New Progress on Modern Research Progress of Chinese Herbal Medicines in *Chinese Traditional and Herbal Drugs* in 2010: Selected Annual Highlights and Comments

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Abstract: As a series of and continuous publication, the papers published on *Chinese Traditional and Herbal Drugs* in 2010 were selectively and briefly highlighted to reflect the new progress on modern research of Chinese herbal medicines. Within 617 articles, chemical constituents (127), pharmaceutics and technology (149), pharmacological studies and clinical observation, and medicinal materials are still major categories. Some comments have also been personally provided.

Key words: Chinese herbal medicines; *Chinese Traditional and Herbal Drugs*; HPLC fingerprint; new compounds; safety and toxicity

DOI: 10.3969/j.issn.1674-6384.2011.04.005

In 2010, there were 617 articles published on *Chinese Traditional and Herbal Drugs* (CTHD) distributed in the columns of chemical constituents (127), pharmaceutics and technology (149), pharmacological studies and clinical observation (141), medicinal materials (120), reviews (64), special topic (6), the modernization of Chinese materia medica (6), intellectual property (3), and pharmaceutical administration (1). In this paper some representative articles will be reviewed in the following aspects.

Chemical constituents

There were 127 papers published in the column of chemical constituents in 2010. Among them 23 new compounds and nine new findings from source materials as known natural products were characterized. Their structures and source materials were illustrated in Fig. 1 and Table 1. These papers involved 124 plant materials including popular Chinese materia medica, common herbs, and Chinese compound formulations. Some of the compounds isolated showed corresponding biological activities, to which further concern should be paid. Wang *et al* (1: 19) investigated the chemical constituents from the leaves of *Rhododendron spiciferum* and their immunomodulatory activities. Twelve known flavonoids were isolated and identified. Among them, epicatechin-(2β→*O*→7,4β→8)-*ent*-epicatechin, proanthocyanidin A-1, and catechin alone or combined with ConA or LPS could significantly enhance the proliferation of spleen lymphocytes in a certain dose range.

Ten steroid compounds were isolated from the flowers of *Hosta plantaginea* (Liu *et al*. 4: 520). The inhibitory effects of these compounds on HL-60, Jurkat, K562, HepG2, MCF7, and SGC7901 cell lines were tested *in vitro* by MTT method. Among them, gitogenin 3-*O*-β-*D*-glucopyranosyl (1→2)-β-*D*-glucopyranosyl (1→4)-β-*D*-galactopyranoside, gitogenin 3-*O*-β-*D*-glucopyranosyl (1→4)-*O*-[α-*L*-rhamnopyranosyl (1→2)]-β-*D*-galactopyranoside, gitogenin 3-*O*-{β-*D*-glucopyranosyl (1→2)-*O*-[β-*D*-xylopyranosyl (1→3)]-*O*-β-*D*-glucopyranosyl (1→4)-β-*D*-galactopyranose}, gitogenin 3-*O*-{β-*D*-glucopyranosyl (1→2)-*O*-[α-*L*-rhamnopyranosyl (1→4)-β-*D*-xylopyranosyl (1→3)]-*O*-β-*D*-glucopyranosyl (1→4)-β-*D*-galactopyranose}, and gitogenin 3-*O*-{β-*D*-xylopyranosyl (1→4)-β-*D*-glucopyranosyl (1→2)-[β-*D*-xylopyranosyl (1→3)]-*O*-β-*D*-glucopyranosyl (1→4)-β-*D*-galactopyranose} showed the favorable inhibitory effects on the cell growth of HepG2, MCF7, and SGC7901 cells.

Zhang *et al* (5: 692) investigated the major chemical constituents in the rhizomes of *Pterocypsela elata* and found that lactuside B was a key component (the yield was 0.15%), which could significantly decrease

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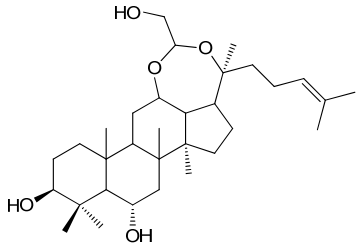
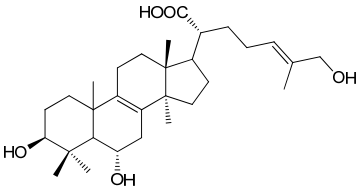
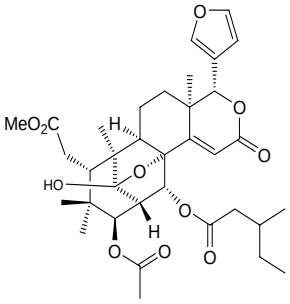
Received: June 18, 2011; Revised: August 23, 2011; Accepted: September 3, 2011



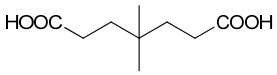
1′-hydroxy ethanedioxy, the derivatives of ginsenoside sapogenins
Li HF *et al*.1: 6.



