

藏药“阿嘎如”类的本草考证和“阿尔玛”的生药学研究

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摘要:目的 本研究对“阿嘎如”类藏药进行本草考证,并对其临床使用品种“阿尔玛”进行生药学研究,为正本清源及质量控制提供依据。**方法** 通过文献研究,结合实地走访、专家咨询等方法,对“阿嘎如”类藏药的名称、品种分类、基原、性味功效、复方制剂及相关品种质量标准等进行整理总结。观察“阿尔玛”药材性状及显微特征;基于薄层色谱法进行理化鉴别,采用气相色谱质谱联用(GC-MS)技术对挥发油各成分及含量进行测定。**结果** “阿嘎如”名称自梵文借词演变而来,为典型的“多品种、多基原”藏药,藏医常以颜色作为分类依据将其分为白(音译名:“阿尔加”或“阿加嘎布”)、黑(音译名:“阿尔纳”或“阿嘎纳保”)、红(音译名:“阿尔玛”或“阿嘎苦拗”)3类。不同地区藏医所习用“阿嘎如”类藏药品种、基原差异较大,涉及5科7属约15种(含变种、变型)植物。其中“阿尔玛”临床使用广泛,其主流基原为云南樟的芯材。对“阿嘎如”类藏药的临床常用品种“阿尔玛”(云南樟)开展了生药学研究,为其质量标准的建立提供了基础数据。**结论** 完成了藏药“阿嘎如”类的本草考证及“阿尔玛”(云南樟)的质量标准研究,将为“阿嘎如”的质量科学评价和深度开发提供重要依据。

关键词:藏药;阿嘎如;阿尔玛;云南樟;本草考证;挥发油;生药学

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Herbal Evidence for the Tibetan Medicine “Agaru” and Pharmacological Study of “Aerma”

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ABSTRACT: OBJECTIVE To examine the herbal evidence of “Agaru” Tibetan medicines, conduct biopharmacological studies and provide a basis for the current origin and quality control. **METHODS** Through literature research, combined with field visits and expert consultations, variety classification, origins, characteristics and effects, compound preparation, and quality standards of “Agaru” type Tibetan medicines were compiled and summarized. The morphological and microscopic characteristics of “Aerma” medicinal materials were observed. Physicochemical identification was carried out based on thin-layer chromatography and determination of volatile oil components and content using GC-MS technology. **RESULTS** The name “Agaru” has evolved from Sanskrit loanwords and is a typical Tibetan medicine characterized by “multiple varieties and multiple origins”. Tibetan medicine often classifies it based on color into three categories: white (transliterated as “A Er Jia” or “A Jia Ga Bu”), black (transliterated as “A Er Na” or “A Ga Na Bao”), and red (transliterated as “A Er Ma” or “A Ga Ku Ao”). There is a significant difference in the varieties and origins of “Agaru” type Tibetan medicines used by Tibetan doctors in different regions, involving about 15 species (including varieties and forms) of plants from 5 families and 7 genera. Among them, “Alma” is widely used clinically, and its mainstream base is the heartwood of *Camphora glandulifera* (Wall.) Nees. Biopharmacological research was carried out on “Aerma” [*C. glandulifera* (Wall.) Nees], a clinically used variety of the “Agaru” group of Tibetan medicines, providing basic data for the establishment of its quality standards. **CONCLUSION** This study completes the botanical verification of the Tibetan medicine “Agaru” and the pharmacognostical research on “Aerma” [*C. glandulifera* (Wall.) Nees]. This will provide an important basis for the scientific evaluation of quality and in-depth development of “Agaru”.

KEY WORDS: Tibetan medicine; Agaru; Aerma; *Camphora glandulifera*; herbal textual research; volatile oil; pharmacognosy

藏药“阿嘎如”是收录在藏药典籍《晶珠本草》中的“树类”药材,是一种典型的多品种、多基原藏药,具有解热舒心、宁心安神、通脉降气、杀虫等多种功效^[1]。目前已广泛应用于八味沉香丸、仲泽八味沉香散、常松八味沉香散等经典藏药处方及各地藏医院的院内制剂中。由于民

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族地区医药基础相对薄弱,文化差异较大等原因,“阿嘎如”临床使用存在着基原复杂、名称混乱、品种混用等问题,不利于其临床使用的安全性和有效性。

调查发现,红色类“阿嘎如”,即“阿尔玛”的临床使用广泛。西藏、青海、四川、甘肃等地的藏医院或藏药企业常用其上品“阿嘎如”,来源为白木香 [*Aquilaria sinensis* (Lour.) Gilg]、沉香 (*Aquilaria agallocha* Roxb),治疗“隆”热侵心或黑白脉病导致的各类心血管疾病。但相关藏药标准中仅《卫生部药品标准·藏药》和《青海省藏药标准》在附录中收录了其名称及基原,《西藏自治区藏药材标准》对其来源、性状、用法、贮藏等做出了相关规定。“阿尔玛”的基原为云南樟 [*Camphora glandulifera* (Wall.) Nees]的干燥芯材。其现行质量标准技术水平低,难以鉴别其真伪优劣,不利于该药材的质量控制和临床用药安全。

基于以上情况,对“阿嘎如”类藏药的名称、品种分类、基原、性味功效、复方制剂及相关品种质量标准6个方面进行了详细的文献考证,对“阿尔玛”开展了生药学研究,为“阿尔玛”的临床安全用药以及完善质量标准提供了依据。

1 名称考证

相关藏医药文献(藏、汉)在收录藏药材时,常以藏文名、藏文名音译名和汉文名3种形式记载其名称^[2],不同文献因使用语言不同而各有偏重之处:藏文文献中常使用“藏文名”(也可见“藏文名+汉文名”等记载方式),汉文文献中一般以二至三种名称合用的形式记载^[3]。

“阿嘎如”在藏语中也被称为“吉瓦木德”^[4],是藏医理论体系指导下的一类具备“清心热”功效藏药材的总称。其藏文名称在可供调查的文献中主要有两种形式:“ཨ་ག་རུ” (音:Agaru) 以及“ཨ་ཀའར” (音:Akaer)。其中,“ཨ་ག་རུ”的使用记载频次最高(6本典籍记载),“ཨ་ག་རུ”在藏语中有“无重”或“去心”之意,为从梵语借词演变而来^[5]，“阿嘎如”为其常见的藏文名音译名,而由于地区藏语方言差异以及藏汉互译偏差等原因,相关文献中还可见“阿卡如、阿苦如、阿嘎日、阿嘎尔、阿嘎、阿孜尔、阿格尔”等众多同音或近音汉文用字^[6-12]。藏药“阿嘎如”的别称较多,仅《晶珠本草》一书就收录了吉迈、曲楠脑丹、赛尔如、塔卫亮保、加保宁吉、雅相等三十余种名称,但近代藏医药文献中多

已不再记载使用。

“阿嘎如”药材名称繁杂,根据品种差异划分为黑(阿尔纳、阿尔纳合、阿嘎纳保)、白(阿尔加、阿加嘎布、巴西合、力醒、拉哇嘎)、红(阿尔玛、阿卡苦拗、阿格尔高咬、阿嘎各略)等三大类藏文名音译名,对应着藏沉香、沉香、山沉香、土沉香、黑沉香、白沉香、红沉香、香樟、白花丁香等众多汉文名称(表1)。

2 品种分类

藏医根据药材的形态、性状和功效对药材进行分类,相似的药材被归为一类,然后根据其特定的形态、产地或性味差异进一步细分为“二类”品种,而“二类”品种还可细分,分别冠以不同的名称,形成“分级式”的记载形式^[14]。如上所述,与藏药“蒂达”^[3]类似,“阿嘎如”为一类具有相似功效藏药材的总称,关于其品种分类存在以下观点。

《蓝琉璃》^[6]以颜色作为品种划分依据,将“阿嘎如”分为黑(ཨ་ར་ནག)和黄(ཨ་ག་རུ་ལྗང་ལྗང་།)两类,其中黄类(ཨ་ག་རུ་ལྗང་ལྗང་།)又分两种,一种称为黄沉香,另一种称作“巴西合”(ཡམ་མཁོ་གཞུག,意为“次等阿嘎如”)。此外,本品文末还记载了“阿加”(ཨ་ག་རུ་ལྗང་ལྗང་།,意为“灰白色阿嘎如”)与“阿嘎苦拗”(ཨ་ག་རུ་ལྗང་ལྗང་།,意为“茴香味阿嘎如”)两种“阿嘎如”代替品的存在,但不属于上述所说的黑、黄两类中的任意一种。

《晶珠本草》同样以颜色作为分类依据,将“阿嘎如”分为“阿尔加”(白类)、“阿尔纳合”(黑类)、“阿嘎尔玛尔保”(红类,对应《蓝琉璃》记载的“阿嘎苦拗”)3种,并进一步根据性状差异,将“阿尔加”分为“阿嘎如巴西合”“普尔索合玛”和“加青”3种,“阿尔纳合”则被分为“纳保巴西合”“伊尔吾且札哇”“阿嘎如木保”等5种(图1)。

蒙药典籍《蒙药正典·美丽目饰》^[4]遵循《晶珠本草》的分类方法,将“阿嘎如”分为阿日纳格、阿日札、阿嘎如玛日布三类,并称“三沉香”。

从上述文献记载来看,历代藏医药古籍在对“阿嘎如”进行品种划分时,均以颜色作为主要依据,且分类情况基本相似。作为集历代藏医药本草之大成者,《晶珠本草》在藏医药文化体系中有着极为重要的地位,故近代文献在记载“阿嘎如”类藏药时,大多参照《晶珠本草》的分类方式,按颜色将其分为黑、白、红3种(图2)。

