全国高等医药院校药学类实验教材

中药炮制学实验

主　编　王延年

中国医药科技出版社

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内 容 提 要

本书为全国高等医药院校药学类实验教材之一。全书分为两章，分别为基本知识和中药炮制实验。其中中药炮制实验共由18个实验组成，实验内容包括了传统实验和现代实验。为适应教育国际化的要求，增加了英文对照内容，以便于学生在阅读英文文献、撰写英文论文时参考。

本书可供高等医药院校中药炮制学专业使用，也可作为医药行业相关人员培训用书。

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前　言

中药炮制学是研究中药炮制理论、工艺、规格标准、历史沿革及其发展方向的综合性的应用学科，是中药学专业课程的重要组成部分。中药炮制实验是中药炮制学教学过程中的重要环节，其目的在于验证、巩固课堂讲授的内容，通过典型药物的炮制与理化检测，掌握中药炮制技术、工艺以及现代中药炮制研究方法，培养学生科学的工作方法和独立思考、比较分析、综合运用知识解决问题的能力。

本实验指导是根据教学大纲的要求，其实验内容包括传统实验与现代实验部分。全书共分两章。第一章为基本知识，主要介绍了中药炮制实验的基本方法、基本要求及注意事项等。第二章为实验内容，包含18个实验，其中包括传统炮制方法实验如清炒法、加固体辅料炒法、炙法、煅法、复制法、煨法、水飞法、制霜法、发酵、发芽法；综合性实验如山楂不同炮制品总有机酸、总黄酮含量的测定、槐米的炮制及其各炮制品中鞣质的含量测定、生枳壳与麸炒枳壳中总挥发油的含量及薄层鉴别比较比较、延胡索的炮制及炮制前后药理作用比较、炮制对黄连化学成分的影响、利用薄层色谱法（TLC）检测不同软化方法对黄芩中黄芩苷的影响、煮法及乌头煮制前后乌头碱毒性的变化、巴豆制霜前后巴豆油的含量测定、发酵炮制对淡豆豉中异黄酮的影响以及综合设计实验等。最后附录内容，按炮制方法分类，以汉英对照的方式列出了中药炮制实验中的常用术语。

本书具有较强的系统性、针对性、实用性、创新性等特点，在继承中药传统炮制原则和方法的基础上，努力创新，重视现代炮制理论及方法研究的新成果、新方法，在内容和形式上都有新的突破。

本书的编写，得到沈阳药科大学教务处等相关领导的大力支持，得到沈阳药科大学中药炮制学专业研究生同学的帮助，在此致以衷心的感谢！

双语教学已成为我国当前高等医药院校教育改革的一个亮点。中药炮制学是一门既传统而又新兴的学科，开展双语教学，既是时代发展的要求，也是为了培养国际化中医药人才的需要。由于水平所限，本书中疏漏、不足之处，恳请读者批评指正。

编者

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第一章　基本知识

Chapter 1　Elementary Knowledge

第一节　中药炮制实验的基本方法

中药炮制是中华民族宝贵的文化财富。在几千年的中药产生、发展史上，我国劳动人民不仅积累了丰富的炮制方法和技术，而且也形成了一套传统的加工设备。中药炮制是中药学的重要组成部分，是通过加热或辅料的作用改变药性的制药技术。药物经过炮制，可以降低或消除毒副作用，保证用药安全，改变药性，利于贮存等。

中药炮制方法主要有清炒法、加固体辅料炒法、炙法、煅法、复制法、煨法、水飞法、制霜法、发酵法、发芽法及其他方法。下面列出中药炮制实验中一些常用的炮制方法。

1. 净选加工　净选加工是中药炮制第一道工序，是中药材切制成饮片或制剂前的基础工作，也是保证饮片质量的关键一环。包括清除杂质、水洗等操作。

清除杂质指清除泥浆及杂质和非药物的部分，使药物洁净或便于进一步加工处理。水洗是将药物通过水洗或漂去杂质的常用方法。

2. 饮片切制　饮片切制是根据不同的要求，将药材切制成不同规格的饮片，其目的是便于有效成分煎出、利于进一步炮炙、利于调配和贮存等。

饮片切制前，一般需要进行药材软化。药材软化的目的主要是使药材吸收一定量的水分，使药物质地由硬变软，便于切制。药材软化通常用浸泡、喷雾、洗、漂等方法。漂法是将中药材用多量水，多次漂洗的方法。古代常用长流水漂。操作时，将药材放入大量的清水中，每日频繁换水，漂去有毒成分降低其毒性，除去盐分及腥臭异味，使药物纯净。