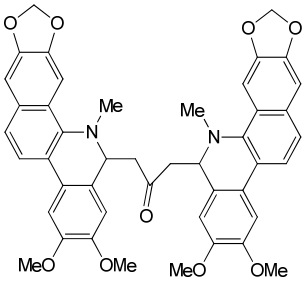
Sinensoic acid, *Ganoderma sinense*
Liu C et al. 1: 8.



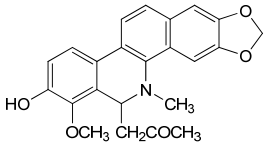
Xylogranatin S, *Xylocarpus granatim*
Huo CH *et al*. 2: 176.



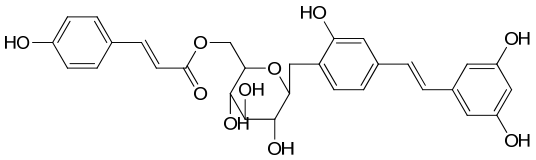
4-dimethyl heptanedioic acid, *Trachelosperomum jasminoides*
Yuan SQ et al. 2: 179.



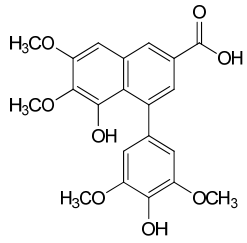
Nitidumtone A, *Zanthoxylum nitidum*
Wang XL *et al*. 3: 340.



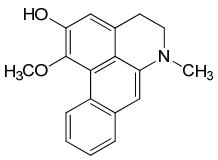
Nitidumtone B, *Zanthoxylum nitidum*
Wang XL *et al*. 3: 340.



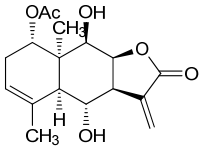
Rheoside, *Rheum emodi*
Wang AQ *et al*. 3: 343.



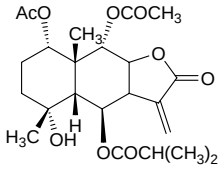
Gardenianan A, *Gardenia jasminoides*
Yu Y *et al*. 4: 509.



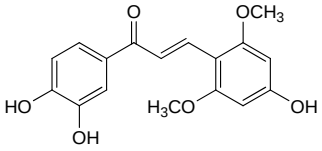
Nelumnucine, *Nelumbo nucifera*
Wu H *et al*. 4: 514.



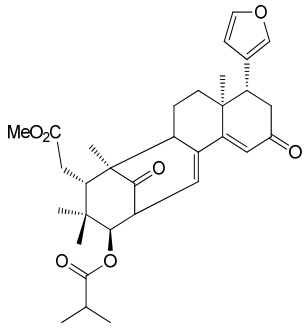
Trilobolide, *Wedelia trilobata*
Wu ML *et al*. 5: 681.



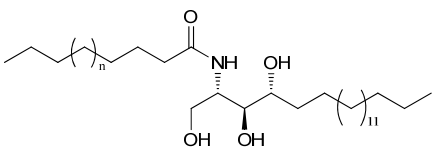
1β-acetoxy-4α-hydroxy-6β-isobutyryloxy-9α-isovaleryloxyprostatolide, *Wedelia trilobata*
Wu ML *et al*. 5: 681.



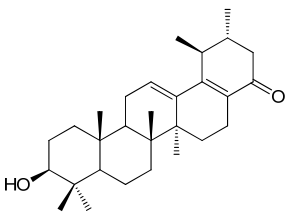
Japonicone D, *Onychium japonicum*
Li MC *et al*. 5: 685.



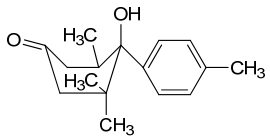
Indiangranatumin A, *Xylocarpus granatum*
Yang XB *et al*. 6: 846.



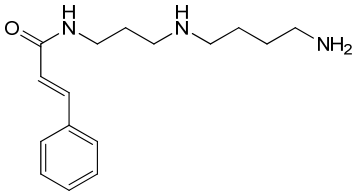
Echinogoriamide, *Echinogorgia sp.*
Liao L *et al*. 6: 851.



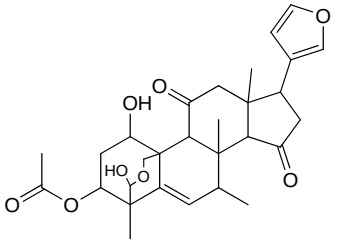
Sanguisorbigenin V, *Sanguisorbae Radix*
Xia HM *et al*. 7: 1048.



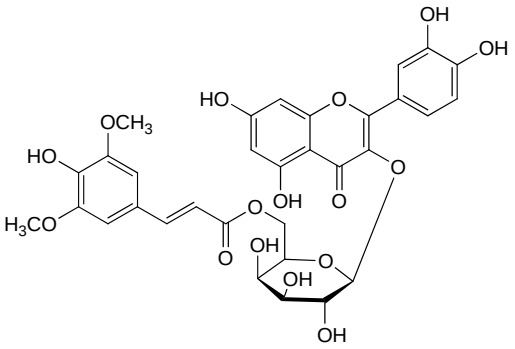
Curcumaone J, *Curcuma longa*
Wu ZH *et al*. 8: 1234.



