Tropical Journal of Pharmaceutical Research September 2022; 21 (9): 2031-2037
ISSN: 1596-5996 (print); 1596-9827 (electronic)

Available online at http://www.tjpr.org
http://dx.doi.org/10.4314/tjpr.v21i9.30

Original Research Article

Characteristics of Tibetan medicine preparations used in the Chinese-Tibetan Hospital of Derong County

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Sent for review: 30 December 2021 *Revised accepted: 27 August 2022*

Abstract

Purpose: *To investigate the Tibetan medicine preparations used in Derong Chinese-Tibetan Hospital.*
Methods: *In this study, 115 preparations were collected from the Chinese-Tibetan Hospital of Derong County. A statistical table of information on medicine preparation was prepared in Excel format, and it included information on the forms of preparations, medicinal materials, medicinal parts used, frequency of use, and clinical applications.*
Results: *The 115 preparations were mainly pills. In clinics, they were used for treating liver disease, stomach-ache, gastric ulcer, nephrotic pain and fever. It was found that 226 medicines were used in various preparations. The plant components used varied from whole herbs, fruits, seeds, roots, rhizomes, and animal-based medicines, to flowers. The most frequently used plants/herbs were Terminalia chebula Retz., Carthamus tinctorius L., Aucklandia lappa Decne., Alpinia katsumadai Hayata and Phyllanthus emblica L. The most commonly used drug combinations involved three fruits (Terminalia chebula Retz., Terminalia billerica (Gaertn.) Roxb and Phyllanthus emblica L.). The preparations and medicinal materials used for liver and stomach diseases are described in detail in this article. These include Terminalia chebula Retz., Aucklandia lappa Decne. and Carthamus tinctorius L.*
Conclusion: *The study has analysed the characteristics and clinical uses of Tibetan medicine preparations and summarised the diseases and medicinal materials in the Tibetan area. These preparations and medicinal materials, with their many years of clinical use, may become invaluable gifts of Tibetan medicine to the world.*

Keywords: *Tibetan medicine, Medical preparations, Terminalia chebula, Aucklandia lappa, Carthamus tinctorius, Derong County, Digestive tract disease*

Tropical Journal of Pharmaceutical Research is indexed by Science Citation Index (SciSearch), Scopus, Web of Science, Chemical Abstracts, Embase, Index Copernicus, EBSCO, African Index Medicus, JournalSeek, Journal Citation Reports/Science Edition, Directory of Open Access Journals (DOAJ), African Journal Online, Bioline International, Open-J-Gate and Pharmacy Abstracts

INTRODUCTION

Tibetan medicine has a long history of textual research. It has incorporated the essence of ancient Indian medicine, Chinese medicine and Greek-Arab medicine, and it occupies a unique position in the world's traditional medical system [1].

In the 15th century, based on the theoretical system of the classic Tibetan medicine Four

Medicine Tantra (གསོ་རིག་རྒྱུད་བཞི།), Tibetan medicine was divided into two major schools of north and south, as functions of regional climate and mastering direction. The features of northern Tibet medicine are rheumatism treatment and the use of warm medicine and moxibustion. In contrast, the southern Tibetan medicine is characterized by use of cold medicines, and the prescription medicines are generally few [2]. Tibetan medicine is usually used for treating gastritis, gastric ulcer, hepatitis, cholecystitis, cirrhosis, rheumatism, stroke, paralysis and high-altitude diseases of the heart and lung characterised by alternating cold and heat [3].

The preparations of 114 medical institutions in Derong County in Ganzi Prefecture have been used in clinical practice for many years, with definite curative effects, low toxicity, minimal side effects, as well as good development and utilisation value. At present, more than 80 % of the medicines used in Tibetan medical clinics are pharmaceutical preparations of medical institutions. Hospital preparations are the major drugs used clinically in Derong Tibetan Medicine Hospital. This study used data mining of prescription information to analyse the characteristics, dosage forms, diseases treated, frequently-used medicinal materials, and other information on prescriptions.