3. 炒法　药物经净制或切制后，加辅料或不加辅料，置预热容器内，用适当火力连续加热，并不断翻动或转动，炒至一定程度标准的炮制方法，称为炒法。药物经过炒制，会改变其药性，改变或消除不良气味，增强疗效，有些药物炒后产生焦香气味，可增强健脾开胃消食的作用。药物经炒制后，失去部分水分，质地变酥脆，有利于粉碎而便于制剂，利于煎出有效成分。根据医疗用药要求，结合药物性质与炒制时加辅料与否，炒法可分为清炒法和加固体辅料炒法。

清炒法：将净制或切制后的饮片，不加辅料，置预热炒制容器内，加热翻动或转动炒至一定程度要求的方法，称为清炒法。根据炒制药物时火力及程度标准要求不同，可分为炒黄、炒焦和炒炭。炒黄的主要目的是增强疗效，降低毒性或副作用，缓和药物性能，保存药效，利于制剂和贮存。炒焦的目的主要是增强药物消食健脾止泻的功

能，缓和药物的性能，减少药物的刺激性，产生焦香气味。炒炭是将净选或切制后的药物，用武火或中火炒至药物表面焦黑色或焦褐色，内部呈棕褐色或棕黄色。炒炭时只能使药物部分炭化，更不能灰化。经炒炭炮制后可使药物保存、增强或产生止血作用。

加辅料炒法：净制或切制后的饮片与固体辅料共同加热拌炒的方法，称为加辅料炒法。根据固体辅料的种类不同，可以分为麸炒、米炒、土炒、砂炒、蛤粉炒和滑石粉炒等。

4. 炙法 将净选或切制后的药物，加入一定量的液体辅料拌炒，使辅料逐渐渗入药物组织内部的炮制方法称为炙法。

药物吸入液体辅料经加工炒制后在性味、功效、作用趋向、归经和理化性质方面均能发生某些变化，起到降低毒性，抑制偏性，增强疗效，矫臭矫味，使有效成分易于溶出等作用，从而达到最大限度地发挥疗效。炙法根据所用辅料不同，可分为酒炙、醋炙、盐炙、蜜炙、姜炙、油炙等方法。

由于使用辅料是不同的，其影响也是不同的。例如，酒炙可以促进血液循环，减少一些药物的副作用；醋炙更能发挥显著影响舒缓肝脏和缓解疼痛，减少毒性作用；盐炙将加强对补肾脏的影响、滋养阴和降低火等；蜜炙润肺，有更好地影响和缓解咳嗽、补肾益胃和脾脏，或者可以适度的药品属性和降低毒性；姜炙可以更明显地影响减轻冷、呕吐和降低毒性。

5. 煅法 将药物直接或间接放入无烟炉火中或置适当的耐火容器内煅烧的方法，称为煅法。目的使其质地疏松，利于粉碎和有效成分的溶出，减少或消除副作用，提高疗效或产生新的功效。一些天然草药、矿物药或贝壳可直接燃烧，直到它们彻底变红，然后迅速放入醋、净水或药物提取液中，被称为淬。

6. 蒸法、煮法、焯法

（1）蒸法是利用水蒸气加热药物的方法，如黄芩的蒸制。现代研究表明，黄芩遇冷水变绿，就是由于黄芩中所含的酶在一定温度和湿度下，可酶解黄芩中所含的黄芩苷，继而氧化而变绿。黄芩苷的水解又与酶的活性有关，以冷水浸，酶的活性最大。而蒸法可破坏酶，使其活性消失，有利于黄芩苷的保存。

（2）煮法是利用清水或药汁在沸腾温度条件下加热药物，一般需煮至药透汤尽，其主要目的都是为了降低毒性或副作用。例如，煮法可以降低乌头等药物的毒副作用，并可增强药效，改变药性。乌头的毒性成分主要为双酯型生物碱，煮制后双酯型生物碱被水解形成单酯型生物碱及非酯型生物碱，其毒性分别为双酯型乌头碱的1/500～1/200及1/4000～1/2000，从而降低毒性。

（3）焯法是在沸水中短时间（5～10分钟）浸煮的方法。焯法可以利于保存药物有效成分，去除非药用部位，或分离不同药用部位。例如，苦杏仁止咳平喘的有效成分是苦杏仁苷，易被共存的苦杏仁酶和野樱酶水解。通过焯制可以杀酶保苷，有利于保存药效，而且焯制后便于去除种皮。

