Contents

Part I Pharmacology

1			Modern Research on Danshen	3
			and Juntian Zhang	
	1.1		l Situation of Application and Research	-
	1.0		shen	3
	1.2		esearch on the Chemical Components	
			shen	4
		1.2.1	Overview	4
		1.2.2	Research on Liposoluble Components	_
			of Danshen.	5
		1.2.3	Research on the Hydrosoluble Chemical	_
			Components of Danshen	5
		1.2.4	Research Methods for the Chemical	
		_	Components	6
	1.3		ch on the Active Components of Danshen	
			eir Pharmacological Actions	6
		1.3.1	Pharmacological Actions	
			of the Liposoluble Components of Danshen	6
		1.3.2	Pharmacological Actions of the Hydrosoluble	
			Components of Danshen	7
	1.4		pment of the Preparations of Danshen	9
		1.4.1	Danshen Preparations Used for Research	
			Purposes	9
		1.4.2	Clinically Used Danshen Preparations	10
	1.5	Researc	ch on the Pharmacological Actions	
		of Dans	shen	10
		1.5.1	Circulatory System	10
		1.5.2	Liver Diseases	11
		1.5.3	Kidney Diseases	12
		1.5.4	Respiratory Diseases	12
		1.5.5	Cancers	12
		1.5.6	Effects on Immunologic Functions	13
		1.5.7	Others	13
	1.6	Clinical	Applications of Danshen	13
		1.6.1	Treatment of Cardiovascular	
			and cerebrovascular Diseases	13
		1.6.2	Treatment of Hepatic and Renal Diseases	14

		1.6.3	Treatment of Respiratory Diseases	14	
		1.6.4	Actions on Tumors	14	
		1.6.5	Others	14	
		1.6.6	Adverse Reactions of Danshen	15	
	1.7	Summa	ry	15	
	Refer		·	15	
2			cological Actions of Danshen ThemeD	10	
			N' W. V. C. Henry Chara	19	
		÷	Yi Wang, Xiumei Gao, Hongcai Shang		
		Kiaoying	•	19	
	2.1	-	site Danshen Dropping Pill	19	
		2.1.1	Compatibility Studies on Compound	10	
		212	Danshen Dropping Pill (CDDP)	19 22	
		2.1.2	Pharmacological Research	LL	
	2.2		armacological Functions of Other	25	
			en-Containing Prescriptions	25	
		2.2.1	Composite Danshen Injection	25	
		2.2.2	Dan-Qi Hemiplegia Capsules	29	
		2.2.3	Compound Radix Codonopsitis Tablet	30	
		2.2.4	Xinkening Capsules.	32	
		2.2.5	Fufang Xueshuantong Capsule	22	
		226	(Copound Xue-Shuantong Capsule)	33	
		2.2.6	Guanxinning Injection	35	
		2.2.7	Bushenyishou Capsule	36	
		2.2.8	Huganning Tablet	39	
		2.2.9	Xinmaitong Tablet	39	
		2.2.10	Ningxinanshen Capsule	41	
		2.2.11	Ningshenbuxin Tablet	41	
		2.2.12	Yangxinshi Tablet	42	
	D (2.2.13	Rukuaixin Tablet	44	
	Refei	rences		46	
3	Activ	ve Const	ituents in Danshen and Their		
	Phar	macolog	ical Actions	49	
			ao Wang, Guanhua Du, Xiuying Yang,		
			g, Minke Tang, Ji Chen, Yonghong Chen,		
	Zhiwei Qu, Jie Wang, Xiaoying Wang, Yan Sun,				
	Ping	Chen an	d Chuan Li		
	3.1	Major	Constituents and Their Pharmacological		
		Action		49	
		3.1.1	Liposoluble Constituents	49	
		3.1.2	Water-Soluble Constituents	52	
		3.1.3	Other Constituents.	54	
	3.2	Pharma	acological Actions of Tanshinones	55	
		3.2.1	Overview of Studies on Tanshinones	55	
		3.2.2	Antibacterial Activity of Tanshinones	57	
		3.2.3	Anti-inflammatory Activity of Tanshinones	59	
			· · ·		