METHODS

Data were manually retrieved from the China National Food and Drug Administration Domestic Drug Database, Classification and Code of Diseases 2016 (GB/T 14396-2016), Catalogue of Preparations and Drugs of Derong Chinese-Tibetan Hospital (DCTH), The Naming Basis of Preparations of DCTH, The Source of Preparations of DCTH, and The Quality Standard of Preparations of DCTH.

Data were collected from Jingzhu *Materia Medica*, *Dictionary of Chinese Ethnic Medicine*, Drug Standards of Tibetan Medicine, and other literature.

The data comprised the name, disease treated, species of plants, family, medicinal parts, traditional usage, and modern pharmacological research.

The botanical names of plants were validated using the Chinese Flora database (http://frps.eflora.cn/). Plant List database (http://www.theplant list.org/) was also used to standardise the Latin names of the plants [4].

RESULTS

A total of 115 preparations are used in DCTH. The preparations called *Zaga Sangpei Ribu* were from *Notes on Clinical Knowledge*; *Darcy Dezma Ribu* and *Zota Dezma Ribu* which appeared in the book *Mi Pang Medicine*. The others were recorded in *Mi Pang Medicine*, *The Four Medical Tantras* and *The Secrets of Medicine*. These preparations had only two dosage forms pill and powder, which were the more frequently-used forms (93.91 %). The number of medicinal species in the preparations ranged from 3 to 35, but most preparations comprised 25 species, while others had 7 species (Figure 1). Several medicines in the preparations (67 %) had between 3 and 15 species, so as to avoid repeated drug use and reduce waste of medicinal resources.

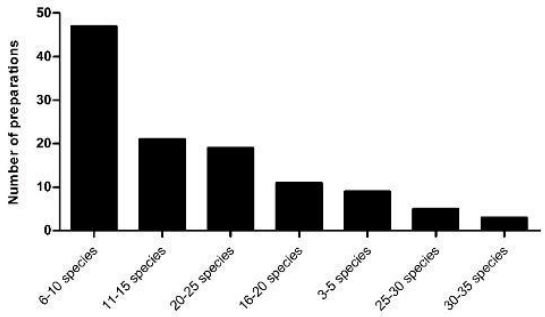

Figure 1: Distributions of medicines contained in the preparations

Modern medical names were used in the descriptions for diseases in DCTH. In the course of clinical applications, the characteristics of Chinese, Western and Tibetan medicines were integrated. Preparations were widely used to treat various diseases within the same systems, or to treat diseases from different systems, including the digestive system and urinary system. Preparations were also used to treat typical Tibetan diseases, especially liver disease, dyspepsia, stomach-aches, vomiting and diarrhoea, gastric ulcers and nephropathy pain. Statistical analysis showed that the preparations were targeted at treating 17 different kinds of diseases. The types of diseases included characteristic diseases of the digestive system, urogenital system, respiratory system, musculoskeletal system and connective tissues, as well as Tibetan medicine. A total of 24 types of preparations were used for the treatment of liver diseases, followed by 16 preparations for fever, and 14 each for nephropathy and dyspepsia. The clinical classification of the preparations is shown in Figure 2.

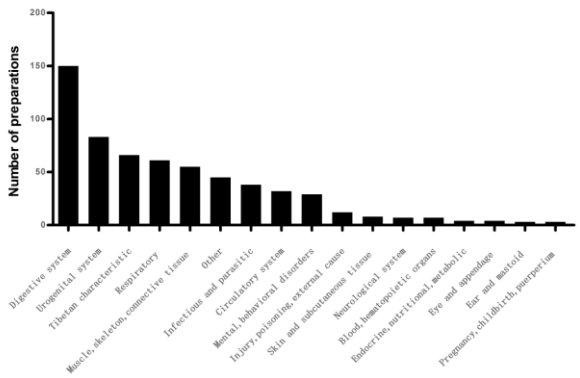

Figure 2: Clinical diseases associated with medicinal preparations in Derong Chinese-Tibetan Hospital

Botanical medicines were the most frequently used drugs amongst the 226 different types of medicines, with a total of 170 species (72.96 %), followed by 25 species of animal medicines (10.73 %), 23 species of mineral medicines (9.87 %), and 8 other species (3.43 %).