7. 发酵与发芽 发酵法经净制或处理后的药物，在一定的温度和湿度条件下，由于霉菌和酶的催化分解作用，使药物发泡、生衣的方法。发芽法将净选后的新鲜成熟

的果实或种子，在一定的温度或湿度条件下，促使萌发幼芽的方法。

8. 其他制法 还有一些其他特殊处理方法炮制中药，如制霜法、水飞、煨法等。

总体上，中药炮制的目的有以下几个方面：降低或消除毒副作用，保证用药安全，如草乌、川乌、附子、半夏、天南星等，通过炮制，可以降低这些中药的毒性。僵蚕具有化痰散结之功，但容易引起呕吐，经麸炒炮制后可以减少这些副作用。

中药炮制提高治疗效果。例如，紫菀、枇杷叶蜂蜜炙能促进润肺来缓解咳嗽，当归、川芎经酒炮制能促进血液循环，延胡索用醋炙可以加强镇痛的作用。

中药炮制可以改变中药的药性，使他们适合的治疗需求。例如，生首乌具有泻下润燥等功效，炮制后更擅于补益肝肾作用。

中药炮制还可以清除杂质、非药用部分和不良气味，使中药材更加纯净，方便患者服用。

大多数植物草药后切成段或块，其有效成分容易溶解在水中，或利于制剂。中药中大多数矿物和贝壳，煅烧或淬火用醋后，很容易被粉碎。一些中药经过炮制和干燥，可以保持很长一段时间，避免发霉、腐烂。因此，中药炮制有利于药物有效成分的溶出，利于制剂，利于贮存。

Section 1 Basic Methods of Processing Medicinal Materials

Processing is an important cultural treasure of China. In the past several thousand years, Chinese have not only accumulated abundant methods and technologies for processing, but also formed a set of traditional processing instruments.

Processing of traditional Chinese medicine (TCM) is one of the important part of traditional Chinese medicine. It is the technique of altering the properties of crude medicines by processing using heat and combination with various materials in a kind of alchemical approach to preparation. Processing of TCM, can promote therapeutic effects, reduce their toxicity, change their nature and effects and are easily stored.

TCM processing methods may involve such means as stir - frying drugs without adjuvant, stir - frying drugs with solid adjuvant, stir - frying with liquid adjuvant, calcined method, steaming, boiling, scalding, repeatedly processing, roasting, purification and the method of refining powder with water, and other methods.

There are several common processing methods which often be used in the processing experiment are listed briefly as following.

1. Processing method of purifying

Processing method of purifying is the first step of TCM processing. It is key link to ensure the quality of TCM slices, is also the basis work of Chinese herbal medicine before the drugs are cut into slices or preparations. In general, processing method of purifying include discarding impurity or washing method. Discarding impurity refer to take away the impurity, the mud and non - pharmaceutical parts, thus making the herbs clean and pure. Washing is a kind of meth-

od of treating crude drug materials for the purposes of cleaning. Impurity and mud on the surface of the crude drug materials should be cleaned with water.

2. Processing method of cutting

According to different requirements, cut crude drug materials into pieces, parts or tiny bit, etc., for convenience in decocting or further preparing, drying, and storing, etc..

The crude drug materials usually need to be softened before it was cut. Softening is a kind of method of treating crude drug materials in order to attain the purposes of making them easy to cut. This method often include sprinkling, washing, soaking – with – sealing with clean water so as to make them soften or easy to cut.

Rinsing is a method for removing the salty elements, poisonous substances, offensive smell from the crude drugs by laying them a certain time in a large container with water. During the Rinsing, water must be changed frequently. The method of Rinsing is a kind of method of treating crude drug materials for the purposes of cleaning, softening, regulate medicinal properties or making them easy to cut, or reducing their toxicity, or making drugs pure, etc..

3. Stir – frying (Processing with fire)

By stir – frying, the properties and effects of crude drugs can be properly changed, their irritant properties and side – effects can be reduced and their side – nature of coldness or dryness may be moderated. Stir – frying crude drug materials have the actions of checking offensive odor and tastes and invigorating the spleen, and they are easy to be pounded into pieces or powder and stored, and their effective components may be dissolved or extracted easily. Stir – frying drugs may be divided into two methods, stir – frying without adjuvants and stir – frying with solid adjuvants.