••••

4

	3.2.4 3.2.5	Effect of Tanshinones on Diseases	59
		of Cardiovascular System	59
3.3		of Salvianolic Acid on Myocardial	
		nia-Reperfusion Injury and Cardiac	
		e Cell	60
	3.3.1		
		in Rat Myocardial I/R Injury	60
	3.3.2	Effect of Salvianolic Acid A on In Vitro	
	0. 1	Cultured Myocardial Cells of Rats	61
3.4		s on Treating Nervous Degenerative Diseases	(2)
		alvianolic Acid B.	63
	3.4.1	Effect of Salvianolic Acid B on Mitochondrial	
		Injury and Nerve Cell Apoptosis Caused	64
	2 4 2	by Cerebral Ischemic Reperfusion	04
	3.4.2	Inhibitory Effect of Salvianolic Acid B	
		on $A\beta_{1-40}$ Fibrogenesis and Its Protective	
		Effect on Mitochondrial Damage and Cell Apoptosis of PC12 Cells Caused	
		by $A\beta_{1-40}$ Self-aggregation.	65
	3.4.3	Effect of Salvianolic Acid B on Neurogenesis	05
	5.4.5	in Rat Middle Cerebral Artery	
		with Ischemic Reperfusion	66
	3.4.4	Prospects of the Study on Salvianolic	00
	5.4.4	Acid B	70
3.5	Evom	les of the Effect of Salvianolic Acid	70
5.5	-	al Cerebral Ischemia	72
	3.5.1	Objective	72
	3.5.2		72
	3.5.3	1	72
	3.5.4	-	74
	3.5.5		75
Refer			75
Refer	CIICC3		10
Effec	ts of Da	nshen on the Cardiovascular System	79
		u, Lianhua Fang, Guanhua Du, Ran Zhang,	
	0	ng, Jinglan Xu and Xiaoying Wang	
4.1		otection of Danshen Over Heart	79
	4.1.1	Improving the Blood Supply of Ischemic	
		Cardiac Muscle.	80
	4.1.2	Improving the Energy Metabolism	
		of Cardiac Muscle.	81
	4.1.3	Inhibition of Myocardial Hypertrophy	84
	4.1.4	Anti-arrhythmia	86
	4.1.5	Treatment of Viral Myocarditis	86
	4.1.6	Summary	87
4.2	The Ef	fects of Danshen on Atherosclerosis	87
	4.2.1	Regulation of Lipid Metabolism	87

		4.2.2	Prevention of Lipid Peroxidation	90		
		4.2.3	Improvement in Functional Disturbance			
			of Blood Vessel Endothelium	93		
		4.2.4	The Inhibition of the Expression			
			of Adhesive Molecules and the Antagonism			
			of the Adhesion Between Cells	95		
		4.2.5	Inhibition of Vascular Smooth Muscle			
			Cell Proliferation.	97		
		4.2.6	Regulation of Antithrombotic System,			
			Inhibition of Thrombosis	99		
		4.2.7	Calcium Antagonism.	102		
		4.2.8	Treatment of Coronary Heart Disease			
		1.2.0	and Heart-Stroke	103		
		4.2.9	Summary	104		
	4.3		ffects of Danshen on Hypertension	101		
	1.5		s Risk Factors	104		
	4.4		ffects on Blood Vessel Endothelium	104		
	4.4		nooth Muscle	108		
		4.4.1	Danshen's Protective Effect on Vascular	100		
		4.4.1	Endothelial Cells.	108		
		4.4.2	The Effects of Danshen on the Proliferation	100		
		4.4.2	and Migration of VSMC	112		
		4.4.3		112		
	4.5		Summary	115		
	4.5 The Molecular Mechanism of Danshen's Protection on Myocardial Ischemia-Reperfusion Injuries					
		4.5.1	· ·	115		
		4.3.1	The Scavenging of Free Radicals	115		
		4.5.2	and Prevention of Lipid Peroxidation Protection of the Cell Membrane	115		
				117		
		4.5.3	The Prevention of Calcium Overload	110		
		4 5 4	in the Cells	119		
		4.5.4	The Effects of Danshen	101		
		155	on Post-ischemia-Reperfusion "No-Reflow"	121		
		4.5.5	The Effects of Danshen on Myocardial	100		
		450	Energy Metabolism	122		
		4.5.6	The Effects of Danshen on the Apoptosis			
			of Myocardial Cells and the Expression			
			of Apoptosis Related Genes During			
	-		Myocardial Ischemia-Reperfusion of Rats	124		
	Refe	rences	•••••••••••••••••••••••••••••••••••••••	124		
5	Drot	ootivo F	ffects of Danshen on Cerebral Vessels			
5			vous System	129		
				129		
		Guangliang Han, Yuehua Wang, Guanhua Du, Hongmei Guang and Xinrui Cheng				
	5.1		and Amur Cheng acological Action of Danshen to Treat			
	5.1		ral Hemorrhage	129		
		5.1.1	Overview of Cerebral Hemorrhage			
		5.1.1		129		
		J.1.4	Pharmacological Action of Danshen	130		