A total of 226 medicinal materials were involved, with the most commonly used drugs being *Terminalia chebula* Retz., *Carthamus tinctorius* L., *Aucklandia lappa* Decne, *Alpinia katsumadai* Hayata and *Phyllanthus emblica* L. (Table 1). There was consistency in rankings of the most frequently used five-dish Tibetan medicines obtained by the Institute of Tibetan Medicine Preparations, based on the quality standards of medicines [5].

The commonly used drug combinations were *Ter minalia chebula* Retz. and *Terminalia billerica* (G aertn.) Roxb and *Phyllanthus emblica* L. (The fruits of these three plants are often used together and are customarily the so-called “three fruits”), *C. tinctorius* L. and *A. lappa* Decne (Table 2).

The most frequently used plant materials were whole plant (21.24 %), fruits and seeds (19.47 %), and roots and rhizomes (16.81 %; Figure 3).

Usage of preparations

The frequencies of medicine intake were twice daily (46.96 %), three times a day (21.74 %), and 2 - 3 three times a day (13.04 %). Daily doses of preparations not exceeding 8 g were the most used (93.04 %), while the highest daily dose of *Zhitu Riga RiBu* was 15 g. There were 4 methods of administration of medications: chewing (93.91 %), decoction (54.35 %), bathing (only *Dezi Jueluo* powder), and swallowing (only *Tabu Mana* powder). Some preparations had special requirements: *Shaizhu Anba Ribu* was taken on an empty stomach in the morning, while *Basang Manma Ribu* was taken once at night in winter and spring.

Digestive diseases and common drugs

Digestive tract diseases have always been the most common diseases in Tibet. As a result of the cold climate and lack of oxygen in residential areas, Tibetans have developed particular habits and dietary patterns. They tend to eat yak meat, mutton, yak butter tea and other high-calorie and high-protein foods, and also drink barley wine in large quantities to keep out the cold. They eat less of fruits and vegetables. Long-term maintenance of these dietary habits lead to high incidence of digestive tract diseases. Gastric and liver problems are the main diseases of the digestive system. Liver and gastric cancers accounted for 75.2 % of all cancer deaths in 2004 - 2005 [6]. Gastric diseases were recorded in detail as early as in *The Four Medical Tantras* and *Yue Wang Yao Zhen* [7].

In modern Western medicine, gastric diseases comprise superficial gastritis, chronic atrophic gastritis, peptic ulcer and *Helicobacter pylori* infection. In addition to gastric diseases, the number of preparations for the treatment of liver diseases is particularly prominent in the category of digestive diseases. Data on the use of Tibetan medicine in the treatment of liver diseases indicate the involvement of 193 different medicines comprising 181 types of plant-based drugs, 7 different animal-derived drugs, and 5 mineral drugs [8]. Through data mining of preparations in Derong Hospital, some frequently used preparations and plants for the treatment of gastric and liver diseases were identified and briefly introduced. These preparations may be potential candidate drugs for the treatment of digestive tract diseases.