表 1 藏药“阿嘎如”名称、基源整理

Tab. 1 Name and original of Tibetan medicine “Agaru”

Category	Tibetan name	The phonetic translation in Tibetan	Herbal name(Pinyin)	Original plant	Comment
Agaru	ལག་རུ་མེད་ལྷོ་མེད་ལྷོ་མེད་ [1,3,7,9-10,16,19,23] ལག་རུ་མེད་ [11] ལག་རུ་མེད་ [19] ལག་རུ་མེད་ [20] ལག་རུ་མེད་ [19]	A ga [3], A ga ru [7,23], A ga er [11], A ga ri [15], A ka ru [16]	Chenxiang [1-3,7-8,11,19,23]	<i>A. agallocha</i> Roxb. [2,6,10-11,19,23], <i>A. sinensis</i> (Lour.) Gilg. [3,10-11,23-29], <i>D. aurantiaca</i> Diels [10-11,19]	
Black Category	ལག་རུ་མེད་ [1,13] ལག་རུ་མེད་ [9,14-15] ལག་རུ་མེད་ [19]	A er na he [2,16], Na bao ba xi he [2], Yi er wu qie za wa [2], A ga ru [6], A ri na ge [6], A er na he [15], A er na [17], A ka ru [17], A ku ru [17], Tai wei ning bu [17], Ji mei [17], Ning si er [17], Zhi xin [17], A ga na bao [19]	Heichengxiang [1-2,7-8,15], Zichenxiang [2], Chenxiang [6,9,14,16-17]	<i>A. agallocha</i> Roxb. [6,9,14,16-17], <i>W. canescens</i> (Wall.) Meisn. [9], <i>D. genkwa</i> Sieb. et Zucc. [9], <i>A. sinensis</i> (Lour.) Gilg. [14-17], <i>D. aurantiaca</i> Diels [13-16], <i>C. minor</i> (C. Pei & S. L. Chen ex C. Y. Wu) C. L. Xiang [19]	① In Mongolian medicine, when writing “ལག་རུ་མེད་” (which refers to Heichenxiang known as “Alnar”), Chenxiang and Baimuxiang are used ② The black heartwood of the rhizome of Chenghuangruixiang is used as a substitute for Heichenxiang in some areas of Yunnan and Sichuan
White Category	ལག་རུ་མེད་ [9,14-15,17] ལག་རུ་མེད་ [11,23] ལག་རུ་མེད་ [18] ལག་རུ་མེད་ [18]	A er jia [2,15-18,21-22], A ga er ba xi he [2], Pu er suo he ma [2], Jia qing [2], A ri zha [6], Su re hei yan (Manchurian language) [6], A jia ga bu [11,23], Li xing [18], La wa ga [18], A la shan-a ga ru (Mongolian language) [30]	Baichenxiang [2,7,15,17], Baimuxiang [6,9], Baihuadixiang [11], Shanchemxiang [22], Zangchenxiang [21-22]	<i>A. sinensis</i> (Lour.) Gilg. [6,9], <i>S. vulgaris</i> f. <i>alba</i> (Weston) Voss [11,15-17,23], <i>S. sueginzovii</i> Koehne et Lingelsh. [18], <i>S. yunnanensis</i> Franch. [18], <i>S. pinatifolia</i> Hemsley [20,24], <i>S. oblata</i> Lindl. [21-22]	
Red Category	ལག་རུ་མེད་ [3,9,15] ལག་རུ་མེད་ [1] ལག་རུ་མེད་ [11,13-14,17,19]	A ga er ma er bao [2], Gao le ma [2], Gao le a ga er [2], A er ma er [2], A ma [3], A ga ru ma ri bu [6], A ge er gao yao [11], A ma er [15], A er ma [16], A ka ru ma er bao [16], A ka ku niu [17], A ga ge lue [19]	Hongchenxiang [2], Xiaohuichenxiang [1,7], Jiangxiang [6], Xiangzhang [9], Yunnanzhang [11,13,16-17]	<i>Camphora officinarum</i> Nees [3,13,15], <i>C. glandulifera</i> (Wall.) Nees [3,9,11,13-15,17], <i>Dalbergia odorifera</i> T. Chen [6], <i>Camphora parthenoxylon</i> , <i>Cinnamomum pauciflorum</i> Nees	“Jiang Xiang”, known as “Ari Mar” in Mongolian medicine, has various names such as “Agaru-Gaoud”, “Wulan-Agaru”, etc. In Tibetan medicine, it is referred to as “Zan tan ma bao”.

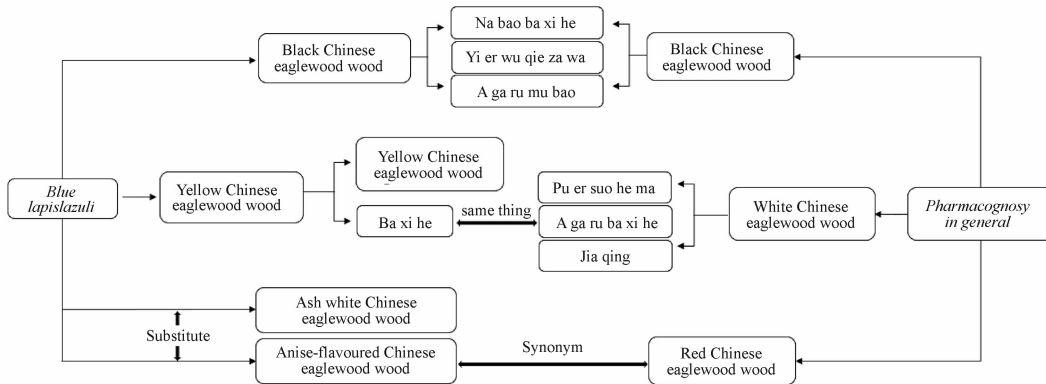


图 1 古籍对于“阿嘎如”的品种分类

Fig. 1 Classification of “Agaru” in ancient books

由于古籍文献中对于“阿嘎如”“三类”品种的描述记载较少,难以考证其对应的药用植物基源。为避免造成名称、品种的进一步混乱,近代文献[8,15-17]在收载“阿嘎如”时,均只划分到黑、白、红3种“二类”品种,而不再使用“三类”品种的概念。此外,部分汉文文献[17-18]常以基原植物中文名(如云南樟、白花洋丁香等)为目录索引,对不同品种基原的“阿嘎如”分别加以记载,这种方式虽有助于避免不同品种间的名称、基原混乱问题,增强了其用药可控性、准确性,但另一方面却也间接弱化了“阿嘎如”各品种间的联系。

3 基源考证

近代文献中记载的“阿嘎如”类藏药基原约有15种(含变种、变型)植物,涉及瑞香科沉香属(*Aquilaria*)、堇花属(*Wikstroemia*)、瑞香属(*Daphne*)、木犀科丁香属(*Syringa*)、马鞭草科菝葜属(*Caryopteris*)、樟科樟属(*Camphora*)、豆科黄檀属(*Dalbergia*)等5科7属(表1,图3)。藏医以黑沉香“阿尔纳”作为“阿嘎如”正品、上品药材,又以进口沉香以及国产白木香作黑沉香的正品基原,由于“阿嘎如”正品药材资源稀少且价格昂贵,为满足日常用药需求,各地藏医常就近采集相似功效的植物,来部分或完全



A - 黑沉香(阿尔纳); B - 白沉香(阿尔加); C - 红沉香(阿尔玛)。
A - Heichenxiang (Arna); B - Baichenxiang (Arga); C - Hongchenxiang (Aerma).

图2 不同类型“阿嘎如”药材

Fig. 2 Different type of “Agaru” medicinal materials

代替正品“阿嘎如”药材(特指沉香及白木香)。不同地区的植物资源因当地的生态环境等因素各有差异,加上不同地区藏医传承有异,这就导致各地藏医所使用的“阿嘎如”代用品基原及入药部位也存在一定差异,这也是“阿嘎如”类藏药品种、基原繁杂的主要原因之一。以基原最为繁杂的白沉香(མེན་མེན།,阿尔加)为例:四川甘孜地区习惯以四川丁香(*Syringa sweginzowii* Koehne & Lingelsh.)或云南丁香(*Syringa yunnanensis* Franch.)的枝、杆或根入药;云南德钦澜沧江各区及西藏盐井地区使用小叶灰毛茛(小白毛茛)[*Caryopteris minor*(C. Pei & S. L. Chen ex C. Y. Wu) C. L. Xiang]的花穗入药;青海部分地区使用白花欧丁香[*Syringa vulgaris* f. *alba* (Weston) Voss]的根;甘肃地区以紫丁香(*Syringa oblata* Lindl.)枝干或根作为白沉香使用;蒙区则习惯使用羽叶丁香(*Syringa pinnatifolia* Hemsl.) (即贺兰山丁香,蒙药称“阿拉嘎-阿嘎如”或“山沉香”)的去皮干燥枝。



A - 沉香《藏药志》; B - D - 沉香、白花欧丁香、云南樟《中华本草》; E - F - 橙花瑞香、小花白毛茛《迪庆藏药》。

A - A. *agallocha* Roxb (Tibetan Materia Medica); B - D - A. *sinensis* (Lour.) Spreng, S. *vulgaris* f. *alba* (Weston) Voss, C. *glandulifera* (Wall.) Nees (Chinese Materia Medica); E - F - D. *aurantiaca* Diels, C. *minor* (C. Pei & S. L. Chen ex C. Y. Wu), C. L. Xiang (Diqing Tibetan Medicine).