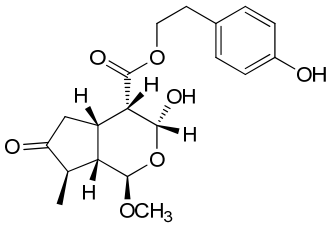
N^1-cinnamoyl spermidne, *Viscum coloratum* f. *rubroaurantiacum*
Sun YH *et al*. 9: 1418.



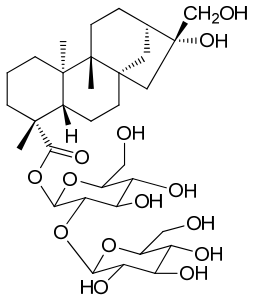
$\Delta^{5,6}$-isotoosendanin, *Toosendan Fructus*
Zhou Y *et al*. 9: 1421.



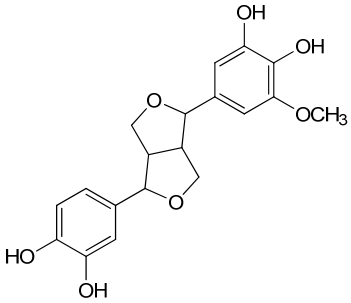
Quercetin-3-*O*-(6″-erucoyl)-*β*-D-galactopyranoside, *Psidium guajava*
Wu HX *et al*. 10: 1593.



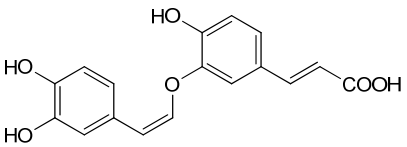
Syringopicrogenin A, *Syringa oblate*
Wang JL *et al*. 10: 1598.



Kaurane acid glycoside A, *Acanthopanax gracilistylus*
Xian LN *et al*. 11: 1761.



Jatrophasin A, *Jatropha curcas*
Li L *et al*. 12: 1932.



Abacopteric acid, *Abacopteris penangiana*
Zhao ZX *et al*. 12: 1936.

Fig. 1 New compounds published on CTHD in 2010

Table 1 New natural compounds published on CTHD in 2010

No.	Compound names	Sources	References
1	20(*S*)-protopanaxadiol-3-one	pericarps of *Juglans mandshurica*	Zhou *et al*. 1: 11.
2	2,3,4′-trihydroxy-4-methoxybenzophenone	Baihe Zhimu Decoction	Fang *et al*. 4: 517.
3	5-hydroxy-6-acety-7-methoxychromnone	*Melicope pteleifolia*	Li *et al*. 7: 1052.
4	neohop-13(18)-en-3β-ol	*Polygonum suffultum*	Yang *et al*. 8: 1236.
5	neohop-13(18)-en-3β-yl acetate	*P. suffultum*	Yang *et al*. 8: 1236.
6	acacetin-7-*O*-β-*D*-apiosyl-(1→2)-β-*D*-glucoside	*Viola yedoensis*	Xu *et al*. 9: 1423.
7	5,7-dihydroxy-4′-methoxy-6-hydroxymethyl-8-methyl-2″,4(*S*)-oxido-2(*R*)-flavan-5-*O*-β-*D*-glucopyranoside	*Abacopteris penangiana*	Fang *et al*. 10: 1601.
8	*m*-carboxyphenylacetic acid	*Cerbera manghas*	Zhang *et al*. 11: 1763.
9	25,27-dehydro-physalin L	*Physalis alkekengi* var. *franchetii*	Yuan *et al*. 12: 1939.

the content of water and MDA levels in the brain tissue, and notably increased the SOD content in all groups.

To study the antitumor activity of berberine, the alkylation and bromination of berberine were performed with Grignard reagent and bromine respectively to give 8-alkyl-13-bromo-berberine derivatives in good to excellent yields. The antiproliferative effect of the derivatives on human hepatoma cell line HepG2 was evaluated by MTT after 48 h incubation. The results showed that the length of carbon chain of the

derivatives was highly correlated with the tumor cell sensitivity and 8-octyl-13-bromo-berberine showed remarkable activity. Its inhibitory rate was 96.82% at the concentration of 32 μg/mL and IC_{50} was 3.33 μg/mL (Ding *et al*. 11: 1765).

Pharmacological studies and clinical observations

Within 141 papers on pharmacological and clinical studies published in 2010, antitumor drug is still one of the hot points and well noted (Fig. 2).