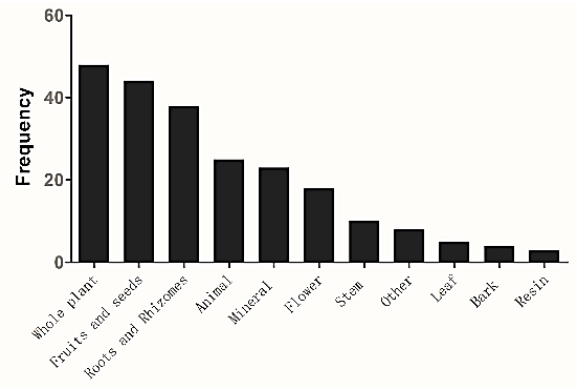

Figure 3: Frequency distribution of medicinal plant parts used in preparations

Table 1: Commonly used medicinal materials in Derong Chinese-Tibetan Hospital

Latin name	Tibetan name	Family	Part used	Life form	Traditional clinical application	Modern Pharmacological Research	Used Frequency (%)
Terminalia chebula Retz.	ཨ་རུ་ར། (Arure)	*Combretaceae*	Fruit	Tree	Bacon's disease, yellow water, chronic dysentery, aphonia, hemorrhage.	Protecting liver and heart, neuroprotection, antibacterial and antineoplastic activities.	70 (4.41)
Carthamus tinctorius L.	གུར་གུམ (Ku-gong)	*Compositae*	Flower	Herb	Dysmenorrhea, dystocia, traumatic injury, blood stasis.	Improving myocardium, antioxidant, anti-apoptotic, anti-inflammatory, and anti-tumor.	52 (3.28)
Aucklandia lappa Decne.	རུ་ཏ། (Ru-da)	*Compositae*	Root	Herb	Qi stagnation, chest and abdomen pain, vomiting and diarrhea, pneumonia, and Long disease.	Improving gastrointestinal (GI) motility, protecting gastric mucosa, promoting gallbladder contraction, vasodilation, inhibiting platelet aggregation.	51 (3.21)
Alpinia katsumadai Hayata	སུ་མའི (Su-mai)	*Zingiberaceae*	Fruit	Herb	Stomach cold, abdominal pain, vomiting, nausea, abdominal distension,	Protecting gastric mucosa, promoting GI motility, antiemetic.	42 (2.65)
Phyllanthus emblica L.	རྒྱ་རུ་ར། (Ju-ru-re)	*Euphorbiaceae*	Fruit	Tree	Blood heat, hepatobiliary disease, indigestion, cough	Anti-inflammatory, hypoglycemic, inhibition of GI motility, anti-aortic atherosclerosis, anti-fatigue.	39 (2.46)
Inula racemosa Hook. F.	མ་ནུ (Ma-nv)	*Compositae*	Root	Herb	Chronic gastritis and GI dysfunction	Antimicrobial activity, chronic gastric distention, GI dysfunction.	34 (2.14)
Moschus berezovskii Flerov.	ལ་ཟ། (La-zai)	*Moschidae*	Secretion of sachet	Animal	Stroke, phlegm, convulsion, heartburn, abdominal blowout, pain, kidney	Bidirectional regulation of sleep, enhanced hypoxia tolerance, protection, brain damage.	34 (2.14)
Myristica fragrans Houtt.	རྫ་དི། (Za-di)	*Myristicaceae*	Fruit	Herb	Deficiency diarrhea, cold dysentery, abdominal pain, vomiting	Antibacterial, antioxidant, anti-cancer, liver protection, hypoglycemia.	34 (2.14)
Corydalis stricta Steph	བ་ཤ་ག (Ba-xia-ga)	*Plantaginaceae*	Whole plant	Herb	Blood fever, liver fever, Chiba disease, tingling and injury	Antioxidant, anti-bacterial activities and in vitro coagulation, antitussive.	32 (2.02)
Syzygium aromaticum (L.) Merr. Et Perry	ལི་ཁི། (Li-xi)	*Myrtaceae*	Bud	Herb	Spleen and kidney deficiency, vomiting, diarrhea, heart and abdominal cold pain	Antibacterial, analgesic and digestive system protection.	32 (2.02)

Table 2: Commonly used medicinal combination in Derong Chinese-Tibetan Hospital

Medicinal combination	Number of preparations (%)
Terminalia chebula Retz. and *Phyllanthus emblica* L.	32 (27.83)
Terminalia chebula Retz. and *Terminalia billerica* (Gaertn.) Roxb and *Phyllanthus emblica* L. (Three fruits)	25 (21.74)
Carthamus tinctorius L.and *Aucklandia lappa* Decne	21 (18.26)
Carthamus tinctorius L. and *Syzygium aromaticum* (L.) Merr. EtPerry	19 (16.52)
Syzygium aromaticum (L.) Merr. EtPerry and *Bambusa tertilis* McClure	16 (13.91)
Carthamus tinctorius L. and *Syzygium aromaticum* (L.) Merr. EtPerry and *Bambusa tertilis* McClure	12 (10.43)
Symplocos caudata Wall.and *Rubia cordifolia* L. and *L.acciferlacca* Kerr.	10 (8.70)