图3 文献记载“阿嘎如”类藏药植物基原

Fig. 3 Original plants of Tibetan Medicine “Agaru” in the literature

关于黑沉香的植物形态记载,最早出现于公元 8 世纪《度母本草》^[11]中:“阿嘎尔”生在阴阳石崖上,茎干形态似野蒿,叶片淡青呈簇生,花朵蓝色气芬芳。《蓝琉璃》^[6]言“阿尔纳”:形态似蒿,茎绿色,花蓝色有光泽,根从地下凸起状如野牛角(《蓝琉璃》中关于黑沉香的植物形态描述引述自《图鉴》,故与《度母本草》记载黑沉香应为同一基原)。《四部医典系列挂图全集》^[27]记载了两种黑沉香植物基原(图 4A, B),图 4A 中植物特征为:丛生,自基部多分枝,叶对生或近对生,未见花,须根膨大弯曲,疑似低矮灌木;图 4B 植物特征为:自基部分枝(基部分枝尚存砍伐痕迹),茎干弯曲,叶片细长,顶端较尖,簇生于枝顶端,疑似为灌木。《晶珠本草》记载黑沉香植株:大小不一,形态相似,叶、花状如瑞香狼毒,花黄色,树皮可做纸,老根呈紫黑色,嫩根白色^[5],且产自汉地(指藏汉杂居的川、甘、滇区域)^[14]及西康地区(今四川甘孜州、凉山州、攀枝花市、雅安市及西藏昌都市、林芝市地区)。

现藏医用“黑沉香”基原为瑞香科沉香

(*A. agallocha* Roxb)、土沉香 [*A. sinensis* (Lour.) Spreng] (即白木香)、橙花瑞香 (*Daphne aurantiaca* Diels)、堇花 [*Wikstroemia canescens* (Wall.) Meisn]、芫花 (*Daphne genkwa* Siebold & Zucc.) 5 种植物。其中沉香、土沉香均为高大乔木,其植物形态与图 4A, B 及《蓝琉璃》《晶珠本草》等古籍记载不符,且我国青藏高原地区没有这两种植物的野生资源分布,与《度母本草》所记载的草木类药物皆产自青藏高原地区不符。而剩余芫花、堇花、橙花瑞香三者的植物形态,地理分布、生长环境,与古籍记载黑沉香的特征皆有交叉,但三者中仅芫花花朵为蓝色且根部有毒(《中国植物志》^[28]记载“根可毒鱼,全株可作农药”),符合“花蓝色”“用前需去毒”的特征,故可能为《蓝琉璃》《度母本草》等所记载黑沉香基原;而橙花瑞香在四川、云南等地以根部黑色芯材入药代替黑沉香入药,且其花为橙黄色,符合“老根呈紫黑色,嫩根白色”“花黄色”的记载,应为《晶珠本草》记载黑沉香基原之一。



A - 黑沉香(出自《四部医典系列挂图全集》第二十六幅唐卡“药物”); B - 黑沉香(出自《四部医典系列挂图全集》第一幅唐卡“药王城”); C - 芫花(墨线图); D - 堇花(墨线图)。

A - Heichenxiang (from the twenty-sixth thangka, “Drugs”, Si Bu Yi Dian Xi Lie Gua Tu Quan Ji); B - Heichenxiang (from the first thangka, “The City of the Medicine King”, of Si Bu Yi Dian Xi Lie Gua Tu Quan Ji); C - D. *genkwa* Sieb. et Zucc. (inked line drawing); D - *W. canescens* (Wall.) Meisn. (inked line drawing).

图 4 黑沉香“阿尔纳”原植物

Fig. 4 The original plants of ‘Arna’

综合上述,藏医药古籍中记载的黑沉香植物形态,其对应基原植物应为分布于青藏高原地区的黑沉香替代品,而作为黑沉香正品来源的沉香和土沉香的植物形态并未出现在藏医药古籍记载中,这一点可能与其资源分布有关(沉香于我国无野生资源分布,土沉香则仅分布于海南、广东、福建等地,限于古代交通不便等原因,藏医药古籍的编纂者可能不易见到上述两种植物的形态特征)。

《蓝琉璃》^[6]记载“树干浅绿色,叶绿色,花白色”。《甘露本草明镜》^[15]云:“常绿灌木,茎高大,内面色白,气芳香,叶草绿色,小而质厚,对生,全缘;

花簇生于枝顶或叶腋,花白色带红光,状如瑞香狼毒”。现代藏医使用本品主要基原为白花欧丁香 [*S. vulgaris* f. *alba* (Weston) Voss] (图 5),其植物形态与文献记载基本相符,应为正品。

《四部医典》^[7]记载“来自尼泊尔等地,叶绿花白者即为阿卡苦拗”。《晶珠本草》云“产自路瑜、门隅和吉达木等地的川地(指平旷的地带)。软硬如白沉香,色深红,松软,气味如茴香(故也称茴香味沉香,即“阿卡苦拗”)”。《甘露本草明镜》云:“本品为多年生乔木,茎粗而长,外表白色,茎内呈红色,总的形态如杨树而多分枝;叶黄绿,光滑,较厚,

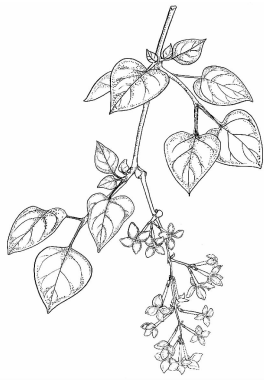


图5 白花欧丁香原植物墨线图

Fig. 5 Inked line drawing of the original plant of *S. vulgaris* f. *alba* (Weston) Voss

呈心形,边缘有裂,背面呈白色,叶脉清晰,叶柄较长,花黄色,小,状如“旁玛”^[29](黑果枸杞,其花萼狭钟状)树之花,又状如铃形。”现藏医临床常用及藏医药文献记载本品基原主要为云南樟[*C. glandulifera* (Wall.) Nees](图6),其植物形态、地理分布符合文献记载,应为正品。



A - 叶; B - 茎。
A - leaf; B - stem.

图6 云南樟植物

Fig. 6 Plant of *C. glandulifera* (Wall.) Nees

4 性味功效

类似于中医的“性味归经”,藏医体系有着“六味、八性、十七效”^[7]的说法。历代藏医文献中关于“阿嘎如”类藏药的味性以及功能主治的记载常莫衷一是,现将其整理归纳,见表2。“阿嘎如”以干燥芯材入药,具有味苦、辛、涩,性寒、凉。《四部医典》记载:味苦、甘、涩,效清凉、缓钝,治热症,功效清心火。《藏药晶镜本草》描述其味苦、辛,消化后性凉而平。《四部医典》云:“苦味具有清血热、赤巴热,健胃舒胸,增生腹肌的功效。辛味有增生胃热,消积化食,镇静催眠,驱除肠胃寄生虫之效”“苦、辛、涩之味消化后,成为苦味”“凉性药可治热症”,这与文献记载的“阿嘎如”味苦、辛,主治“龙”热侵心等病症的记载基本一致。故结合文献记载可知:“阿嘎

如”类藏药均具有味苦、辛,消化后味苦,性凉的共性。而根据品种差异不同,黑、白、红3种“阿嘎如”的具体性效存在一定差异,主要功效为清命脉热与心热、宁心安神、降气、温中、暖胃,多用于治疗心脏病、消化不良、头痛健忘等疾病,临床用药时需对症入药。

5 复方制剂

“阿嘎如”类藏药具有极高的药用价值,现藏医在沿袭传统用药的基础上,结合临床用药经验,将其大量应用在以治疗心脑血管疾病为主的藏药方剂中,部分含“阿嘎如”类藏药的藏成方制剂及其功能主治见表3。

值得注意的是,《藏药标准》中收录的沉香利水丸(阿杰曲久日布)其处方藏文原文为“ཕལ་འཇུག་ལྷུ་ལྷུ་རྒྱུ་རྒྱུ།”,应译为“白沉香利水丸”,按现藏医使用品种分类,其入药基原应为以白花欧丁香为主的多种木犀科植物的枝干或根部,而不应使用白木香作为其“上位”替代品。

《部颁标准·藏药卷》《藏药标准》等相关标准中均将“ཕལ་འཇུག་”译为“沉香”,并规定以白木香的含树脂木材部位入药,但白木香为国家二级重点保护植物,其进出口均受到严格管控,资源量稀少而昂贵,若在众多使用“阿嘎如”入药的藏处方制剂中,规定只能使用“白木香”,不仅会增加药物成本,且不符合各地藏医品种使用情况。为规范各地藏医院对于“阿嘎如”类的使用情况,保证以“阿嘎如”入药的藏药成方制剂的安全有效性,应加强“阿嘎如”类藏药基原的化学成分、药理作用、毒性机制等相关研究,从众多基原中筛选出资源丰富、安全有效的品种。

6 标准收载

“阿嘎如”类藏药在西藏、青海、四川、甘肃等地各藏医院、企业的处方制剂中被广泛使用,且广泛应用于如意珍宝丸等数十个国药准字的藏药复方制剂中。但目前仅沉香、白木香、云南樟、樟、羽叶丁香、芫花6个品种被相关法定标准收载或记录(表4),而大多数“阿嘎如”基原仍未被任何相关藏药标准所收载,也鲜见相关化学成分或药理相关研究。

《中国药典》2020年版^[35]中,芫花以花蕾入药,但藏医常以芫花根部入药代替沉香使用。值得注意的是,芫花为全株有毒植物,含芫花素(genkwanin)

表2 “阿嘎如”类藏药的性味、功效整理

Tab. 2 The properties, tastes and functions of “Agaru”