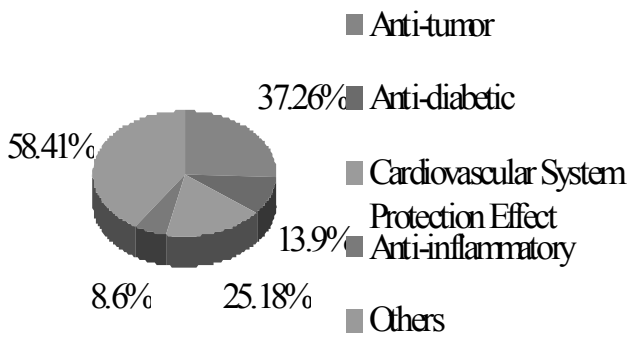


Fig. 2 Articles on pharmacological studies and clinical observation published in 2010

Dihydroartemisinin (DHA) could significantly inhibit the proliferation of PC-3 cells, induce their apoptosis in a time-concentration dependent manner, and lead to mitochondrial swelling, nuclear fragmentations, and apoptosis body formation, down-expression of Bcl-2 protein and over-expression of Bax protein correspondence with DHA concentration (Gao *et al*. 1: 81). *Ent*-11*α*-hydroxy-15-oxo-kaur- 16-en-19-oic-acid (5F), isolated from *Pteris semipinnata*, possessed cytotoxicity on HepG2 cells (Li *et al*. 2: 241) and NCI-H460 cells (Liu *et al*. 3: 435). The mechanism for 5F induction of cell apoptosis involves p53, Caspase-3 activation, and inhibition of NF-κB pathway.

Sancaofang (SCF), composed of *Prunellae Spica*, *Hedyotis Diffusae Herba*, *Agrimoniae Herba*, *Eecliptae Herba*, and *Corni Fructus*, were used for Lewis lung cancer. Ethanol soluble parts (95% and 60%) of SCF were prepared and their components were separated by macroporous resin. SPC-A-1 and A549 cell models were adopted for *in vitro* experiment and MTT assay was used. C57 BL/6J black mice injected with Lewis lung cancer cells were adopted for the *in vivo* experiment. The tumor inhibition ratio, spleen index, and thymus index were used for the evaluation. Results showed that the components EI, DII, and EII had comparative by strong antitumor activities against SPC-A-1 and A549 cells and IC_{50} were relatively low. The *in vivo* and *in vitro* experiments showed that the component compatibility of D and E had the apparent synergism antitumor activity (Jia *et al*. 4: 592). Emodin could significantly inhibit the growth of K562 cells xenografts in nude mice. The mechanism may be correlated to activate the Caspase-3 and Caspase-9 signaling pathway (Wang *et al*. 5: 751).

Humulon, the main constituent of *Humulus lupulus*, could prevent the occurrence and deterioration of cancer. Its mechanisms could be attributed to its effect on decreasing the production of acetylation of carcinogenic aromatic amines, which is acetylated from aromatic amines, and inhibiting the NAT1 activity and expression of NAT1 mRNA (Gao *et al*. 5: 761). It is also a noncompetitive inhibitor of NAT1 in SGC-7901 cells (Gao *et al*. 6: 931). 20-*O*-β-*D*- Glucopyranoside-20(*S*)-protopanaxadiol, a major metabolite of natural ginsenosides (e.g. Rb_1, Rb_2, etc.) by intestinal bacteria after ig administration, could increase the inhibitory effect of cyclophosphamide (CTX) on cell proliferation of hepatocellular carcinoma (HCC) and the sensitization on chemotherapy, and also had wide adaptability (Ming *et al*. 6: 935). Periplocin, isoleted from *Periplocae Cortex*, exhibited marked inhibition on the hepatocarcinoma H_{22} transplantation tumor in BALB/c mice, which was probably related to blocking cell cycle and induction of apoptosis (Zhang *et al*. 8: 1307). Asiatic acid, a major constituent of *Centella asiatica*, showed significant inhibition on liver cancer cell, breast cancer cell, melanoma cell, and glioblastoma. Lv *et al* (9: 1484) reported that asiatic acid could inhibit the proliferation by inducing apoptosis and regulating cell cycle process. The mechanism of induction apoptosis is associated with up-regulation of survivin and bcl-2 transcription level.

Triptolide, the main active ingredient from *Tripterygium wilfordii*, could inhibit a variety of tumor proliferation, apoptosis, and transfer. Liu *et al* (11: 1819) reported that triptolide might exhibit its strong antitumor effect on RPMI 8226 cell via alternation of P21wap1/cip1 and P27kip1. The results may provide framework for clinical evaluations of triptolide.

Gambogic acid could inhibit the growth of gastric cancer cells BGC-803 significantly, showing a significant role in promoting tumor cell apoptosis and inhibiting tumor cell metastasis-associated properties. The mechanism may be related to decreasing the expression of bcl-2 and ICAM-1, and increasing bax expression (Huang. 11: 1823). Hu *et al* (12: 2005) investigated the anticancer activity of the novel lactosyl-norcantharidin nanoparticles (Lac-NCTD-NPs) *in vivo* and *in vitro*. The results showed that the tumor-growth was inhibited effectively by Lac-NCTD-NPs which might be a kind of novel liver-targeting agents and could strongly inhibit the tumor growth.