Terminalia chebula Retz

Terminalia chebula Retz. is called A-Ru-Re (Ä) in Tibetan, and *Hezi* in Chinese. *Hezi* is derived from the dried ripe fruit of the *Gentianaceae* plant *T. chebula* Retz. or *T. chebula* Retz. var. *tomentella* Kurt. *Terminalia chebula* is widely used in southern Tibetan medicine for balancing *Long, Chiba* and *Bacon* ('three factors'). It is often used for treating prolonged diarrhoea and dysentery, bloody stool, anal prolapse, asthma and cough due to lung deficiency, prolonged cough and laryngitis. In Tibetan medicine, the dominant dogma centers on balancing the *three fires* of the stomach which mediate gastric diseases. Data mining revealed that *T. chebula* Retz. was the most frequently used medicinal material data on the treatment of stomach ailments and gout [9]. Tannins are the main bioactive compounds in the fruits of *T. Chebula*. The tannins comprise ellagic acid, terchebin, chebulinic acid, punicalagin, corilagin, terflavin, chebulagic acid and terchebulin. Tannins also contain phenolic acids (gallic acid, ethyl gallate and transcinnamic acid), triterpenoids (chebupentol, β-sitosterol and terchebin), and flavonoids (rutin, quercetin dihydrate and quercetin-3-O-rhamnoside). Their pharmacological effects comprise antioxidative, neuroprotective, anti-carcinogenic, bacteriostatic and antiviral effects [10].

It has been reported that the ethanol extract of *T. chebula* suppressed acetylcholine chloride-induced excitation of intestinal smooth muscles, inhibited gastric emptying and intestinal motility in normal mice, prevented contraction of isolated intestinal smooth muscles, and reduced serum motilin content in rats [11]. Moreover, serum containing *T. chebula* extract mitigated CCl_4-induced morphological changes in cells, significantly increased cell viability, effectively inhibited CCl_4-induced lipid peroxidation in hepatocytes, and enhanced the activities of lipid peroxidase, SOD and GSH-Px [12].

Carthamus tinctorius L.

Carthamus tinctorius L. is a commonly used herb in China. It is grown mainly in Henan, Hunan, Sichuan, Xinjiang and Tibet Provinces. The medicinally-used parts of *C. tinctorius* are the dried flowers which are known as *Ku-gong* in Tibetan, *Honghua* in Chinese, and safflower in English. *Carthamus tinctorius* L. is used for the treatment of dysmenorrhea, dystocia, traumatic injury and blood stasis in TTM and TCM. *Ku-gong* is also used in Tibetan medicine for treating hepatitis and hepatic heat. Modern pharmacological studies have shown that safflower has pharmacological properties that protect the myocardium, as well as antioxidant, anti-apoptotic, anti-inflammatory and anti-tumor effects. Hydroxysafflor yellow A, the effective bioactive component in safflower, is the material basis for its pharmacological effects [13]. Studies have shown that safflower exerts protective effect against acute liver injury induced by CCl_4 in rats as a result of its anti-inflammatory and antioxidative properties; it inhibits activation of JNK signaling pathway and regulates the expression of apoptotic factors [14]. A study determined the effect of safflower on the expressions of Bax and Bcl-2 and their ratios in rats with acute liver injury induced by lipopolysaccharide (LPS)/D-galactosamine (D-GalN) [15]. Compared with the traditional hepatoprotective drug (reduced glutathione (GSH)), safflower significantly protected the rats from LPS/D-GaIN-induced hepatocyte injury. Moreover, extract of *C. tinctorius* exerted significant inhibitory effect on diethylnitrosamine-induced liver cirrhosis in rats [16].

Aucklandia lappa Decne.

