麻杏石甘滴丸提取工艺的比较研究

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摘要　研究了麻杏石甘汤改成滴丸工艺中提取物的制备方法。以双波长薄层扫描法测定麻黄碱的含量为依据，对4种提取方法进行比较。结果表明，各法与汤剂之间存在显著性差异，分开提取法Ⅰ较好。

关键词　麻杏石甘滴丸　提取工艺　麻黄碱　双波长薄层扫描

麻杏石甘汤由麻黄、杏仁、石膏、炙甘草组成，出自《伤寒论》，具辛凉宣泄、清肺平喘功能，主治外感风邪、身热不解，热壅遏于肺、咳喘气急等症，对支气管炎、百日咳等作用显著，尤其对小儿肺炎疗效高，有效率达100%[1]。但小儿服汤剂极为不便，难以满足临床需要，故有将其制成糖浆剂[2]、合剂[3]、栓剂[4]等。为使该经典方药即保持汤剂速效、高效特点，又能达到体积小、更方便小儿吞服、方便携带、贮运等方面的要求，我们将其改成滴丸，并对提取工艺进行了初步实验研究。

1　材料和设备

麻黄、杏仁、石膏、甘草均购自本院南苑门诊部。硅胶G，青岛海洋化工厂；盐酸麻黄碱标准品，中国药品生物制品检定所；其余试剂均为AR级。

岛津CS-930双波长薄层扫描仪（日本），定量毛细管（美国）。

2　提取方法

2.1　水提冷藏法（A法）：将处方中4味药依法炮制处理后，分别浸渍0.5h，麻黄、石膏（布包）先煎20min，再加入甘草、杏仁共煎30min，过滤，依法煎2次，合并2次滤液，水浴浓缩至1∶2，冷藏24h，滤过，滤液水浴浓缩成稠浸膏。

2.2　水提醇沉法（称B法）：入药顺序如上，水浴浓缩至1∶4后放冷，加入95%乙醇至含醇量达60%，静置24h，滤过，滤液回收乙醇，浓缩成稠浸膏。

2.3　分开提取法Ⅰ（称C法）：先将方中麻黄用0.5%HCl液冷浸1.5h，过滤，药渣继续用0.5%HCl浸渍8h，合并浸提液，水浴浓缩至1∶1时，静置24h，滤过；滤液浓缩成稠膏。

炙甘草用0.5%$NH_3 \cdot H_2O$渗漉，漉液水浴浓缩至原体积的1/5，滤过，滤液用浓H_2SO_4调pH至3.0，滤取析出的沉淀，水洗3次，得粗甘草酸。

石膏、杏仁各浸泡30min后，石膏先煎30min，再加杏仁共煎30min，煎2次，合并滤液，用水浴浓缩，加入上述麻黄、甘草提取物，继续浓缩成稠膏。

2.4　分开提取法Ⅱ（称D法）：麻黄、甘草共煎2次（1h，45min），合并滤液，水浴浓缩成稠膏。

石膏、杏仁处理同2.3；合并混匀制成稠膏。

3　双波长薄层扫描法测定麻黄碱的含量

3.1　标准溶液的配制：精密称取115℃干燥至恒重的盐酸麻黄碱标准品5mg，用蒸馏水定容至10ml，摇匀，浓度为0.5μg/μl供点样用（20±2℃）。

3.2　待测样品的制备：各法制得的提取物分别加95%乙醇浸渍12h，回流2h，过滤，蒸干滤液，沉淀用乙醇溶解定容至50ml供点样用。同法制备对照品汤剂，麻黄（+）、麻黄（-）。

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3.3 测定条件：参照文献[5]硅胶G-0.3%CMC-Na溶液（1∶3）制成20×20cm薄板，以$CHCl_3-CH_3OH-NH_3\cdot H_2O$（100∶8∶1）展开，0.5%茚三酮无水乙醇液为显色剂，测定波长$\lambda s=510nm$，$\lambda_R=435nm$，反射式锯齿扫描（吸收光谱图略），盐酸麻黄碱含量对吸收峰面积的标准曲线方程为$C=1725.395A+1532.58$（$r=0.9958$）。