	••
V1.	111
~ v	н

	5.1.3	The TCM Basis for Using Danshen to Treat	
		Cerebral Hemorrhage.	130
	5.1.4	The Theoretical and Experimental Basis	
		of Danshen's Treatment of Cerebral	
		Hemorrhage	130
	5.1.5	Inseparable Relationship Between Cerebral	
		Hemorrhage and Cerebral Ischemia	131
	5.1.6	Decreasing Intracranial Pressure and Promoting	
		the Absorption of Cephalophyma	132
	5.1.7	Improving Hemorheological Characteristics	132
	5.1.8	The Timing of Danshen Treatment	
		for Cerebral Hemorrhage	133
5.2	The Ef	fect of Danshen on Learning and Memory	
	Abilitie	es	134
	5.2.1	The Effect of Danshen on Promoting	
		the Ability of Learning and Memory	134
	5.2.2	The Effect of Tanshinone	
		on Alzheimer's-Like Disease in Rats	135
	5.2.3	Effect of Compound Danshen Preparations	
		on Learning and Memory in Dementia Rats	140
5.3	Pharma	acological Effects of Danshen for Treatment	
	of Acu	te Ischemic Cerebrovascular Disease	144
	5.3.1	Mechanism of Action of Danshen	
		in Ischemic Cerebrovascular Disease	144
	5.3.2	Summary and Prospect	153
5.4		ive Effect of Danshen on Cerebral	
	Hemon	rhage-Reperfusion Injury	154
	5.4.1	Improving Energy Metabolism	154
	5.4.2	Clearing Free Radicals	155
	5.4.3	Reducing Calcium Overload	156
	5.4.4	Inhibiting the Release of Excitatory	
		Amino Acids (EAA)	158
	5.4.5	Regulating Immunity and Effects	
		on Cytokines	159
	5.4.6	Affecting the Expression of Heat	
		Shock Protein	160
	5.4.7	Improving Hemorheology	
		and Microcirculation	161
	5.4.8	Inhibiting Apoptosis	161
	5.4.9	Improving Learning and Memory Disorders	162
Refer	ences		164