Aucklandia. lappa Decne is a *Compositae* plant, and its medicinal value resides in its dried roots, commonly known as *Ru-da* in Tibetan or *Muxiang* in Chinese. It is native to India, and it grows on high mountains. The plant was introduced to, and is cultivated in Shanxi, Gansu,

Hubei, Hunan, Guangdong, Guangxi, Sichuan, Yunnan and Tibet. In Tibetan medicine, it is used to treat *qi* stagnation, chest and abdomen pain, vomiting, diarrhoea, pneumonia and 'Long' disease. Modern pharmacological pharmacodynamic studies have shown that *A. lappa* Decne–improves gastrointestinal motility, protects the gastric mucosa, enhances gallbladder contraction and vasodilation, inhibits platelet aggregation and resists pathogenic microorganisms. Moreover, *A. lappa* Decne has anti-inflammatory and anti-tumour properties. The main bioactive compounds and quality control markers of *A. lappa* Decne are costunolide and dehydrocostus lactone.

Costunolide alleviated lipopolysaccharide-induced acute liver injury in animal models. It has been reported that aqueous and alcohol extracts of stems and leaves of *A. lappa* Decne. promoted small intestinal propulsion in mice, an effect which may be related to M cholinergic receptors [17]. Recent studies have shown that costunolide regulated the expressions of lipid metabolism-related transcription factors SREBP-1c and PPARα by activating AMPK, thereby reducing lipid production and accumulation in hepatocytes [18]. Thus, costunolide may be used as a potential preventive drug for alcoholic fatty liver.

In this study, a total of 115 preparations used in Derong medical institutions were collected, mainly from *Fanbian Medical Works*, *The Four Medical Tantras* and *Secret Prescriptions of Medicine*. Traditionally, the preparations were in only two formulations: pills and powders. The primary health issues for which these preparations were used were digestive system diseases, urogenital system diseases, characteristic diseases of Tibetan medicine and respiratory system diseases. The doses used for 67.83 % of the preparations did not exceed 5 g per day. A total of 226 kinds of medicines were involved in the 115 preparations, with the use of botanical medicines being the most common, followed by animal-based medicines. The medicinal parts used were roots, stems, leaves, flowers and some parts of flowers and fruits, as well as animal bones, horns, organs, excreta and blood. Fruits and seeds were the most commonly used medicinal materials, followed by roots and rhizomes. Based on frequency of use, the top five drug plants were *T. chebula*, *C. tinctorius* L., *A. lappa* Decne., *A. katsumadai* Hayata and *P. emblica*. *T. chebula*, safflower, *Muxiang, Yuganzi* and pomegranate were introduced, including their traditional uses, phytochemistry and pharmacological effects.

This study summarizes the characteristics and clinical uses of Tibetan medicine preparations. It is one of the few countries with relatively complete preservation of the southern Tibetan medicine culture. The selected areas have limited research data on Tibetan medicine preparations. Further research is needed to improve research on Tibetan medicine.

CONCLUSION

This study has provided vital information on the characteristics and clinical uses of Tibetan medicine preparations and summarized the common diseases and medicinal materials in the Tibetan area. These preparations and medicinal materials, with their many years of clinical use, may become invaluable contributions of Tibetan medicine to the modern world.

DECLARATIONS

Funding

This research was supported by the National Key Research and Development Program of China (no. 2017YFC1703904), the Sichuan Provincial Science and Technology Poverty Alleviation Special Project (no. 2017NFP0080), the Major Cultivation Project of Achievement Transformation in Sichuan Colleges and Universities (no. 18CZ0011), and the Achievements Transformation Project of Science and Technology Development Fund of Chengdu University of Traditional Chinese Medicine (no. CGZH1704).

Ethical approval

None provided.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of Interest

No conflict of interest associated with this work.

Contribution of Authors

We declare that this work was done by the authors named in this article, and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. Meiling Zhao and You Zhou participated in the establishment of the database, statistics and writing of

manuscript. Ke Fu, Xiaoli Li and Min Xu participated in the establishment of the database for the study. Yuan Liang, Xuemei Zeng, Gang Fan and Jing Zhang participated in statistical analysis of data. Qupi Arong, Zhenzhui Luorong and Zhang Wang collected data from the Chinese-Tibetan Hospital of Derong County. Meiling Zhao and You Zhou contributed equally to this work.