3.4 各法提取物中麻黄碱含量测定结果：用外标二点法定量，取待测样品，标准品阳性、阴性、汤剂点于同一硅胶G板，展开、显色，照上述条件测定，计算结果如表1。

表1 麻黄碱含量测定结果

样品	汤剂	提取方法 A法	B法	C法	D法
①	0.1826	0.1558	0.1496	0.1665	0.1454
②	0.1736	0.1600	0.1420	0.1624	0.1496
③	0.1781	0.1516	0.1458	0.1583	0.15_{38}
CV%	2.53	2.70	2.61	2.52	$2_{.81}$

表2 方差分析表

方差来源	自由度	离差平方和	方差	F值	显著性
组间	4	1.94×10^{-3}	4.85×10^{-4}	27.96	$F_{1-0.01}=5.9$ ∵$F>F_{1-0.01}$ ∴很显著（$\alpha=0.01$）
组内	10	1.74×10^{-4}	1.74×10^{-5}		

表3 两两间多重比较表

yi—yj	$\bar{y}_2$(A法)	$\bar{y}_3$(B法)	$\bar{y}_4$(C法	$\bar{y}_5$(D法)
$\bar{y}_1$	0.0223	0.0323	0.0157	0.0285
$\bar{y}_2$		0.0100	0.0066	0.0062
$\bar{y}_3$			0.0166	0.0038
$\bar{y}_4$				0.0128

3.5 方差分析及比较：显然，A与B、C、D；B与D；C与D方法之间无显著性差异外，其余两两间均有显著性差异，各法与汤剂比均有显著性差异。

4 小结与讨论

4.1 中药滴丸提取物制备的原则是最大限度地提取有效成分，除去杂质，缩小体积且能保持原方各药配伍的综合疗效。本实验选方中君药麻黄中的主要有效成分麻黄碱为指标，以汤剂作对照衡量各提取方法有效成分的差异，结果表明提取方法不同有效成分含量有显著性差异，由于C法最接近汤剂，且提取方法简便，耗能少，薄层层析结果证明杂质少，故认为分开提取法I为适宜的提取物制备方法。

4.2 分开提取法I中麻黄单用0.5%HCl冷浸使生物碱成盐而稳定，并可避免加热生物碱随水蒸汽挥发而损失。石膏既要先煎又要包煎，杏仁宜后下以减少水解，同时石膏与杏仁同煎石膏中Ca^{++}等高价离子可吸附杏仁中的有效成分使之稳定，该法工艺设计基本合理，实践中可行。

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ABSTRACTS OF ORIGINAL ARTICLES

Studies on the Chemical Constituents of Sagittate Epimedium (*Epimedium sagittatum*)

Wu Qinli, Zhao Yanqing, Li Zhulian

From *Epimedium sagittatum* Maxim, three compounds were isolated. They are β-sitosterol, β-sitosterolglucoside and a new flavone compound I. By spectroscopic and chemical methods, I was elucidated as 5-hydroxy-6, 7-dimethoxy-3′, 4′-methylene-dioxyflavone.

(Original article on page451)

Studies on the Chemical Constituents of Korean Epimedium(*Epimedium koreanum*)

Li Wenkui, Zhang Ruyi, Xiao Peigen

Eight compounds were isolated from the aerial parts of *Epimedium koreanum* Nakai. Their structures were identified as daucosterol(Ⅰ), icariin(Ⅱ), epimedoside-C(Ⅲ), hyperoside(Ⅳ), quercetin (Ⅴ), icariside Ⅰ(Ⅵ), baohuoside-Ⅰ(Ⅶ)and icaritin (Ⅷ) by physico-chemical properties and UV, IR, ^{1}HNMR, ^{13}CNMR and MS. Among them Ⅰ, Ⅳ, Ⅴ, Ⅵ, and Ⅷ were isolated from the plant for the first time.