Classification of varieties	Taste and effects
Agaru	Bitter in taste, rough in nature ^[6] Bitter, sweet, astringent in taste, cool and calming in effect, treats heat syndromes, clears heart fire ^[7] Bitter and acrid in taste, cool and harmonizing after digestion, clears heat from the heart and blood vessels ^[8]
Arna (Aganabao)	Bitter in taste, rough in nature, classified as a hot medicine ^[11] Moistening in nature, clears wind-heat from the heart and vital meridians ^[1] Bitter and acrid in taste, neutral in nature. Treats heart and vascular diseases with special efficacy ^[6] Bitter in taste, cold in nature. Treats heart heat symptoms, headache, insomnia, irritability, and forgetfulness ^[12] Bitter and acrid in taste, becomes bitter after digestion, cool in nature, heavy, dull, cool, moistening, soft, and tender in effect ^[15] Pungent and bitter in taste, neutral in nature. Clears heart heat; treats wind-heat diseases, gynecological disorders ^[16] Pungent and bitter in taste, warm, slow, moistening, and drying in nature. Reduces fever, clears wind-heat in the meridians and heart; treats heart heat diseases and heart diseases, “dragon” diseases ^[17] Pungent and bitter in taste, warm in nature. Calms the mind, soothes the spirit, opens the channels, and reduces qi; treats restlessness, mental confusion, and madness ^[18] Pungent and bitter in taste, neutral in nature. Calms the mind and reduces qi; treats heart diseases ^[19] Pungent and bitter in taste, neutral and cool in nature. Calms the mind, opens the channels, and reduces qi; treats heart diseases ^[21] Calms the mind, opens the channels, reduces qi, warms the middle, and warms the stomach; treats heart diseases, heat in the meridians, qi reversal with rapid breathing, vomiting and diarrhea, and heart and abdominal pain ^[25] Pungent in taste, slightly warm in nature. Reduces qi, warms the middle; treats heart diseases, heat in the meridians, rapid breathing and asthma, vomiting and diarrhea, hiccups, heart and abdominal pain, weakness in the waist and knees, constipation due to deficiency ^[31]
Algar (Agagabu)	Heavy in nature, clears wind-heat in the heart and vital meridians ^[1] Bitter in taste, cold in nature. Treats heart heat symptoms, headache, insomnia, irritability, and forgetfulness ^[12] Bitter and slightly pungent in taste, becomes bitter after digestion, cool in nature, heavy in effect ^[15] Bitter in taste, neutral and heavy in nature. Clears heart heat; treats wind-heat diseases, gynecological disorders ^[16] Bitter in taste, cold in nature. Clears heart heat. Treats headache, forgetfulness, insomnia, irritability, and other symptoms ^[17] Bitter and slightly pungent in taste, cool in nature. Clears heart heat, opens the channels. Treats heart diseases, mild mental disorders, neurasthenia, insomnia, and other symptoms ^[18] Bitter and cold in taste. Clears heat and dryness, clears heart heat, stimulates appetite, aids digestion; treats headache, forgetfulness, insomnia, irritability, kidney diseases, wind-cold syndrome, cold “dragon” diseases, arthritis, cold syndromes, indigestion ^[19] Bitter and pungent in taste, warm in nature. Treats heart diseases ^[21] Clears “heart heat”, treats headache, insomnia, irritability, forgetfulness, and other symptoms ^[25] Bitter in taste, cold in nature, non-toxic. Clears “heart heat.” Treats headache, forgetfulness, insomnia, irritability, and other symptoms ^[32]
Aerma. (Agakuniu)	Cool in nature, clears heat from the heart and vital meridians. Treats wind-heat diseases ^[1] Clears heat and pathogenic wind from the heart and vital meridians, particularly effective against wind-heat ^[5] Treats “dragon” diseases, “tripa” diseases, stomach ailments, indigestion, and abdominal pain due to cold in the stomach ^[12] Bitter and acrid in taste, becomes bitter after digestion, cool in nature, with a moistening effect ^[15] Pungent and bitter in taste, warm in nature. Expels wind, disperses cold, regulates qi, stimulates the appetite, aids digestion; treats headaches, wind-cold syndrome, cold “dragon” diseases, arthritis, and indigestion ^[16] Pungent in taste, hot in nature. Heavy and moistening in effect; treats “dragon” diseases and “tripa” diseases ^[17] Bitter and pungent in taste, warm in nature. Clears heat; treats heart diseases and “dragon” heat syndrome ^[18] Pungent in taste, warm in nature. Warms the stomach, aids digestion; treats “dragon” diseases, stomach ailments, and indigestion ^[20] Pungent in taste, warm in nature; improves stomach warmth and aids digestion; treats “dragon” diseases, stomach pain, and indigestion ^[21] Bitter in taste, cool in nature. Clears heart heat; treats wind-heat diseases and various gynecological conditions ^[25] Bitter and pungent in taste, cool in nature. Clears heat and soothes the heart; treats cardiovascular diseases caused by “Lung” disease, such as palpitations and irritability ^[33] Bitter and pungent in taste, cool in nature. Reduces fever and clears the heart; treats diseases of the black and white vessels, “dragon” heat affecting the heart, palpitations, and mania ^[34]

等化学成分,其水提物具有肝毒性^[36],使用不当容易导致肝脏损伤,具有一定的危险性,临床使用需谨慎,并应当加强其质量标准建立工作。“基原不同,则成分不同”,在缺乏化学成分、药理作用等研究的情况下,不同科属的植物互相代替使用,必然会造成临床疗效存在差异,不利于临床用药安全性、有效性。因此,有必要在品种整理基础上,对各类别“阿嘎如”药材基原的化学成分、药理活性等开展进一步的研究,并建立相关质量标准,为指导临床合理用药奠定基础。

7 “阿尔玛”的生药学研究

7.1 实验仪器、试剂与药材

7.1.1 仪器 电阻炉(型号:8-10型,中国沈阳市节能电炉厂),优普系列超纯水器(型号:UPT-II-10T,四川优普超纯科技有限公司),电子天平(型号:TT223BC,常熟市双杰测试仪器厂),多功能暗箱式紫外透射仪(型号:ZF-90,上海宝山顾村电光仪器厂),生物显微镜(型号:BH200,舜宇光学科技),滑走切片机(型号:SM 2000R,上海徕卡仪器有限公司),光学显微镜(型号:CX-21,日本奥林巴斯公司),