Xiexin Decoction (XXD), composed of *Rhei Radix* et *Rhizoma*, *Coptidis Rhizoma*, and *Scutellariae Radix*, is used for consumptive thirst. Compared with the model group, XXD reduced the levels of water intake, food consumption, urine volume, HbAlc, insulin resistance index (IRI), creatinine clearance rate (CCr), albumin in urine, and blood lipids ($P < 0.05, 0.01$), and decreased the incrassation of the glomerular basement membrane and the change of foot process fusion. So XXD could protect the kidney in rats with experimental early diabetic nephropathy (DN). The nephroprotection of XXD may be related to the decrease of blood lipids and HbAlc and improvement in insulin resistance (Wu *et al*. 1: 73). Liuwei Dihuang Jiawei Capsula (LDJ Capsula) could decrease renal protein kinase C (PKC) activity and connective tissue growth factor (CTGF) expression, and ameliorate proteinuria and renal function of DN rats. Combination with Lotensin could decrease renal PKC activity and CTGF expression more obviously and at the same time had more notable protective effect on kidney of DN rats (1: 77). Huanglian Jiedu Decoction, composed of *Coptidis Rhizoma*, *Scutellariae Radix*, *Phellodendri Chinensis Cortex*, and *Gardenia Fructus*, possesses remarkable hypoglycemic effect on diabetic rats induced by streptozotocin, and its preliminary mechanism may result from the inhibitory effect on the activities of intestinal disaccharidases (Deng *et al*. 7: 1127).

The water extract of Ermiao Pills processed bidirectional actions of inhibiting the production of hepatic uric acid and promoting the excretion of urinary uric acid, resulting in serum urate reduction in hyperuricemic mice. The mechanisms might be involved in down-regulation of mRNA and protein levels of hepatic XOD and renal mURAT1 (Lv *et al*. 3: 418). Ganoderma spore oil showed protective activity for the Friend murine leukemia virus (Fr.MuLV)-infected model mice by improving body weight extenuation, inhibiting splenomegaly and atrophy of thymus gland, and increasing the amount of T lymphocyte (Huang *et al*. 3: 423).

Sodium tanshinone II_A sulfonate (STS) could postpone the progress of myocardial hypertrophy by down-regulating the expression of AT1R receptors and STAT3 (Yan *et al*. 4: 588). Apigenin (APG) is a common naturally occurring flavonoid with a variety of biological activities, such as anti-inflammatory, anti-hypertension, anti-atherosclerosis and thrombosis, anti-anxiety, antibacteria, antivirus, anti-allergy, anti-oxidation, radiation injury protection, and regulation of differentiation. Liu *et al* (10: 1658) further reported that APG was capable of regulating the expression of caveolin-1 in ischemic brain and had the effects on prevention of focal cerebral ischemia- reperfusion injury in rats which might be one of the anti-ischemic mechanisms of APG. Liu *et al* (12: 2010) explored the effects and mechanisms of polydatin (3,4′,5-trihydroxstilbene-3-β-*D*-glucoside) extracted from the rhizomes of *Polygonum cuspidatum* on rats with brain hemorrhagic injury, and the results showed that polydatin (25, 50, and 100 mg/kg) could significantly reduce the symptoms of neurological deficits of cerebral hemorrhage rats, raise the activity of SOD, reduce the content of MDA, increase the protein expression of Bcl-2, and decrease the content of IL-1β in serum. Its effects were positively correlated with the dose-effect.

Pharmaceutics and technology

In addition to traditional pills, tablets, and capsules etc., new drug delivery systems such as oversaturated self-emulsifying drug delivery system (S-SEDDS), cyclodextrin inclusion technique, liposomes, nano-capsules and so on become a new bright spot.

The S-SEDDS represents a new thermo-dynamically stable formulation approach wherein it is designed to contain a reduced amount of surfactant and a water-soluble cellulosic polymer (or other polymers) to prevent precipitation of the drug by generating and

maintaining a supersaturated state *in vivo*. The S-SEDDS formulation could result in enhanced oral absorption as compared with the related self-emulsifying drug delivery systems (SEDDS) formulation and the reduced surfactant levels might minimize gastrointestinal surfactant side effects. Silymarin is a mixture of flavonolignans extracted from the fruits of milk thistle, *Silybum marianum*, which has been used to treat hepatobiliary diseases. However, it has a low bioavailability after ig administration on account of its low solubility in water. In order to improve the dissolution rate, Peng *et al* (1: 40) prepared the S-SEDDS of silymarin to evaluate its basic properties. The optimum silymarin S-SEDDS was composed of 40% medium chain triglycerides (MCT), 48% Cremophor RH40 (ethoxylated hydrogenated-castor oil), and 12% Labrasol. The time of self-emulsifying was less than 3 min, the average particle diameter was 49.6 nm, the adding amount of hydroxypropyl methylcellulose (HPMC) was 50 mg/g, and the average content of silymarin was 39.3 mg/g. The *in vitro* dissolution test of silymarin S-SEDDS showed that the presence of a small amount of cellulosic polymer effectively sustained a metastable supersaturated state by retarding precipitation kinetics. Xiong *et al* (4: 559) optimized the formulation of self-microemulsifying drug delivery system containing tanshinone II_A (tanshinone II_A-SMEDDS) and assessed its quality.