Stir – frying without adjuvants is the procedure of stir – baking without adjuvants. According to the degrees required, the method of stir – frying without adjuvants can be divided into three kinds, stir – frying crude drug materials until they become yellowish, stir – frying crude drug materials until they become burnt – colorand stir – frying crude drug materials until they become carbonized.

By stir – frying crude drug materials into yellowish, it means that they are stir – frying into yellow surface or till they bulge while there is no change in their interior. Stir – frying crude drug materials into yellowish can reduce the coldness and side – effect. By stir – frying crude drug materials into burnt – color, it means that they are toasted into burnt – yellow or burnt – brown surface and yellow interior with burnt odor. Stir – frying drugs into burnt – color can promote the action of invigorating the spleen and digestion. By stir – frying drugs into carbonized, it means that their surface becomes burnt black and the interior is burnt yellow while their medicinal properties or form still exist. After stir – frying, their function of arresting hemorrhage can be reinforced.

Stir – frying with solid adjuvants is the procedure of stir – frying with certain amount of solid adjuvants until the degrees required. The commonly – used adjuvants are wheat bran,

rice, mud, sand, pulverized – clamshell, etc..

4. Stir – frying with liquid adjuvants

The commonly – used liquid adjuvants include wine, vinegar, salt solution, honey, ginger juice and oil, etc.. The purpose of this method is to increase their therapeutic actions, to correct their pharmaceutical properties, or reduce their side – effects through gradual increase of permeation of the liquid adjuvants into the medicinal materials during processing.

The different liquid adjuvants which used in process will lead to different effects on crude drug materials. For example, wine – stir – frying drugs can promote the blood circulation and reduce the side – effects of some pharmaceutical herbs; vinegar – stir – frying drugs can exert more remarkable effects on soothing the liver and relieving pain and reducing the toxic effects; salt solution – stir – frying drugs will strengthen the effects on tonifying the kidney, nourishing yin and lowering the fire; honey – stir – frying traditional Chinese medicinal have better effects on moistening the lung and relieving cough, invigorating the stomach and spleen, or can moderate the pharmaceutical properties and reduce the toxic effects; ginger juice – stir – frying drugs can get more obvious effects on relieving cold, vomiting and reducing the toxic effects, etc..

The methods of stir – frying with liquid adjuvants are respectively known as stir – frying with wine, vinegar, salt solution, honey and ginger juice.

5. Calcining

It is a method of treating crude drug materials by direct or indirect burning with medium heating fire or strong fire. The purposes of calcining is to make them pure, clean, crispy, easy to be powdered and their effective components is apt to extracted. Calcining method can change natures of crude drug materials to increase therapeutic effects.

Some crude drug materials of hard minerals or shells may be burned directly till they are thoroughly reddish, then they are quickly put into clean water (this method is called water – tempering) or vinegar (this method is called vinegar – tempering), which is called tempering.

6. Steaming, Boiling, Scalding (Processing with both fire and water)

Steaming is a method of processing crude drug materials by putting them in a steaming pot or other container to heat them with steam. For example, steaming of Radix Scutellariae can reserve most baicalin because steaming processing can destroy the enzyme to protect the baicalin.

Boiling is a method of treating the crude drug materials by heating them in clean water or other liquid adjuvants at boiling temperature. The main purpose is to detoxify. For example, The toxic constituent of aconite root is alkaloid which posses double ester bonds, and can be hydrolyzed to single ester bond alkaloid or diester type alkaloid by boiling, which toxicity is 1/500—1/200 or 1/4000—1/2000 of that double ester bonds type, respectively.

Scalding is a method of treating the crude drug materials by putting them into boiling water, and stirring them for a short time (5—10 minutes), take them out as the seed coats are expanded and soak in cold water. Take them out and separate the seed coat and kernel by rubbing.

Scalding method is facilitate to preserve effective component, remove the non – medicinal part, or separate the different medicinal parts. For example, Bitter apricot kernel contains amygdalin, which is the active constituent for relieving cough and asthma. Amygdalin can be enzymolyse by amygdalase. Scalding can inactivate the enzyme to avoid the enzymatic hydrolysis of amygdalin and then enhance the clinical effect, and be convenient for removing the seed coat.

7. Fermentation and Germination

Fermentation means that pharmaceutical crude materials are fermented at certain temperature with a series of procedures. Germination means that crude drug materials seeds are germinated to certain highness.

8. Other processing methods

There are some other special processing methods according to different requirement of crude drug materials, such as frost – like powder, levigation, roasting, etc. .