	xv	i	i	i
--	----	---	---	---

6			ishen on the Blood System	
			rculatory Function	169
			Zhixin Guo, Jinhua Wang,	
	Li Zh	ang and	l Guanhua Du	
	6.1	The Ef	ffect of Danshen on Microcirculatory	
		Dysfur	nction Caused by I/R	170
		6.1.1	Danshen Improved the Microcirculatory	
			Dysfunction Caused by I/R	172
		6.1.2	The Improving Effect of Danshen	
			on I/R-Related Injury	176
	6.2	Effect	of Danshen on Microcirculatory Dysfunction	
			l by Endotoxins	178
		6.2.1	Effect on Diameter of Small Artery	
			and Vein	179
		6.2.2	Effect on Erythrocyte Velocity	
			of the Small Veins	179
		6.2.3	Effect on the Adhesion of Leukocytes	
			to the Small Veins	179
		6.2.4	Inhibitive Effect on Peroxides	179
		6.2.5	Protective Effect on Endovascular	
			Cell Injury	179
		6.2.6	Effect on Mast Cell Degranulation	180
		6.2.7	Inhibitory Effect on Serum Albumin	200
				180
	6.3	Improv	ving Effects of Danshen on Microcirculatory	
		-	nction Caused by Other Factors	180
		6.3.1	Improving Effect on Microcirculatory	
			Dysfunction Caused by Photochemical	
			Reactions	180
		6.3.2	Improving Effect on Microcirculatory	
		0.0.1	Dysfunction Caused by Noradrenaline	180
		6.3.3	Improving Effect on Microcirculatory	
		01010	Dysfunction Caused by Scalding	181
		6.3.4	Improving Effect on Microcirculatory	
		0.271	Dysfunction Caused by Noise.	181
		6.3.5	Improving Effect on Microcirculatory	.01
		0.0.0	Dysfunction Caused by Dextran Polymer	181
		6.3.6	Summary	181
	6.4		ch Progress in Danshen's Effects on the Blood	101
	0.1		, Microcirculation, and Hemorheology	181
		6.4.1	Anticoagulation, Promoting Fibrinolysis,	101
		0	and Antithrombosis	182
		6.4.2	Effect on Lipids	183
		6.4.3	The Function of Danshen on Improving	105
		0.4.5	Microcirculation and Promoting	
			Hemorheology	183
		6.4.4	Summary	185
	Refer			187
	I CLICI			107

		and Therapeutic Effects of Danshen	
on I	Digestive	System Diseases	19
Yan	qiao Zan	g, Ying Dai, Guanhua Du and Mei Gao	
7.1	Pharm	acological Effects of Danshen on Diseases	
	of Sto	mach and Intestine	19
	7.1.1	Pharmacological Effects on Peptic Ulcers	19
	7.1.2	Pharmacological Effects of Danshen	
		on Intestinal Tract.	192
	7.1.3	Clinical Application of Danshen in Intestinal	
		Tract Diseases	194
7.2	Pharm	acological Effects of Danshen on Acute	
		eatitis and Its Mechanisms	199
	7.2.1	Improving Hemorrheology	199
	7.2.2	Antiplatelet Aggregation	199
	7.2.3	Against Angiotensin II (Ang II)	200
	7.2.4	Regulating Endothelin Level.	200
	7.2.5	Scavenging Free Radicals.	200
	7.2.6	Inhibitory Effects on Ca^{2+}	20
	7.2.7	AntiBacterial and Anti-Inflammatory Effects	20
	7.2.8	Inhibiting the Aggregation of White	20
	7.2.0	Blood Cells	201
	7.2.9	Protective Effects on Extrapancreatic	20
	1.2.9	Organs.	202
7.3	Drogre	ss in the Study on Pharmacological Effects	202
7.5		elevant Mechanisms of Danshen in the Liver	202
	7.3.1	Pharmacological Effects of Danshen	202
	7.5.1	on the Liver	203
	7.3.2	Mechanisms of the Effects of Danshen's	20.
	1.3.2	Chemical Components on the Liver.	206
Dafa	****	▲	
Rele	rences		209
The	Effects of	of Danshen on Respiratory Diseases	
and	Their M	lechanisms	213
Guor	ong He,	Guanhua Du and Danshen Zhang	
8.1	The M	ain Pharmacological Effects of Danshen's	
	Treatm	ent of Respiratory Diseases	213
	8.1.1	Scavenging Free Radicals.	213
	8.1.2	Improving Hemorrheological Indices	214
	8.1.3	Calcium Antagonist.	215
	8.1.4	Regulating the Secretion of Cell	
		Factors [18, 19]	216
	8.1.5	Antiendotoxin Actions [23–25]	217
	8.1.6	Others	217
8.2		ive Effects of Danshen on Acute Lung Injury	
0.2		by Various Factors.	218
	8.2.1	Protective Effects of Danshen on Traumatic	210
	0.2.1	Lung Injury	218
			<i>4</i> 10