表3 “阿嘎如”类藏药在藏医处方制剂中的应用

Tab. 3 Application of “Agaru” in the Tibetan medicine prescription

Herbal name (pinyin)	Functions and indications
Qiweimaqianziwan (Guoqidunbaribu)	Clears heat, soothes qi, and promotes blood circulation. Used for diseases caused by blood stasis and congestion, chest qi obstruction, and spreading heat
Baweichenxiangsan (Agaerjieba)	Clears heart heat, calms the heart, soothes the spirit, and opens orifices. Used for heat diseases attacking the heart, delirium, chest pain in the precordial area, and heart trauma
Shiyiweiganluwan (Duijijujiribu)	Nourishes the heart and calms the spirit, harmonizes qi and blood. Used for headaches, chest pain, palpitations, back swelling, and irritability caused by “Ninglong” and “Peilong” diseases; dizziness, nausea, vomiting, and acid reflux caused by “Peilong”
Shiyiweibanmaowan (Qiangbajujiribu)	Opens orifices and calms convulsions. Used for epilepsy, convulsions, and fainting
Shiyiweiweimingsan (Suozengjuju)	Calms and soothes the spirit. Used for mental disorders, palpitations, insomnia, and dizziness caused by “Suolong” disease
Shisanweichenxiangsan (Aernajiusong)	Calms and relieves pain. Used for restlessness, palpitations, and stabbing pain in the liver and breast areas caused by “Ninglong” disease
Shisanweimaqianziwan (Guoqijiusongribu)	Regulates qi, lowers blood pressure, and alleviates pain by resolving blood stasis. Used for hypertension, chest and back pain, difficulty breathing, dizziness, tinnitus, and swollen and sore gums caused by “Gangba” disease
Sareshisanweidapengwan (Sarexiaqiongjiusongribu)	Reduces inflammation and relieves pain, awakens the chest and opens orifices. Used for facial paralysis, numbness, paralysis, arteritis, tenosynovitis, and joint stiffness caused by “Baimai” disease
Shiwuweilongdanhuawan (Bangjianjiaoairibu)	Clears heat and regulates the lungs, stops coughing and transforms phlegm. Used for bronchitis, emphysema, coughing, wheezing, and hoarseness
Shiwuweichenxiangsan (Ageerjiuai)	Used for qi and blood disharmony, mania, muteness, breast pain on both sides, and hypertension
Shiliweidujuanhuawan (Dalijuzhouribu)	Benefits qi and aids digestion, promotes diuresis and relieves cough. Used for edema, indigestion, abdominal pain and bloating, coughing, dizziness, and water and soil discomfort
Shiqiweichenxiangwan (Agaerjiutunribu)	Tonifies the kidneys and calms the spirit. Used for palpitations, insomnia, mental confusion, dizziness, tinnitus, back and waist pain, and stiff neck
Shibaweijinsetangsan (Setangjiujie)	Reduces bad blood and relieves pain. Used for the early stages of “eye entry” disease, purplish lips, swollen and bleeding gums, chest tightness, and back pain
Shibaweinihuangsan (Langqingmeijujie)	Promotes blood circulation and resolves blood stasis. Used for chest and back stabbing pain caused by an increase in liver blood, “wood block” increase, and discomfort in the liver and stomach
Shibaweidujuanwan (Dalijujieribu)	Expels wind and unblocks the collaterals, promotes blood circulation. Used for numbness in the limbs, tremors, muscle atrophy, tendon spasms, and facial palsy caused by “vascular diseases”
Shijiuweichenxiangsan (Ageerjiugu)	Lowers blood pressure and benefits the lungs. Used for hypertension and asthma
Ershiweiroudoukouwan (Bimameizhiribu)	Calms and soothes the spirit. Used for mental confusion, irritability, mental distraction, insomnia, forgetfulness, dizziness, tinnitus, tremors, and palpitations
Ershiweichenxiangwan (Agaemixiuribu)	Harmonizes qi and blood, calms and soothes the spirit. Used for hemiplegia, hypertension, mental confusion, facial palsy, numbness in the limbs, and insomnia
Ershiweijintangsan (Saitangjiujie)	Regulates the balance of lung, blood, and phlegm, dries dampness, reduces inflammation, and relieves pain. Used for “Gangba” disease, blood diseases, and red-ba diseases, blue leg tooth decay, upper body pain, shortness of breath, and panting
Ershiwuweizhenzhuwan (Mudiniaribu)	Soothes the spirit and opens the orifices. Used for stroke, hemiplegia, facial palsy, unconsciousness, mental confusion, and delirious behavior
Ershiwuweilronghaowan (Weibainiaribu)	Clears liver heat. Used for pain caused by toxins and “Benbu” descending into the gallbladder, and pain in the liver and stomach area caused by liver enlargement in both new and old liver diseases
Ershiwuweibingpiansan (Kabunia)	Clears heat and detoxifies, treats carbuncles and ulcers. Used for heat diseases in the viscera, skin, muscles, bones, and vessels, spreading heat injury, fluctuating fever, pestilential fever, toxic heat, new and old heat diseases, gout, rheumatism, carbuncles, internal abscesses, and purulent blood
Ershiwuweiweisai (Xianggengnia)	Expels wind and calms the body. Used for “dragon diseases” of the five viscera and six bowels, “Lung diseases” of the skin, tendons, and bones, and all internal “Lung diseases.”
Ershiwuweisihanwan (Qiumaemiaribu)	Opens the orifices, unblocks the collaterals, relieves pain, and harmonizes qi and blood. Used for persistent headaches, white vein disease, encephalitis, dizziness, numbness and rigidity of the limbs, mental confusion, irregular blood pressure, convulsions, and spasms
Ershiwuweiguijuwan (Wusiniaribu)	Expels wind, relieves pain, and regulates menstrual blood. Used for women’s blood diseases, wind syndromes, uterine worm diseases, lower limb joint pain, pain in the lower abdomen, liver, gallbladder, upper body, irritability, blood deficiency, and irregular menstruation
Ershiqiweixiaoyelianwan (Wusinitunribu)	Regulates qi and blood, resolves blood stasis. Used for irregular menstruation, excessive menstrual bleeding or amenorrhea, abnormal menstrual color, dizziness, and pain in the waist, back, and lower abdomen
Ershijiuweiqianghuosan (Zhunanigu)	Clears heat and reduces inflammation, alleviates pain and eliminates pestilence. Used for pestilence, dysentery, jaundice, smallpox, anthrax, etc
Sanshiwuweichenxiangwan (Agasuoaribu)	Clears epidemic heat, expels wind, benefits the lungs, and alleviates bi (obstruction in the channels). Used for diseases caused by the struggle between pestilence, heat, and lung, the onset of febrile diseases, chronic lung diseases, lung iron cloth syndrome, cough with reversed qi, bi syndrome, heart lung syndrome, and difficult cases of qi and blood stasis
Anshenwan (Sengedejiribu)	Nourishes the heart and calms the spirit. Used for neuroses, delirium, excessive dreaming, dizziness, tinnitus, palpitations, and tremors
Ruyibaoshiwan (Sangpeinuburibu)	Clears heat, awakens the brain and opens the orifices, dries yellow water (refers to clearing damp-heat), and promotes blood circulation. Used for numbness in the limbs, paralysis, facial palsy, mental confusion, and joint stiffness
Chenxianglishuiwan (Aaieqjujiribu)	Strengthens the heart and promotes diuresis. Used for edema on the face, eyelids, and dorsum of the feet caused by heart disease, fatigue, stabbing pain in the chest and ribs, palpitations, shortness of breath, restless sleep, and oliguria (reduced urine output)
Fengshizhitongwan (Chunbusujiaoribu)	Reduces swelling and alleviates pain. Used for cold bi syndrome (cold-damp obstruction in the channels), rheumatoid arthritis, etc

表4 各级标准收载“阿嘎如”类藏药情况

Tab. 4 Standard inclusion Tibetan medicine “Agaru”

Standard source	Standards for Inclusion(version)
<i>A. agallocha</i> Roxb.	Pharmacopoeia of the People’s Republic of China(1963)、Import Standards for Medicinal Materials by the Ministry of Health of the People’s Republic of China(1987)
<i>A. sinensis</i> (Lour.) Gilg	National Compendium of Tibetan Medicine Standards, Appendix of the Tibetan Medicine Volume of the Health Ministry’s Pharmaceutical Standards (1995)、Pharmacopoeia of the People’s Republic of China(1963)
<i>C. glandulifera</i> (Wall.) Nees	Appendix of Qinghai Province Tibetan Medicine Standards(1992)、Sichuan Province Tibetan Medicinal Materials Standards(2020)、Tibetan Medicinal Materials Standards of the Tibet Autonomous Region, Appendix of the Tibetan Medicine Volume of the Health Ministry’s Pharmaceutical Standards (1995)
<i>C. officinarum</i> Nees	Appendix of the Tibetan Medicine Volume of the Health Ministry’s Pharmaceutical Standards (1995)、Appendix of Qinghai Province Tibetan Medicine Standards(1992)
<i>S. pinnatifolia</i> Hemsl.	Appendix of the Tibetan Medicine Volume of the Health Ministry’s Pharmaceutical Standards (1995)
<i>D. genkwa</i> Siebold & Zucc.	Pharmacopoeia of the People’s Republic of China(2020)

安捷伦 7890A-5975C 气质联用仪(美国安捷伦公司)。

7.1.2 试剂 甲醇、乙醇、正己烷、甲苯、二甲苯、石油醚(60~90℃)、羧甲基纤维素钠、乙酸乙酯、水合氯醛、甘油等试剂均为 AR 级。硅胶 G 板、硅胶 GF₂₅₄ 板均购买自青岛海洋化工有限公司。 α -松油醇对照品(批号:PSO20226,纯度 98.0%,成都普思生物科技有限公司)。

7.1.3 药材 本实验收集了来自四川省(编号:SC)、青海省(编号:QH)、甘肃省(编号:GS)、西藏自治区(编号:XZ)、云南省(编号:YN)5 个省的“阿尔玛”药材共 15 批,经成都中医药大学尹鸿翔副教授和重庆中药研究院秦松云老师鉴定为樟科樟属植物云南樟[*C. glandulifera* (Wall.) Nees],实验样品保存于成都中医药大学民族医药学院标本中心,样品来源、产地信息见表 5。

表5 样品来源及编号

Tab. 5 Sample source and number

Province	Sample number	Place of origin (in Chinese)	Collection time
Sichuan	SC-1	Ganzi Tibetan Autonomous Prefecture Tibetan Hospital(甘孜藏族自治州藏医院)	2020.07.08
	SC-2	Chengdu Hehua Pond Medicinal Materials Market (Bencao Tang)[成都荷花池药材市场(本草堂)]	2020.11.16
	SC-3	Ganzi Derong County Chinese-Tibetan Hospital(甘孜州德荣县中藏医院)	2020.08.15
	SC-4	Ganzi Shiquan County Tibetan Hospital(甘孜州石渠县藏医院)	2020.08.06
	SC-5	Liangshan Yi Autonomous Prefecture Huili County(凉山彝族自治州会理县) ¹⁾	2020.07.11
	SC-6	Liangshan Yi Autonomous Prefecture Huidong County(凉山彝族自治州会东县) ¹⁾	2020.07.13
Qinghai	QH-1	Huangnan Tibetan Autonomous Prefecture Tibetan Hospital(黄南藏族自治州藏医院)	2020.07.13
	QH-2	Yushu Tibetan Autonomous Prefecture Nangqian County Tibetan Hospital(玉树藏族自治州囊谦县藏医院)	2020.08.03
	QH-3	Bayi Road Medicinal Materials Market(San Zhi Shang Pu)[八一路药材市场(三智商铺)]	2020.07.14
	QH-4	Qinghai Province Tibetan Hospital(青海省藏医院)	2020.07.10
Gansu	GS-1	Gannan Tibetan Autonomous Prefecture Tibetan Hospital(甘南藏族自治州藏医院)	2020.07.08
Xizang	XZ-1	Tibet Tibetan Medical College Tibetan Medicine Co., Ltd.(西藏藏医学院藏药有限公司)	2020.08.17
	XZ-2	Tibet Qizheng Tibetan Medicine Co., Ltd.(西藏奇正藏药股份有限公司)	2019.12.19
	XZ-3	Lhasa Sapphire Medicinal Materials Co., Ltd.(拉萨蓝宝石药材有限公司)	2020.09.17
Yunnan	YN-1	Yunnan Luosi Bay Medicinal Materials Market(云南螺蛳湾药材市场)	2021.07.16

注:¹⁾ - 自采样品批次。

Note:¹⁾ - Self-collected sample batches.

