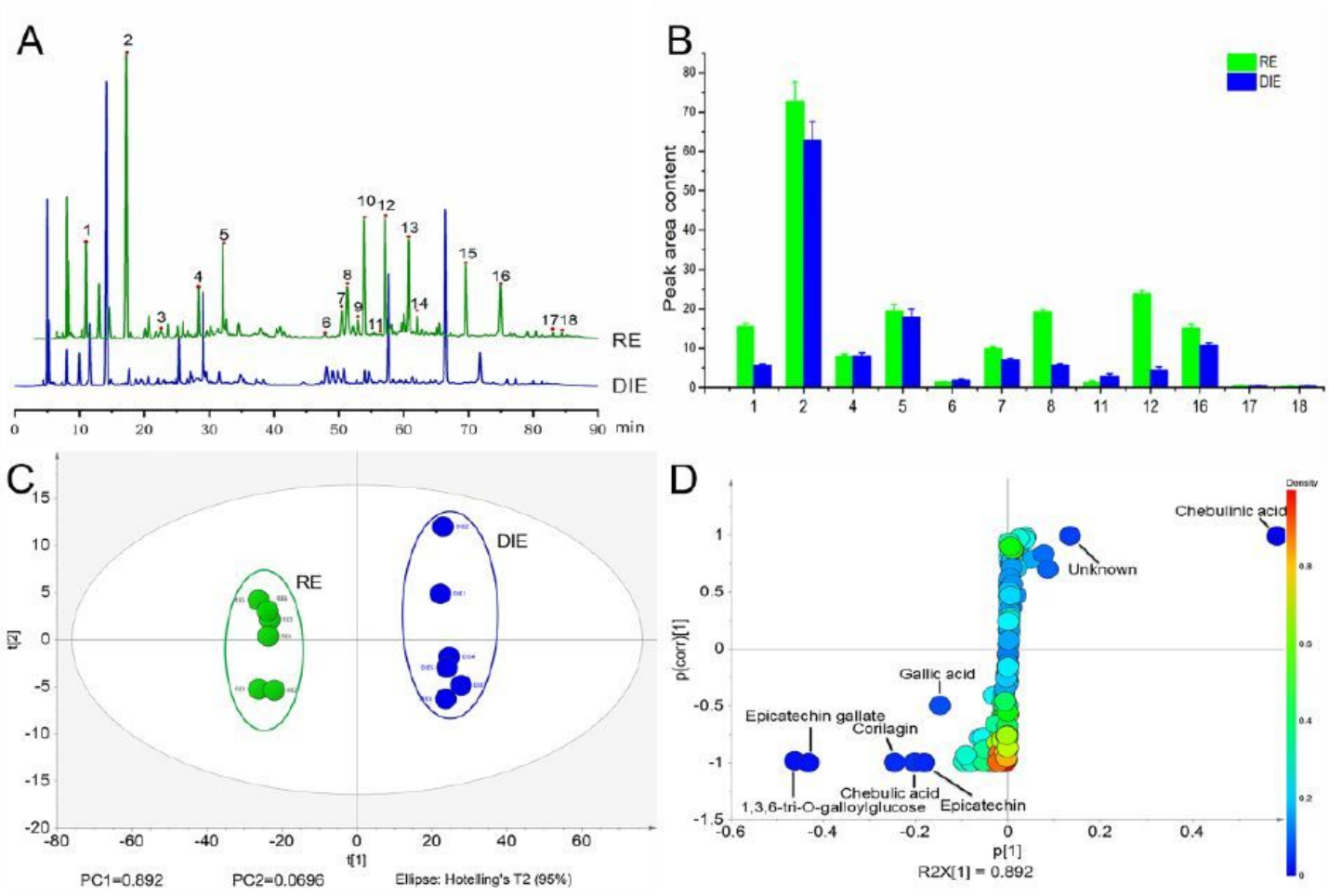

Figure 3

.3. HPLC of Triphala in different extraction methods 1. Chebulic acid, 2. Gallic acid, 3. 380 Punicalin Punicalin 44.. GallocatechinGallocatechin, 5. , 5. Catechin,Catechin, 6. 6. Epigallocatechin gallateEpigallocatechin gallate, 7., 7. EpicatechinEpicatechin,, 88.. 381 CorilaginCorilagin, 9., 9. Gallocatechin gallateGallocatechin gallate, 10. , 10. 1,3,61,3,6--tritri--OO--galloylglucose,galloylglucose, 11. 11. ethyl gallateethyl gallate, 12. , 12. 382 epicatechin gallateepicatechin gallate, 13. , 13. chebulagic acidchebulagic acid, 14. , 14. 1,2,3,4,61,2,3,4,6--OO--pentapenta--galloyl glucose,galloyl glucose, 15. 15. chebulinic chebulinic 383 acidacid, 16. , 16. ellagic acidellagic acid, 17. , 17. QuercetinQuercetin, 18. , 18. LuteolinLuteolin). B.). B. PCA score of extractPCA score of extractss ofof TriphalaTriphala.. C. C. 384 PLSPLS--DA DA model validationmodel validation. . DD. S. S--plot of plot of extractextractss of of TriphalaTriphala..