(Original article on page 453)

Analysis and Preparation of γ-Linolenic Acid from Seed Oil of Common Borage (*Borago officinalis*)

Sun Qiliang

GC-MS analysis showed that seed oil of *Borago offciinalis* contains up to 20.01% γ-linolenic acid. Urea fractionation- vacuum distillation separation allowed us to obtain fractions of methyl-γ-linolenate of 92.8% purity at a yield of 50%.

(Original article on page 456)

Determination of Flavonoids in Leaf Extract Preparations of Ginkgo (*Ginkgo biloba*) by HPLC

Liu Songqing, Tang Xianzhe, Ma Wenxiu, et al

Quantitative HPLC method was developed for the determination of flavonoids in extract preparations of leaves of *Ginkgo biloba* L. YWG-C_{18} column was used with a mobile phase of methanol-water-glacial acetic acid (40∶57.5∶2.5, V/V) and detected at 254nm. The flow rate was 1.0ml/min. Ten Peaks were observed. Rutin was used as external standard and the calibration curve was linear over the rang of 0.5～2.5μg ($r=0.9996$). The extraction recovery was 104.2%(RSD=3.3%). Compared with the results of chemical colorimetric analysis, the method has a better reproducibility and more information about the flavonoids in *G. biloba* can be obtained.

(Original article on page 461)

Comparative Study on the Extraction Process for the Preparation of Maxingshigan Pill

He Qun, Luo Jieying, Deng Qingping

Influence of extraction process on the quality of Maxingshigan pills was studied. Guided by the amount of ephedrine in the extraction as determined by dual wavelength TL-

C-scanning. Four different processes were compared. Result showed that Process C was the best among all.

(Original article on page463)

Preparation of Cuiru Oral Liquid

Ma Shuangcheng, Ni Long, Chen Dechang

Cuiru oral liquid (COL) for the promotion of lactation is prepared from an aqueous extract of *Angelica sinensis*, *Astragalus membranaceus*(Fisch.) Bge., *Rehmbnnia glutinosa* Libosch.,et al. Its formulation and processing were briefly described, and the quality standard and stability of the finished product were studied. Results showed that the formu lation processing and stability of COL were suitable for clinical trial. Moreover, its pharmacology was briefly described.

(Original article on page 465)

Experimental Studies on Liposome Encapsulation in Cytotoxicity of Tetrandrine

Yang Saili, Yang Xi, et al

Changes in the cytotoxicity of tetrandrine before and after liposome encapsulation on rat alveolar macrophages in vitro were observed. Results suggested that there was a siginificant differentiation on the adsorptive capacity to yeast, and the level in cytoplasmic free calcium and potassium, and the cytoskeletal control of macrophages at the concentration of 40μg/ml. Experiments showed that liposome encapsulation may attenuate cytotoxicity of tetrandrine.

(Original article on page 470)

Studies on Narrowleaf Sibiraea (*Sibiraea angustata*) in Regulating Lipoid Metabolism

Wang Xiaoli, Guo Jiming, Yang Bingxun

Liu Tea (*Sibiraea angustata*) at doses of 8.5 and 15.0g/kg ig could reduce TG, β-LP, TC and elevate HDL-C levels of normal or hyperlipoidemia rat. In vitro experiments indcated that *S.angustata* may promote the catabolism of FFA. The contents of FFA in rat serum showed significant elevation in *S. angustata* treated groups as compared with the control. In addition, fat cells were smaller in *S. angustata* treated rats and mucoid changes could be seen under microscope. These results suggested that *S. angustata* could iegulate the metabolism of lipoid.

(Original article on page 473)

Pharmacological Activity of Nest of Silvestri (*Macrotermes annandalei*)

Bei Weijian, Chen Yong, Chen Chaoshu, et al

Experiments showed that the nest of *Macrotermes annandalei* (Silvestri) had the activity of relieving cough, eliminating phlegm, and bacteriostasis. It could also promote the phagocytosis of macrophages, enhance the transformation of T-cell of lymphocyte and rasiethe ratio of ANAE cell of lymphocyte in mice.

(Original article on page 476)