7.2 方法与结果

7.2.1 原植物形态特征 按植物分类学方法,参考《中国植物志》,观察记录原植物形态特征,并对其植株特征进行拍照,见图 6。云南樟为常绿乔木,高 5~20 m,胸径达 30 cm;树皮灰褐色,深纵裂,内皮红褐色,具有樟脑气味。叶互生,椭圆形至卵状椭圆形或披针形,革质,羽状脉或偶有近离基三出脉,侧脉每边 4~5 条,与中脉两面明显。圆锥花序腋

生,花小,长达 3 mm,淡黄色,花被裂片 6,宽卵圆形。果球形,直径达 1 cm,黑色。花期 3~5 月,果期 7~9 月。

7.2.2 药材性状 取“阿尔玛”干燥药材,从形状、大小、色泽、表面特征、质地、气味等方面对药材的性状特征进行观察记录。本品呈不规则块状、条状或片状,长 10~32 cm,直径 8~14 cm;外表面红棕色至棕褐色。有的具疤节和纵裂纹,凹凸不平,有刀

痕。横断面刺状,红棕色,年轮明显或不明显,纵向劈开纹理较顺直。质坚实,不易折断。气芳香,味辛,甜(图7)。



图7 “阿尔玛”药材

Fig. 7 “Aerma” medicinal herbs

7.2.3 三切面特征 选取云南樟茎新鲜组织,制作云南樟茎干的横切面、径切面及弦切面切片,其中横切面及径切面观察分别在髓部及近髓心4~5年轮处两个点位各取一小块(1.5 cm × 1.5 cm × 1.5 cm)切片,使用FAA固定液浸泡,软化并清洗后,用滑走式切片机将试样切成横、径和弦向切片,厚度为15 μm。用番红-普鲁士蓝溶液染色,经不同体积分数乙醇(50%、70%、85%、90%和100%)脱水和二甲苯透明处理后,用中性树脂胶封片。待树脂胶阴干后,在显微镜下观察切片^[37-38]。

横切面:木射线宽1~3列细胞,呈径向延长。导管圆多角形,管孔为单管孔和径列复管孔,少数管孔团。木纤维多角形,壁厚,木化(图8 A1~B3)。

弦切面:木射线细胞异型多列,偶见单列,宽1~3列细胞,高4~20列细胞。导管为具缘纹孔,长短不一,两端平截,具缘纹孔紧密排列,互列,导管直径50~220 μm。纤维狭长,壁较厚。木薄壁细胞内含淀粉粒,细胞壁有时增厚。油细胞长70~270 μm(图8 C1~C3)。

径切面:木射线排列成横向带状,高4~20层细胞,细胞为长方形或略长方形。纤维径向壁上有单纹孔,余同切向纵切面(图8 D1~E3)。

7.2.4 粉末特征 药材经粉碎过筛后,挑取少许粉末置载玻片上,滴加水合氯醛试液1~2滴,搅匀后在酒精灯上加热透化,重复2~3次操作,滴加稀甘油装片。冷却后置于显微镜下观察并拍摄特征。本品粉末黄棕色,气香,味微涩。木纤维极多,常单个散在,细长,直径15~30 μm。具缘纹孔导管直径

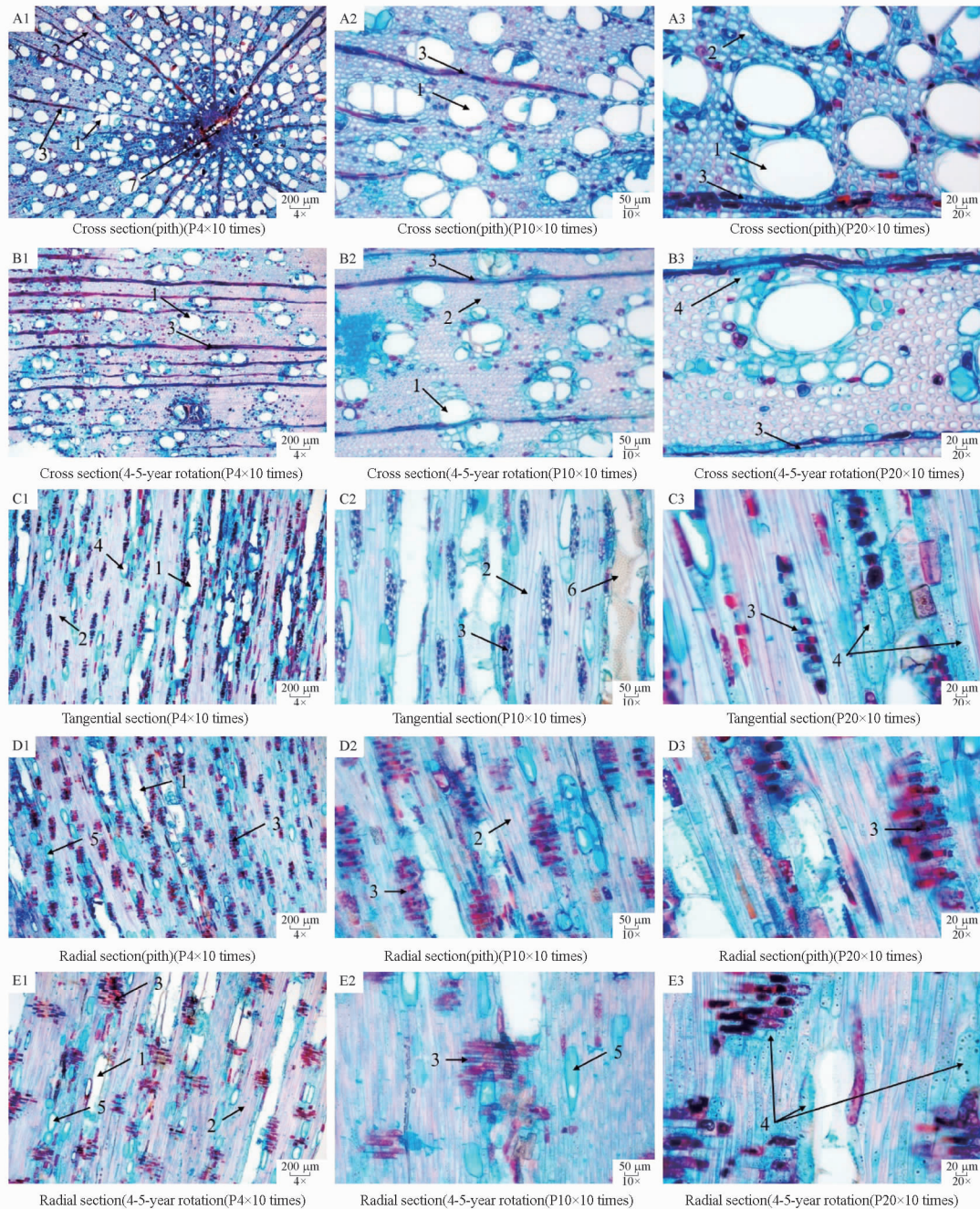
70~230 μm,多破碎,具缘纹孔排列紧密,互列,导管中常含黄色分泌物。木薄壁细胞呈类长方形或类方形,壁连珠状增厚,木化,纹孔明显。油细胞较少见,呈类圆形,胞腔内含黄色物质。本品纤维、导管、木薄壁细胞3者结构特征明显,见图9。

7.2.5 薄层色谱鉴别 供试品溶液制备:取本品粉末20.0 g,置于1 000 mL圆底烧瓶中,加水300 mL,连接挥发油测定器,自测定器上端加水至溢流至烧瓶,自挥发油测定器上端加乙酸乙酯5 mL,连接冷凝管,加热煮沸2 h,冷却至室温;取乙酸乙酯液通过铺有无水硫酸钠的漏斗滤过,滤液作为供试品待用。对照品溶液制备:另取α-松油醇对照品,加甲醇制成每1 mL含4 μL的溶液,作为对照品溶液。吸取上述两种溶液各5~10 μL,分别点于同一硅胶G薄层板上,以石油醚(60~90℃)-乙酸乙酯(17:3)为展开剂,展开,取出,晾干,喷以10%磷钼酸乙醇溶液,105℃加热至斑点显色清晰,日光下检视。供试品色谱中,在与对照品色谱相应的位置上,显相同的蓝紫色斑点。结果见图10。

7.2.6 挥发油含量测定 藏药“阿尔玛”具有祛风散寒,理气止痛的功效。可用于感冒,中暑、支气管炎、食滞气胀、胃痛、腹泻胀痛、淋病、风湿关节痛等多种病症,这与其挥发油成分中多种物质的药理作用相关^[39-42]。樟属植物化学型复杂,不同化学型所含化学成分含量差异巨大^[43],不宜以单一成分作为其含量测定项,故参考《中国药典》对于同类芳香性药物的标准规定,以挥发油含量总和作为其质量控制项。

据文献记载,从与云南樟的同属植物樟[*C. officinarum* Nees]中提取的挥发油相对密度为0.878~0.898。故选择《中国药典》2020年版四部通则2204挥发油含量测定法项下甲法。取药材粉末各50 g,置于1 000 mL圆底烧瓶中,加500 mL蒸馏水;置于电热套上,连接挥发油提取器与冷凝回流管,自冷凝管上端加水至刚好溢流入烧瓶;电热套加热,至沸腾,保持煮沸约5 h,至测定器中油量不再增加,停止加热,放置1 h以上,再开启活塞使油层下降至其上端恰与刻度0线平齐,读取挥发油量,并计算供试品中挥发油的含量(%)。测定结果见表6。

最后测得“阿尔玛”挥发油为淡黄色透明油状液体,有浓烈的特殊香气,相对密度为0.811~0.880。由于“阿尔玛”在储藏过程中挥发油易挥发,不同批次样品挥发油含量差异较大,最高可达4.6%,最低仅有0.4%。因此挥发油含量总和可作为评价药材质量优劣的重要指标。



A1 ~ A3 – 横切面(髓部)(P4×10倍、P10×10倍、P20×10倍); B1 ~ B3 – 横切面(4~5年轮)(P4×10倍、P10×10倍、P20×10倍); C1 ~ C3 – 弦切面(P4×10倍、P10×10倍、P20×10倍); D1 ~ D3 – 径切面(髓部)(P4×10倍、P10×10倍、P20×10倍); E1 ~ E3 – 径切面(4~5年轮)(P4×10倍、P10×10倍、P20×10倍); 1 – 导管; 2 – 木纤维; 3 – 木射线; 4 – 木薄壁细胞; 5 – 油细胞或黏液细胞; 6 – 具缘纹孔; 7 – 髓。

A1 ~ A3 – cross section (pith) (P4×10 times, P10×10 times, P20×10 times); B1 ~ B3 – cross section (4~5-year rotation) (P4×10 times, P10×10 times, P20×10 times); C1 ~ C3 – tangential section (P4×10 times, P10×10 times, P20×10 times); D1 ~ D3 – radial section (pith) (P4×10 times, P10×10 times, P20×10 times); E1 ~ E3 – radial section (4~5-year rotation) (P4×10 times, P10×10 times, P20×10 times); 1 – Ducts; 2 – Wood fibres; 3 – Wood rays; 4 – Wood thin-walled cells; 5 – Oil or mucous cells; 6 – Marginal striated pore; 7 – Pith.