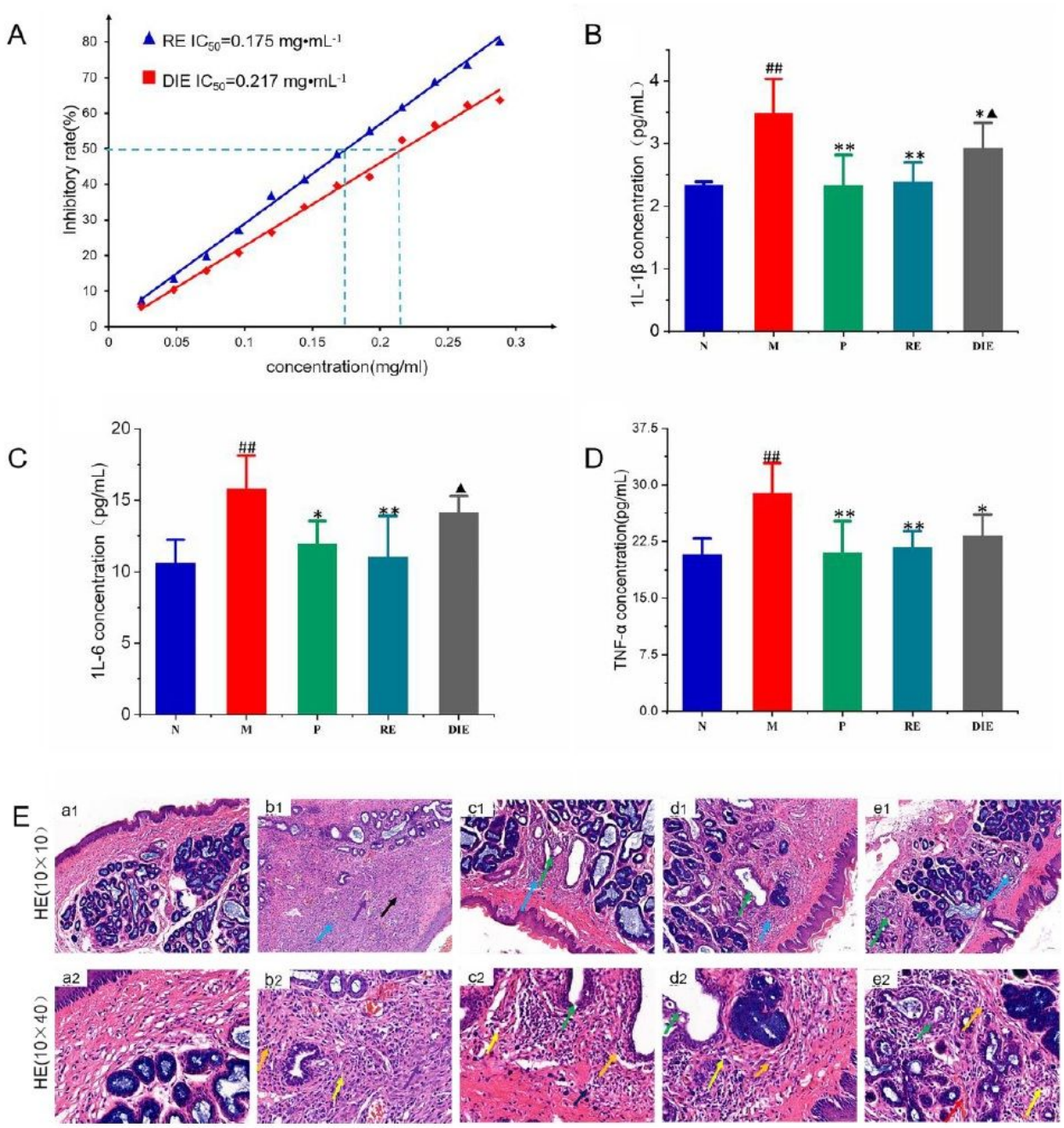

Figure 4

please see the manuscript file for the full caption

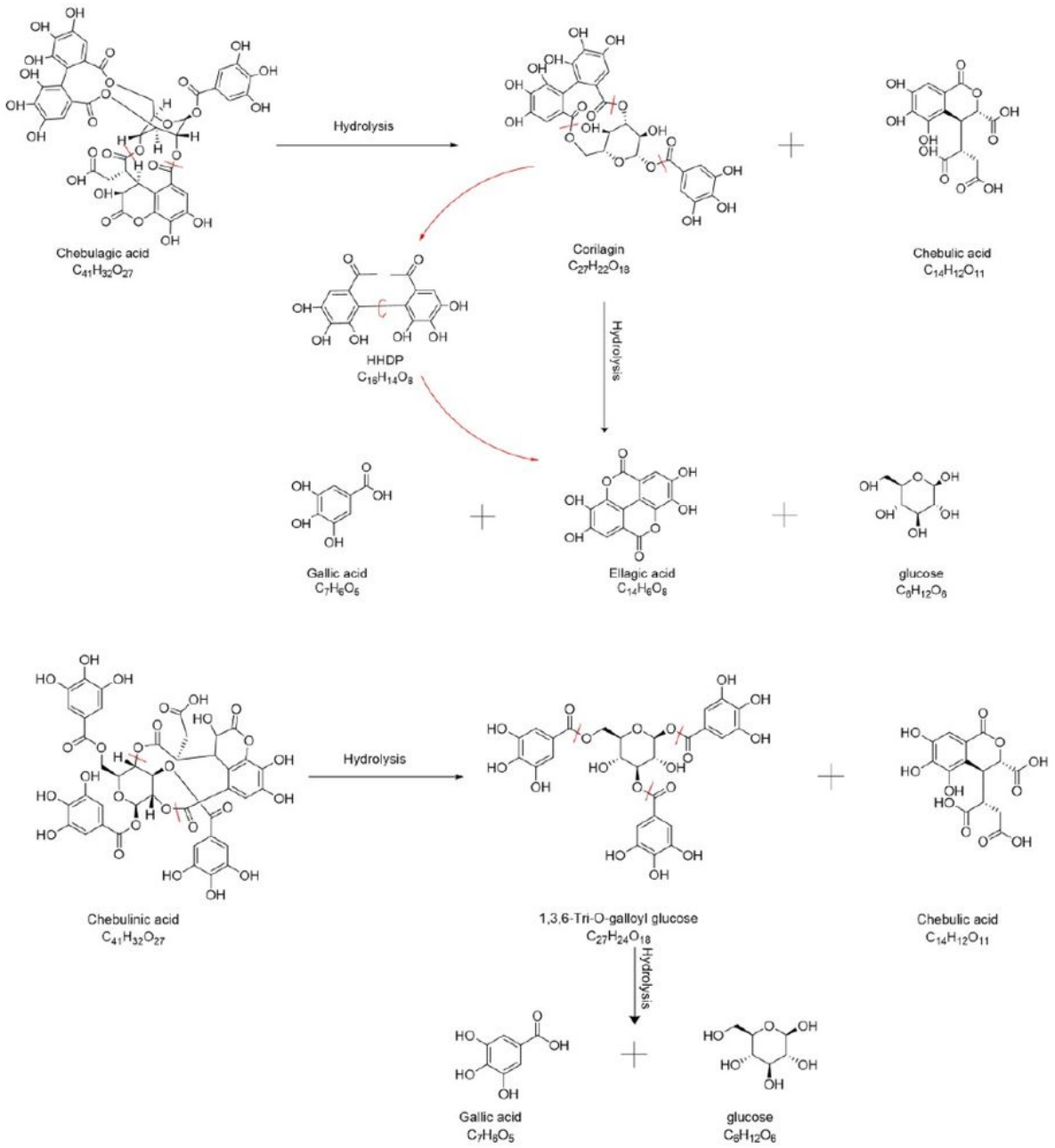

Figure 5

Schematic diagram of the hydrolysis of Chebulinic acid and Chebulagic acid.

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