Cyclodextrins are chemically stable and water soluble oligosaccharide derived enzymatically from starch. Because of their relatively lipophilic interior and hydrophilic exterior, cyclodextrins could complex hydrophobic guests to form inclusion complexes in aqueous solution. Han *et al* (2: 212) investigated the inclusion mechanism of 14-deoxyandrographolide and β-cyclodextrin in inclusion ratio, molecular interaction between host and guest, and inclusion part and stability of inclusion compound. Further more, Chen *et al* (12: 1973) reported the optimized technology of inclusion for the volatile oil of *Caryophylli Flos* with β-cyclodextrin polymer (β-CDP) microsphere. The best condition was as follows: the volatile oil of *Caryophylli Flos*-β-CDP microsphere was 1:1; The inclusion temperature was 35 ℃; And clathration time was 1 h. Ethyl alcohol could be ignored. The package method is successful by characterizing structure.

Chinese materia medica injections (CMMI) originated in China and have been extensively used in clinic. However, the adverse drug reactions (ADR) have been reported in some events, and the allergic reaction is the main ADR of CMMI. To establish a biological method to effectively evaluate the quality of CMMI for ultimately solving the ADR of CMMI will be the main focus in proceeding of the modernization of tradition Chinese medicine (TCM). Zhang *et al* (7: 1084) investigated the quality fluctuation of Shuanghuanglian Freeze-dried Powder for injection by microcalorimetry. All the results showed that the biotic thermal activity of different samples could be evaluated qualitatively and quantitatively by similarity values of biological profiles and thermodynamics parameters.

Chemical fingerprinting analysis and simultaneous detection of multicomponent were still major methods for the quality assurance of TCM. Fig. 3 summarized some representative HPLC fingerprints of Chinese herbal medicines reported in 2010. Zhang *et al* (3: 376) investigated the drug *in vitro* release behavior of gastric floating sustained release preparation of *T. wilfordii* and established their quality evaluating methods. HPLC was used to gain the fingerprint of releasing medium of preparation. Triptolide was selected as marker to calculate the linear equation concerning peak area, then the relative drug release and f_2 similarity factor value were acquired. The result showed that the quality and *in vitro* release behavior of gastric floating sustained-release preparation of *T. wilfordii* could be evaluated more scientifically and comprehensively by using HPLC fingerprinting method. Zhang *et al* (8: 1282) established an HPLC fingerprinting method of polar components in Qingyan Dropping Pills, through analyzing 12 batches of samples. Furthermore, principal component analysis (PCA) was used to differentiate and evaluate the whole fingerprints. The result showed that liquiritin was the key component of quality control. Among the chromatographic peaks, there were six chromatographic peaks coming from *Glycyrrhizae Radix* et *Rhizoma* and five peaks coming from *Chebulae Fructus*.

Cui *et al* (6: 978) compared the affiliation of *Citrus grandis* var. *tomentosa* fruits and *C. reticulate* using HPLC fingerprinting method, the result showed