图8 “阿尔玛”木材三切面显微特征

Fig. 8 Microscopic characteristics of “Aerma” wood in three sections

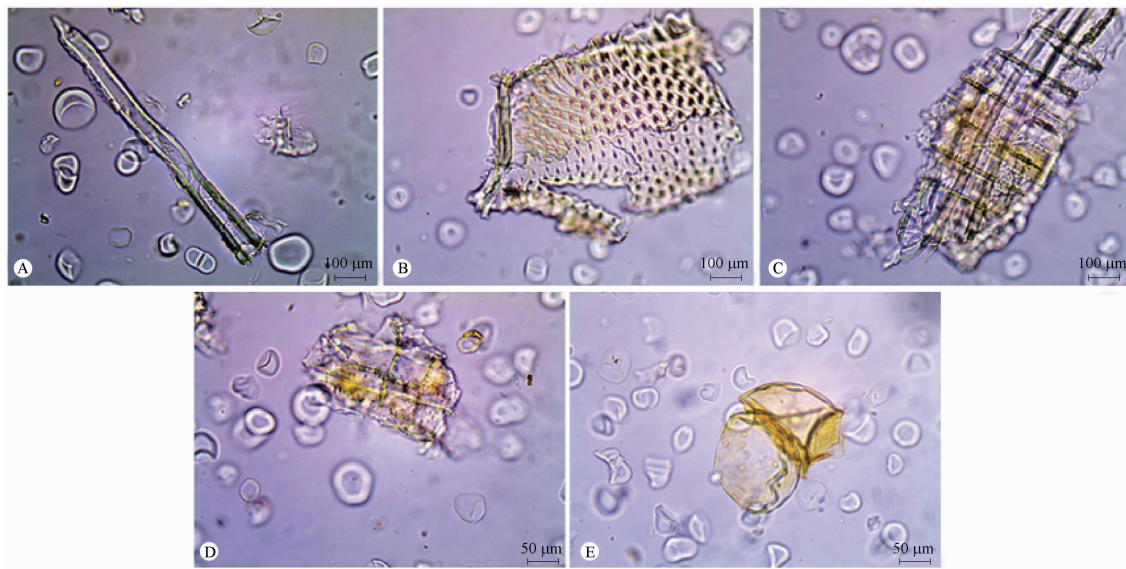
7.2.7 挥发油成分分析 挥发油提取与制备:随机选取产自四川、青海、云南、西藏的“阿尔玛”干燥药材各至少一批(SC-3、QH-3、XZ-2、XZ-3、YN-1)提取的挥发油,加入适量无水硫酸钠脱水。吸取10 μL

挥发油溶解于1 mL丙酮中,并过0.22 μm微孔滤膜,即得待测样品溶液^[44-47]。

气相色谱(GC)条件:HPINNOW_{ax}型毛细管质谱柱(0.25 μm×250 μm×30 m);载气为高纯

度 He;载气流量为 $1.0 \text{ mL} \cdot \text{min}^{-1}$;柱温及升温程序:初始温度 $60 \text{ }^\circ\text{C}$,保持 1 min,再以

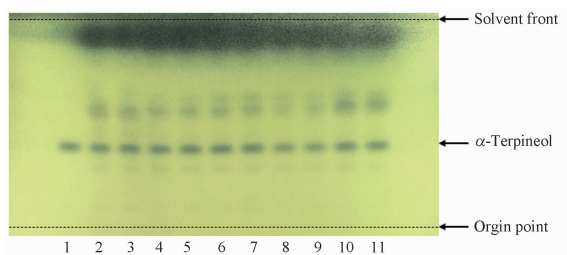
$15 \text{ }^\circ\text{C} \cdot \text{min}^{-1}$ 升至 $200 \text{ }^\circ\text{C}$;分流进样,分流比 20:1,进样量为 $1.0 \text{ } \mu\text{L}$ 。



A - 木纤维;B - 具缘纹孔导管;C - 木射线;D - 木薄壁细胞;E - 油细胞(破碎)。
A - wood fibres; B - ciliated pore ducts; C - wood rays; D - wood thin-walled cells; E - oil cells (broken).

图9 “阿尔玛”粉末显微特征图

Fig. 9 Microscopic characteristics of “Aerma” powder



1 - α -松油醇;2 - 11 - 不同批次“阿尔玛”药材。
1 - α -Terpineol; 2 - 11 - Different batches of “Aerma” herbs.

图10 藏药“阿尔玛”药材薄层色谱图

Fig. 10 TLC of Tibetan medicine “Aerma”

质谱条件(MS):EMV 模式;增益因子: 1.00,结果 EM 电压:1 494;离子源温度: $230 \text{ }^\circ\text{C}$;质量范围 m/z 20 ~ 550,全扫描;四极杆温度 $150 \text{ }^\circ\text{C}$;溶剂延迟 4 min。

挥发性成分鉴定:经气质联用仪计算机谱库对各色谱峰对应的质谱图检索进行定性,质谱数据库为 NIST14. L,按匹配度在 85% 以上鉴定化合物。GC-MS 总离子流图见图 11。化合物信息见表 7。经 Chemicalbook、Pubchem 等平台检索确认,从 5 批样品挥发油中共鉴定出 37 种化合物,主要是烯炔类(14 种)、醇类(9 种)、芳烃类(6 种)等,采用峰面积百分比法,得到 5 批药材中共有成分 3 个(葑醇

表6 “阿尔玛”挥发油含量测定结果

Tab. 6 Results of the determination of the volatile oil content of “Aerma”

Sample number	Volatile oil content/%
SC-1	2.2
SC-2	4.6
SC-3	1.4
SC-4	1.6
SC-5	1.0
SC-6	1.2
QH-1	1.8
QH-2	1.4
QH-3	1.2
QH-4	2.4
GS-1	1.4
XZ-1	1.2
XZ-2	0.6
XZ-3	0.4
YN-1	0.6
On average	1.5

0.26% ~ 1.61%、黄樟素 21.04% ~ 87.34%、D-樟脑 1.16% ~ 6.65%),这 3 种挥发性成分在“阿尔玛”药材中较稳定存在,可见不同产地“阿尔玛”中挥发性成分及相对含量具有一定差异。

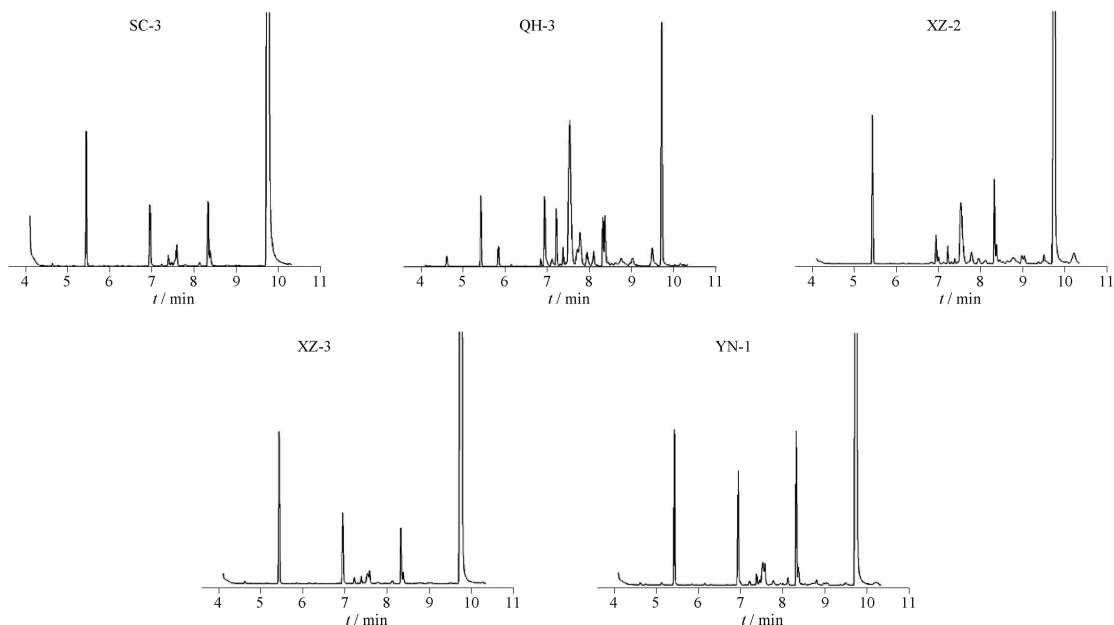


图 11 “阿尔玛”药材挥发油总离子流图
Fig. 11 GC-MS total ion flow diagram of the sample of “Aerma”