		8.2.2	Protective Actions of Danshen Against	
			Infectious Toxic Lung Injury	223
		8.2.3	Protective Effects of Danshen Against	
			Chemical Lung Injury	224
		8.2.4	Protective Effect of Danshen on Mixed	
			Lung Injury	228
	Refere	ences		231
9	The I	Effects o	f Danshen on Kidney Diseases	233
			antai Zhang and Guanhua Du	
	9.1		tive and Curative Effects of Danshen	
			al Inflammatory Diseases	233
		9.1.1	Definition of Renal Inflammatory Diseases	
			and Pathogenesis.	233
		9.1.2	Preventive and Curative Effects of Danshen	
		<i>></i> 111 <u></u>	on Renal Inflammatory Diseases	234
	9.2	Prevent	tive and Curative Effects of Danshen	
			al Failure	234
		9.2.1	Classification and Clinical Manifestation	
			of Renal Failure	234
		9.2.2		201
		2.2.2	Renal Failure	235
	9.3	Protect	ive Effects of Danshen on the Ischemia	
	7.5		hemia-Reperfusion Injury in Kidneys	235
		9.3.1	Antioxidation	235
		9.3.2	Affecting Inflammatory Factors.	236
		9.3.3	Effects on Nitric Oxide Synthase	236
	9.4		tive and Curative Effects of Danshen Against	200
	2.4		pairment of Renal Functions Caused	
		-	ic Substances	237
	9.5	•	tive and Curative Effects of Danshen Against	201
	7.5		pairment of Renal Function Caused by Renal	
			tial Substance Injury	237
	Refer			238
	Refet	011003		250
10	The J	Anti-tun	or Effects of Danshen	239
			, Tiantai Zhang and Guanhua Du	
	10.1		ation of Danshen in Clinical Tumor Therapy	239
		10.1.1	Alleviating the Pain of Malignant Tumors	239
		10.1.2	Enhancing the Therapeutic Effects	
			of Radiotherapy	239
		10.1.3	Prevention and Treatment of Radiotherapy	207
		101110	and Chemotherapy-Induced	
			Myelosuppression	240
	10.2	Action	s of Danshen on Malignant Tumors	240
	10,2		ssible Mechanisms.	240
		10.2.1	Effects of Danshen on Tumorigenesis	2 4 0
		10.2.1	and Relevant Mechanisms	240
		10.2.2		240 241
		10.4.4	Liteous on the Development of Tullois	∠41

	Refer	10.2.3 Other Potential Effects on Tumors. 10.2.4 Discussion and Prospects ences.	246 246 247
11	Studi	es on the Antibacterial and Anti-inflammatory	
	Actio	ns of Danshen and Its Effects	
	on th	e Immune System	249
		ang and Guanhua Du	
	11.1	Pharmacological Effects of Danshen	
		in Anti-inflammation and Immunity	249
		11.1.1 Effects on Immunocyte Function	249
		11.1.2 Effects on Cytokines	253
	11.2	The Pharmacological Effects of Danshen	
		in Antibacterial Activity.	260
		11.2.1 Effects on Staphylococcus Aureus	260
		11.2.2 Effects on Helicobacter Pylori	261

References.