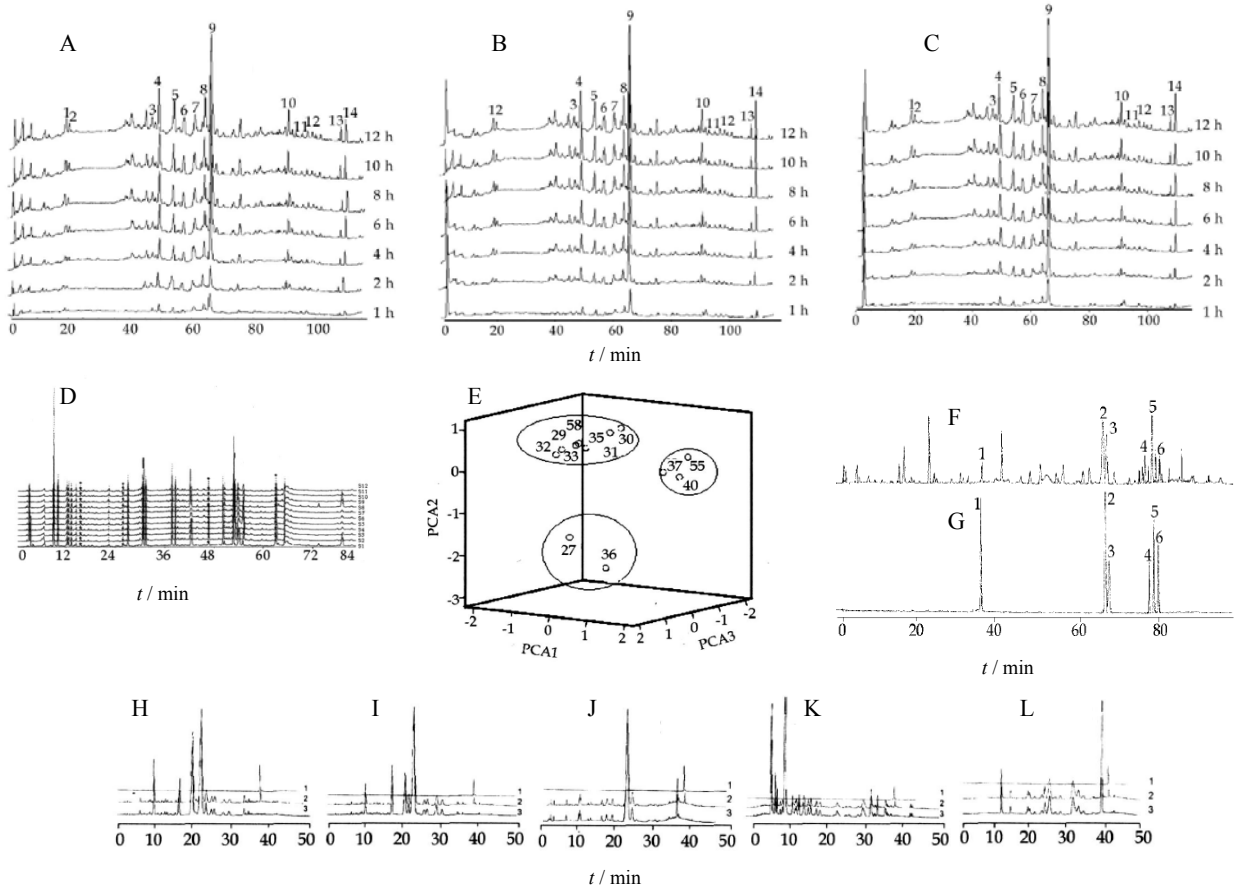


Fig. 3 HPLC fingerprints of some Chinese herbal medicines reported in CTHD in 2010

Release profiles of different components from gastric floating sustained-release tablets (A), pellets (B), and capsules (C) of *T. wilfordii*

HPLC chromatographic overlap of 12 batches of Qingyan Dropping Pills (D) and PCA figure (E)

HPLC fingerprint of *O. japonicus* for characteristic peaks (F) and standard control peaks (G)

HPLC chromatograms in five species of *Crataegi Folium* and internal standard: *C. pinnatifida* (H), *C. pinnatifida* var. *major* (J), *C. monogyna* (J), *C. cuneata* (K), and *C. scabrifolia* (L)

that the Chinese materia medica (CMM) fingerprint of *C. medica* var. *sarcodatylia* fruits and three medicinal plants in *Citrus* L. was combined with cluster analysis of principal components.

To establish the method of chemical pattern recognition for wild germplasm resource of *Ophiopogon japonicus* in Sichuan Province, Liu *et al* (11: 1875) established HPLC fingerprint of germplasm resource of *O. japonicus* in Sichuan. According to the HPLC fingerprint, 26 wild germplasm resources of *O. japonicus* from different habitats in Sichuan were comprehensively compared by SPSS software with PCA and cluster analysis. The correctness of "principal component-cluster analysis" was verified by the software of similarity evaluation.

The relationship between HPLC fingerprint and its inhibition on superoxide anion (O_2^-) in *Crataegi Folium* (CF) was established by Liu *et al* (7: 1173). The effect of CF on scavenging was taken as the target. Based on the HPLC fingerprint peaks, five species of CF were isolated and used for the effective experiment. The mathematic models of the relation between the area and the effect of fingerprint peaks were established. This evaluative pattern is an all-around evaluative system, which includes not only chemical identification but also effective evaluation for CMM. This study has made up for the deficiencies of the current evaluation pattern for the quality of CMM and has also provided a new idea for modern study on CMM.

Review on reviews

There were more than 60 reviews published in 2010. These reviews covered various aspects of Chinese herbal medicines and related areas, such as progress of a class of natural compounds, e.g. xanthones (Wang *et al*. 7: 1196), tirucallane-type

triterpenoids (Zhang *et al*. 10: 1733), marine natural products (Shi *et al*. 7: 1031), and C_{21} steroidal glycosides in asclepiadaceaeous plants (Ni *et al*. 1: 162) etc.; single herb, e.g. *Scutellaria barbata* (Zheng *et al*. 8: 1406), *T. wilfordii* (Liu *et al*. 7: 1215), *Saururus chinensis* (Xiao *et al*. 12: 2111), *Ligustrum lucidum* (Cheng *et al*. 7: 1219), *Epimedium davidii* (Zhang *et al*. 2: 329), and *Codonopsis pilosula* (Zou *et al*. 3: Appen. 3) etc.; and compound CMM, e.g. Gegen Qinlian Decoction (Chen *et al*. 4: Appen.8) and Maren Soft Capsula (Wu *et al*. 9: 1575) etc. It is almost impossible to give a relatively comprehensive review and comment for all of these reviews with both the limit of space and lack of knowledge.