8 讨论

“阿嘎如”是在藏医理论体系指导下使用的一类具备相似功效药材的总称,其与黑沉香“阿尔纳”、白沉香“阿尔加”,红沉香“阿尔玛”为包含关系,故其名下不应对应具体的植物基源,也不宜以“沉香”这一容易引起误解的名称作为其汉文名(从“阿嘎如”各品种基原使用情况看来,“沉香”一名更适宜作为黑沉香的别称存在)。因此,后续藏药著作在记载藏药“阿嘎如”时,应在体现民族用药特色的同时避免与藏药黑沉香和中药沉香产生概念混淆,建议以“藏沉香”(意为:藏医用沉香类药材)作为其汉文名正名,形成:汉文名(藏沉香)+藏文名(ལག་ལྷོ་ཅ།)+藏文名音译名(阿嘎如)的记载形式,音译名不再使用卡、固、尕等近音或同音字。“纳”“加”“玛”在藏语中分别有黑、白、红的意思,为体现不同品种“阿嘎如”的分类依据及品种间联系,建议将“阿尔纳/黑沉香”“阿尔加/白沉香”“阿尔玛/红沉香”分别作为不同品种“阿嘎如”正名,并在正名后记载各品种常用别称。

四川省甘孜州、青海省等部分藏区将白类“阿嘎如”(阿尔加/阿加嘎布)称作“土沉香”或“山沉香”(不使用“白沉香”),易与中国植物志记载白木香正名——土沉香,以及蒙医使用山沉香[蒙:阿拉善-阿嘎如,基原:羽叶丁香(*S. pinnatifolia* Hemsley)]相混淆,需谨慎使用。另外,红沉香这一名称仅出现在文献记载中,相关藏医

药从业者普遍不使用这一名称,而是使用诸如“香樟”“樟木”“香樟木”等能体现其药材来源的名称。

“阿嘎如”不仅是我国藏族常用药材,而且也是印度、孟加拉国等南亚以及越南、柬埔寨、泰国等东南亚国家常用传统药材之一,孟加拉语称其为 *Agaru*、Hindi *Agara*,印地语、泰米语称 *Agar*^[10](同我国藏语对阿嘎如的发音“*Agaru*”“*Agaer*”或“*Akaru*”基本一致),其原植物为瑞香科沉香属植物沉香(*A. agallocha* Roxb),种加词 *agallocha* 由 *Agaru* 谐音变化而来。基于上述理由,本实验推测藏医最早使用的“阿嘎如”药材基原可能是印度、孟加拉国等地流入的以沉香为主的沉香属植物。而如莞花、尧花,白花欧丁香、紫丁香、云南樟、降香等品种,应为我国藏医在正品“阿嘎如”资源稀缺情况下,使用的本土替代资源。

对采集的“阿尔玛”进行原植物形态、药材性状、显微鉴别,粉末显微特征中木纤维、具缘纹孔导管、木射线、木薄壁细胞、油细胞可作为其鉴别点。

基于指标性成分 α -松油醇建立薄层色谱鉴别方法并对挥发油含量进行测定,结果显示,薄层色谱法专属性强、设备简单、可操作性较强等特点,可用于“阿尔玛”药材的质量控制。挥发油含量测定及成分分析结果显示,采自四川、青海等 5 个省的 15 批“阿尔玛”药材挥发油含量及成分差异较大,分析原因可能为:①不同的生长环境和不同的采摘时间

表7 “阿尔玛”挥发油的化学成分

Tab.7 Chemical composition of the volatile oils of “Aerma”

No.	Category	Compounds	CAS code	Molecular formula	Relative content/%				
					xz-3	xz-9	xz-13	xz-14	xz-15
1	Alkene	3-Carene	013466-78-9	C ₁₀ H ₁₆	0.04	-	-	-	-
2		(+)- δ -Cadinene	000483-76-1	C ₁₅ H ₂₄	0.04	-	0.55	0.08	0.14
3		Di-epi- α -cedrene-(1)	021996-77-0	C ₁₅ H ₂₄	-	1.17	0.15	-	0.06
4		(-)- α -cedrene	000469-61-4	C ₁₅ H ₂₄	-	28	6.12	0.64	1.73
5		(+)- β -cedrene	000546-28-1	C ₁₅ H ₂₄	-	5.83	-	0.15	0.36
6		(-)-Thujopsen	000470-40-6	C ₁₅ H ₂₄	-	2.14	0.44	-	0.14
7		Terpinolene	000586-62-9	C ₁₀ H ₁₆	-	3.93	-	-	0.06
8		1,8-dimethyl-4-(1-methylethylidene)-, (1r,5r)-rel-spiro[4.5]dec-7-ene	099529-78-9	C ₁₅ H ₂₄	-	2.55	1.2	-	-
9		(-)- α -Cubebene	017699-14-8	C ₁₅ H ₂₄	-	-	0.19	-	-
10		2-Isopropyl-5-methyl-9-methylene-bicyclo-1-decene(4.4.0)	150320-52-8	C ₁₅ H ₂₄	-	-	1	-	-
11		1,2,4a,5,6,8a-Hexahydro-1-isopropyl-4,7-dimethylnaphthalene	000483-75-0	C ₁₅ H ₂₄	-	-	0.32	-	-
12		[1 <i>S</i> -(1 α ,4 α ,7 α)]-1,2,3,4,5,6,7,8-Octahydro-1,4,9,9-tetra-methyl-4,7-methanoazulene	000514-51-2	C ₁₅ H ₂₄	-	-	0.27	-	-
14		4-(1,5-dimethyl-1,4-hexadienyl)-1-methyl-, (z)-cyclohexene	029837-07-8	C ₁₅ H ₂₄	-	-	-	-	0.28
15	Aromatic hydrocarbon	<i>o</i> -cymene	000527-84-4	C ₁₀ H ₁₄	0.12	0.94	0.05	0.1	-
16		(+)-Cuparene	016982-00-6	C ₁₅ H ₂₂	0.04	2.97	0.79	-	0.28
17		α -Curcumene	000644-30-4	C ₁₅ H ₂₂	-	1.75	0.58	-	0.26
18		α -Calacorene	021391-99-1	C ₁₅ H ₂₀	-	-	-	0.12	-
19		<i>m</i> -cymene	000535-77-3	C ₁₀ H ₁₄	-	-	-	-	0.11
20		α , <i>p</i> -Dimethylstyrene	001195-32-0	C ₁₀ H ₁₂	-	-	-	0.05	0.10
21	Alcohol	Fenchol	001632-73-1	C ₁₀ H ₁₈ O	0.44	1.61	0.26	0.32	0.51
22		L(-)-Borneol	000464-45-9	C ₁₀ H ₁₈ O	0.73	-	-	-	-
23		(-)- α -Terpineol	010482-56-1	C ₁₀ H ₁₈ O	2.29	-	3.27	-	-
24		Terpinen-4-ol	000562-74-3	C ₁₀ H ₁₈ O	1.26	-	-	0.58	1.07
25		Citronellol	000106-22-9	C ₁₀ H ₂₀ O	-	-	-	-	0.47
26		Borneol	000507-70-0	C ₁₀ H ₁₈ O	-	1.86	-	-	-
27		Linalool	000078-70-6	C ₁₀ H ₁₈ O	-	-	0.27	-	-
28		4-(Isopropyl)-1-methylcyclohex-3-en-1-ol	000586-82-3	C ₁₀ H ₁₈ O	-	-	0.11	-	-
29		α -Terpineol	000098-55-5	C ₁₀ H ₁₈ O	-	-	-	-	5.66
30	Ether	Estragole	000140-67-0	C ₁₀ H ₁₂ O	0.22	-	-	0.21	0.4
31		Safrole	000094-59-7	C ₁₀ H ₁₀ O ₂	86.7	21.04	74.15	87.34	76.41
32		Isosafrole	000120-58-1	C ₁₀ H ₁₀ O ₂	-	-	-	0.08	-
33	Aldehyde	Octadecanal	000638-66-4	C ₁₈ H ₃₆ O	-	-	0.15	-	-
34		Tetradecanal	000124-25-4	C ₁₄ H ₂₈ O	-	-	1.34	-	0.24
35	Ketone	Fenchone	001195-79-5	C ₁₀ H ₁₆ O	0.03	1.7	-	-	-
36		d-Camphor	000464-49-3	C ₁₀ H ₁₆ O	2.52	6.65	1.16	2.56	4.52
37	Salts	Bornyl acetate	000076-49-3	C ₁₂ H ₂₀ O ₂	0.2	-	-	-	0.26

注: - - 未测出。

Note: - - not measured.

影响云南樟挥发油的合成和积累,造成其挥发油含量和成分具一定差异。②药材在储存和加工过程中,条件控制不当,导致挥发油成分的降解或变化。3个共有成分(葑醇、黄樟素、D-樟脑)的发现,为提升“阿尔玛”药材质量控制水平提供了新的指标成分参考。

9 结论

“阿嘎如”是典型的“多品种、多基原”藏药,藏医常以颜色作为分类依据将其分为黑、白、红三类。经考证,“阿嘎如”类藏药中临床应用最广泛的品种是“阿尔玛”。本研究对“阿尔玛”(云南樟)进行了本草考证和生药学研究,并利用

GC-MS 技术从“阿尔玛”挥发油中检测分析出 37 个成分,为建立质量标准提供了基础物质数据,有利于该药材的进一步开发利用以及质量控制。该品现已被《四川省藏药材标准》(2020 年版)正式收载。随着现代检测仪器和高精尖技术的出现与发展,在未来我们有必要对“阿尔玛”的基础药理、化学成分等展开深入研究,阐明相关机制,更好地服务于民族医药相关产业,促进它们的健康发展。

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