Part II Quality Control

12	Qual	itative R	esearch	269			
	Guoq	iang Fan	, Guoqing Wu, Xiaoqian Zhang, Xian Zhang,				
	Rixin Liang, Manling Li, Fenglan Cao, Ming Zhu,						
	Zhan	gzhao Jir	n, Bilian Chen, Linke Ma, Shen Ji,				
	Qing	Gong, Z	hengliang Ye and Jun Gao				
	12.1	Identifi	cation of Medicinal Danshen	269			
		12.1.1	Morphological Identification	269			
		12.1.2	Microscopic Identification	269			
		12.1.3	Physical and Chemical Identification	271			
		12.1.4	Identification by Thin-Layer				
			Chromatography (TLC)	271			
		12.1.5	Spectral Identification	275			
	12.2	Identifi	cation of Danshen Preparations	276			
		12.2.1	Qualitative Identification of Dantonic [™]	276			
		12.2.2	Qualitative Identification of Danshen				
			Injection	279			
		12.2.3	Qualitative Identification of Compound				
			Danshen Tablet and Danshen Tablet				
			by TLC	283			
		12.2.4	Qualitative Identification of Xiangdan				
			Injection	284			
		12.2.5	Identification of Guanxinning Injection				
			by TLC	285			
		12.2.6	Identification of Danshen Total Phenolic				
			Acid Injection (Lypholized)	288			
	Refer	ences		289			

263 264

13		-	lity Control Methods	291	
	Xiaojian Zhang, Guoqing Wu, Rixin Liang, Manling Li,				
	Xiaoq	jian Zhai	ng and Shen Ji		
	13.1	Determ	ination of Water Content	291	
	13.2	Determ	ination of Ash Content	291	
		13.2.1	Total Ash	291	
		13.2.2	Acid-Insoluble Ash	291	
			ination of Extractives	292	
		13.3.1	Water-Soluble Extractives	292	
		13.3.2	Alcohol-Soluble Extractives	293	
	13.4		Metals	294	
		13.4.1	Overview	294	
		13.4.2	Detection and Determination		
			of Heavy Metals	295	
		13.4.3	Detection of Heavy Metals in Danshen	295	
		13.4.4	Method Validation	296	
	13.5		le Residues.	297	
	15.5	13.5.1	Overview	297	
		13.5.2	Organochlorine Pesticide Residues	298	
		13.5.3	Organophosphorus Pesticide Residues	299	
		13.5.4	Pyrethroid Pesticide Residues	301	
	13.6			302	
	15.0	13.6.1	Overview	302	
		13.6.2	Determination of Aflatoxin.	302	
		13.6.3	Assay Results	303	
	Dafar		•	305	
	References				
14	Cont	ent Dete	rmination	307	
	Wany	ing Wu,	Rongxia Liu, Dean Guo, Xiaoqian Zhang,		
	-	-	Rixin Liang, Manling Li, Fengnan Cao,		
	-		ngzhao Jin, Bilian Cheng, Linke Ma, Qing Gong,		
	-		Zhu, Zhengliang Ye, Jun Gao and Aihua Liu		
	14.1 Determination of Salvianolic Acid Content.				
		14.1.1	Determination of Total Phenolic Acid		
			Content in Compound Danshen Tablet	307	
		14.1.2			
			in Danshen Herb.	309	
		14.1.3	Determination of the Water-Soluble		
			Constituents in Dantonic ^{TM}	314	
		14.1.4	Determination of Salvianolic Acids	~ 1 1	
			in Danshen Injection	318	
		14.1.5	Determination of the Phenolic Components	210	
		1	in Compound Danshen Tablet		
			and Danshen Tablet.	326	
				540	