Chinese traditional and herbal medicines have been proved again and again through thousands of years' practices and millions of cases' experiences to be effective for various diseases or functional disorder, which is a visible, touchable, and indisputable fact. For the modernization of TCM, scientists have been contributing their intelligence to exploring the mechanism, to finding why and how it was effective, and to giving people a satisfactory answer. Study on the effective component of Chinese traditional and herbal medicines is one of the key fields, which could be used in almost all research areas including quality control and evaluation, resource characterization and evaluation, pharmacology and toxicology, pharmaco-kinetics and pharmacodynamics, mechanism study, and new drug discovery etc., and still plays a critical role in the modernization of CMM. For many years, the field scientists have been using the words of "effective component", "effective compound", "effective composition", and "effective constituent" or "active/ bioactive component", "active/bioactive compound", "active/bioactive composition", and "active/bioactive constituent" to describe the substance representing the efficacy of corresponding medicine. But, since the appearance of Wuzhi Jichu (物质基础 in Chinese) of Efficacy, the real meaning and improper translation brought confused application either in English or in Chinese (Chen *et al*. 1: 1). Actually the term of "effective component" and "effective substance" should be completely the same and several substances composed the "substantial basis". So-called investigation on the "effective component" or "substantial basis" of particular herb or formulated medicines actually is to find "effective component" (molecule/molecules) or "effective substance" (still molecule/molecules), instead of the substantial/material basis. Some of CMM (single herb or multi-herbs) exert their efficacy through multi-targets by one or more different molecules, and some of CMM may only rely on one herb or one molecule, especially for particular symptom, disease, or functional disorder. So, the application of TCM or CMM could be very simple or complicated, depending on individual case.

The establishment of the best harvest time of traditional Chinese medicinal materials is one of the keys to ensure the good quality and identical efficacy of final product. Duan *et al* (11: 1755) established an evaluated mode to objectively determine the best harvest time of *Angelica sinensis* through system investigating from different producing areas and harvest times, and characterizing the phenology and multi-index components comprehensive criteria. The author firstly proposed the suitable methods of the best harvest time of CMM, which was a basis of theory and method of resource chemistry of CMM, and including the time-space relationships and laws of substances dynamic accumulation. The data could provide the guidance for standardized product ion and guaranteed quality and yield of CMM.

The safety and toxicity of CMM have been attracting worldwide attention since the event of aristolochic acid. Although there is record about the renal toxicity of Madouling (*Aristolochia debilis*) and related aristolochiaceaeous plants, few attention had been paid until Belgium case happened in 1993 (Vanherweghem *et al*, 1993). Since then, aristolochic acid storm swept the world and brought the fear to people who had been using Chinese herbal medicines. People also felt scared on Chinese herbal medicines because of the unfair name Chinese herb nephropathy (CHN) until it was corrected to aristolochic acid nephropathy (AAN) in the meeting of National Toxicology Program (NIH, USA) in 2008 (NTP program, 2008). Now in the worldwide the use of AAN and the product containing AAN is strictly prohibited. So, the saying of either "CMM or natural product has no or less toxicity than Western medicines" or "one third toxicity for all drugs, CMM or west medicines" is

not correct or complete. Other cases like some popular CMM *Aconitum carmichaelii*, *Strychnos nuxvomica*, *Datura metel*, Rabiagar (As_4S_4), Arsenic trioxide (As_2O_3), and *Daphne genkwa*, etc., are very toxic. But, it could exert good curing efficacy when use them correctly. Xia (2: 209) focused on the toxicity of CMM, and from historical knowledge to modern understanding, gave a comprehensive analysis. Toxicity and efficacy sometimes work like a double-edged sword. To scientifically and artistically use it is critical and is the guarantee of success for a knowledgeable doctor.

The root of *Polygonum multiflorum* is a well known tonic herbal medicine. But its heptotoxicity has been seriously noted (Yu *et al*. 7: 1206).

Medicinal materials and resources are also one of the major columns of CTHD. The application of HPLC fingerprinting method to identify the real or fake and good or poor of medicinal material and processed product could effectively ensure the quality of final product. Baishao (farm cultured *Paeonia lactiflora*) and Chishao (wild harvested *P. lactiflora*) could be effectively recognized by comparing their HPLC fingerprint (Gao *et al*. 11: 1904).

Conclusion

The papers published on CTHD in 2010 were selectively and briefly reviewed; intend to reflect the new progress on modern research of Chinese herbal medicines. Chemical/bioactive compounds, preparations and quality evaluation, pharmacological and clinical studies, and crude drug and resources are still major concern in the field. Cancer, cardiovascular diseases, and diabetes are the top reasons of death and threatening factors for human life, and so attracting more efforts of scientists. The application of biotechnology and cell/molecular biology method will bring strong impact on the development of CTHD.

Acknowledgements

Authors are very thankful for the authors who contributed their intelligence and papers to CTHD to make this article possible. Authors also feel regretful for more good contributions couldn't be included in this limited text. All the papers cited could be found in corresponding place of CTHD.

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