REFERENCES

1. *Deng D. Ganzinan School of Tibetan Medicine. Tibetol China 2011; 4: 138-145.*
2. *Xiza CP. Study on the formation and characteristics of the North-South School of Tibetan Medicine. Die Health Care 2018; 5: 287.*
3. *Yang WJ, Nie J, Yu J, Nai XR, Zhang D, Yongjiang SL, Zhang Y, Deng D. Tibetan and Canadian Ganghuan Chenlei, an analysis of the main academic characteristics of southern Tibetan medicine. Lishizhen Med Mater Med Res 2016; 7: 1683-1684.*
4. *Wang JJ, Wang Z, Huang JZ, Yao LC, Jiang Z. Study on the characteristics of varieties and prescriptions of Chinese patent medicines for treating dysfunctional uterine bleeding. Chin Patent Med 2015; 37(10): 3.*
5. *Kuang TT, Sun M, Wang Z, Zhu XQ, Tang YH, Cao MD, Zeng Y, Jia MR, Zhang Y, Jiang DF. Study on the variety, main treatment and medicinal characteristics of Tibetan medicine preparations based on drug standards. Chin Folk Med 2016; 25: 24-27.*
6. *Li YQ, Ping C, Li GL, Chen WQ, Zhao P, Zou XL. An Investigation on Deaths Caused by Malignancy in Tibet Autonomous Region in 2004-2005. China Cancer 2011; 20: 498-502.*
7. *Hong WS, Cai JF. Knowledge of esophageal and gastric diseases in ancient Tibetan medical literature. J Beijing Univ Tradit Chin Med 1995; 5: 26-27.*
8. *Li Q, Li HJ, Xu T, Du H, Ganghuan CL, Fan G, Zhang Y. Natural medicines used in the traditional Tibetan medical system for the treatment of liver diseases. Frontiers Pharmacol 2018; 9: 29.*
9. *Wongze ZY, Jiang YS, De L, Geng ZJ, Zhang Y. Data mining-based association rules analysis of core drugs of Tibetan medicine for gout. Shizhen Guoyi Guoyao 2017; 28(12): 2.*
10. *Zhang YY, Zeng HT, Yuan YJ, Li X. Progress in the study of chemical constituents and pharmacological activities of Terminalia chebula. J China Pharm 2018; 14: 2002-2006.*
11. *Zhang D, Wu GD, Gao HB, Xu JH. Effects of ethanol extract of Terminalia chebula on gastrointestinal motility and serum motilin content in animals. Chin J Exp Med Form 2013; 19: 243-246.*
12. *Li G, Zhang SY, Wang YH, Guan HB, Peng YS. Terminalia chebula and serum containing drugs on hepatocyte injury in rats. Lishizhen Med Mater Med Res 2010; 21(7): 3.*
13. *Zhou X, Tang, L, Xu Y, Zhou G, Wang Z. Towards a better understanding of medicinal uses of Carthamus tinctorius L in traditional Chinese medicine: A phytochemical and pharmacological review. J Ethnopharmacol 2014; 151: 27–43.*
14. *Lv XM, Lu RL, Ma YH, Ma LJ. Protective effect and mechanism of safflower on acute liver injury induced by carbon tetrachloride Beijing. J Tradit Chin Med 2018; 41(11): 943-949.*
15. *Chen Y. Huang XM Effects of Safflower Injection on Bax Bcl-2 Expression and Its Ratio in Rats with Endotoxin Acute Liver Injury. Chin J Tradit Chin Med Pharm 2010; 28: 159-162.*
16. *Hu ZW, Wang WX. Effect of Carthamus tinctorius L extract on diethy lnitrosamine induced liver cirrhosis in rats. Trop J Pharm Res 2015; 14: 1213-1216.*
17. *Gou J, Xu X, Li MY, Yuan LJ. Preliminary detection of the components of woody stem and leaf extract and its effects on intestinal propulsion and gastric emptying in mice. Pharm Evaluat Res 2017; 40(9): 1259-1264.*
18. *Ferré P, Foufelle F. SREBP-1c transcription factor and lipid homeostasis: clinical perspective. Horm Res 2007; 68: 72-82.*