		14.1.6	Determination of Salvianolic Acids		
			in Xiangdan Injection	329	
		14.1.7	Determination of Salvianolic Acids		
			in Lyophilized Danshen Total Phenolic		
			Acid Injection.	334	
		14.1.8	Determination of the 6 Major Phenolic		
			Acids in Danshen and Its Preparations	338	
	14.2	Determ	ination of Tanshinone Contents	347	
		14.2.1	Determination of Tanshinones in Danshen	347	
		14.2.2	Determination of 4 Tanshinones in Danshen		
			and Danshen Preparations	348	
	Refer	ences		355	
15				357	
			nlan Zhang, Ming Zhu, Xiaohui Fan,		
	<i>u</i>		u, Aihua Liu, Min Yang and Haibing Qu		
	15.1		of Chromatographic Fingerprinting.	357	
		15.1.1	Study of the Chromatographic Fingerprinting		
			of Salvianolic Acids	357	
		15.1.2	Chromatographic Fingerprints of Diterpene		
			Quinone Constituents	425	
	15.2		on Near Infrared Spectral Fingerprint	446	
		15.2.1		446	
		15.2.2	The Near Infrared Spectral Fingerprints		
			of Danshen	447	
		15.2.3	NIR Spectral Fingerprint Based		
			on Wavelet Transform	453	
	Refer	ences		457	
17	01	the Cont	rol of Dantonic™	459	
16				439	
	Shunhang Liu, Jun Gao, Yan Liu, Shunnan Zhang,				
	Haiou Dong, Xueming Zhang, Jianping Lin, Junquan Wang, Xuesong Liu, Haibin Qu and Xiaohui Fan				
				450	
	16.1	~ *	Control of Raw Material Medicinals	459 459	
			Overview		
			Summary	462	
	16.2		Control in the Extraction Process.	462	
		16.2.1	Strict Quality Standard for Crude	160	
			Drug Materials	463	
		16.2.2	Advanced Techniques and Equipment	463	
		16.2.3	Quality Control of Extraction Process:		
			Implementation of CGEP Management	463	
		16.2.4	High Quality Standards for Extractum	464	

	16.3	Quality	Quality Control in the Preparation Process			
		16.3.1	Overview	46		
		16.3.2	Quality Control of the Production Process			
			of Dantonic [™]	46		
		16.3.3	The Application of Near-Infrared Spectroscopy			
			in the Quality Control of Dantonic TM			
			Production	47		
	16.4	Danton	ic [™] Quality Control Technique Based			
	1011	on Multivariant HPLC Fingerprinting				
		16.4.1	Acquisition of Multiple Chromatographic	49		
			Fingerprints of Dantonic TM	49		
		16.4.2	Authentication of Dantonic TM			
		10.1.2	Multiple Chromatographic Fingerprints	49		
		16.4.3	Validation of Dantonic TM Multiple			
		10.4.5	Chromatographic Fingerprints	49		
		16.4.4	Multiple Chromatographic Fingerprinting	77		
		10.4.4	Calculation Based on Information Fusion	49		
	16.5	Metho	d for Determining the Quality Uniformity	Τ.		
	10.5		npound Danshen Extract	50		
		16.5.1	Mixing Uniformity Method	50		
		16.5.2	e i	50		
		10.5.2	Multiple Fingerprinting	50		
		16.5.3		50		
			Results and Discussion	50		
	Dafar			50		
	Refer	ences		50		
17	In Vi	ivo Mets	abolism of Danshen and Its Preparations	51		
1,			ean Guo, Jinlan Zhang and Jianghao Sun	51		
	17.1 Pharmacokinetics and In Vivo Metabolism of Total					
	1/.1		nolic Acids	51		
		17.1.1	Pharmacokinetics Study of Total	51		
		1/.1.1	Salvianolic Acids	51		
		17.1.2	The Metabolites of Total Salvianolic	51		
		17.1.2	Acids from Danshen in Rats	51		
	17.2	Dhorme	acokinetics and In Vivo Metabolism	51		
	17.2		shen Preparations	52		
		17.2.1	Preliminary Pharmacokinetic Study	52		
		17.2.1		52		
		17.2.2	of Compound Danshen Tablet	52		
		17.2.2	Metabolic Fingerprinting of Danshen	52		
		1722	Injection	52		
		17.2.3	The Metabolites of Danshen Injection			
	17.0		in Rats After Intravenous Administration	52		
	17.3		etabolism of Monomer Tanshinone	~~		
			onents	53		
		17.3.1	In Vivo Pharmacokinetics of Tanshinone	.		
		17.2.0	II _A in Rats	53		
		17.3.2	The Metabolites in Rat Bile After			
			Intravenous Administration	<u> </u>		
			of 7 Tanshinones	54		

17.3.3	Quantitative Analysis of Bile Excretion Following Intravenous Administration						
	of 7 Tanshinones to Rats	571					
References	••••••	582					
Postscript		585					
Index		589					