As a whole, the purposes of processing traditional Chinese medicinal are briefly summarized as follows.

Removing or reducing thetoxicity, drastic properties and side effects of some Chinese medicinal herbs. For instance, the poisonous components of medicinal herbs, such as Radix Aconiti Kusnezoffii (Caowu), Radix Aconiti (Chuanwu), Radix Euphorbiae Kansui (Gansui), Rhizoma Pinelliae (Banxia) and Rhizoma Arisaematis (Tiannanxing), will be reduced when they are processed; Bombyx Batryticatus (Jiangcan), after taken, easily induce vomiting and if used to reducing phlegm and resolving masses, the side effects can be reduced after stir – frying with wheat bran.

Processing traditional Chinese medicinal can promote therapeutic effects. For instance, radix asteris (Ziwan), Folium Eriobotryae (Pipaye) roasted with honey can promote nourishing the lung to relieve cough; Rhizoma Chuanxiong (Chuanxiong) and Radix Angelicae Sinensis (Danggui) stir – frying with wine can promote warming channels to promote blood circulation; Rhizoma Corydalis (Yanhusuo) prepared with vinegar can strengthen the effects of relieving pain.

Modifying the natures and actions of traditional Chinese medicinal so as to make them suitable for therapeutic requirements. For instance, Radix Polygoni (Heshouwu) in raw form has moistening – purging effect, but after processed by steaming method, it can be good at invigorating the liver and kidney.

Processing traditional Chinese medicine can taking away the impurity, non – pharmaceutical parts and unpleasant tastes, thus making traditional Chinese medicine clean and pure, and convenient for patients to take.

Most traditional Chinese medicine will be easily decocted in water after cut into pieces or segments and their effective components will be easily dissolved out or the forms of drugs will be easily prepared. Most of shells and minerals of Chinese medicinal herbs, will be easy to be ground into powder after calcined or quenched with vinegar. Some medicinal herbs are to be

stir – fried and fully dried so as to be kept for a long time from being moldy or rot. Therefore, processing traditional Chinese medicine can facilitate decocting and taking medicine, making preparation and storing medicine.

第二节 中药炮制实验基本要求及注意事项

中药炮制实验室是中药炮制课程的一个重要组成部分。用于加深对中药炮制知识的理解；全面了解中药炮制工作的性质和任务，培养严肃认真、实事求是的科学态度和工作作风。

实验课程要求学生熟练掌握各种炮制方法和操作技术，培养独立开展中药炮制工作的能力。正确掌握实验教材中各类代表性药物的炮制方法。为确保实验教学质量，每个实验者应认真做到以下几点：

（1）实验前做好预习，明确实验的目的和要求，熟悉原理和操作要点，估计实验中可能发生的问题及处理方法，有准备地接受教师的提问。

（2）为防止试剂、药品污染，取用时应仔细观察标签，杜绝错盖瓶盖或不随手加盖的现象发生。当不慎发生试剂污染时，应及时报告任课教师。公用试剂、药品应在指定位置取用。此外，取出的试剂、药品不能再倒回原瓶。

（3）及时做好完整而确切的原始记录。要用钢笔或圆珠笔书写，字体端正。应直接记录与实验记录本上，不允许记于纸条上或者其他本子上。

（4）爱护仪器，小心使用，破损仪器应及时报损、补发。动用精密仪器，须经教师同意，用后登记签名。

（5）严格按照实验规程操作，细心观察实验现象。认真总结实验数据，按指定格式填写实验报告，并按规定时间上交。

（6）爱护公物，节约水电、药品和试剂。可回收利用的废溶剂应回收至指定的容器中，不可随意弃去。腐蚀性残液应倒入废液缸中，切勿倒进水槽。

（7）实验时确保安全，时刻注意防火、防爆。发现可能的事故及时报告，不懂时不要擅自动手处理。

（8）实验完毕应认真清理实验台，仪器洗净后放回原处，擦净台面，经指导教师同意后，方可离开。值日生还应负责整理公用试剂台、打扫地面卫生、清除垃圾及废液缸中的废物，并检查水、电、门窗等安全事宜。

Section 2 Basic Requirements and Announcements of Processing of Chinese Herbal Medicinals

Processing of traditional Chinese medicine experimental course is an important part of Processing of Chinese herbal medicinals subject. Its purpose is to deepen the comprehension of Processing of traditional Chinese herbal medicinals knowledge, to have full understanding of the

property and task of the work, and to develop serious, practical and realistic scientific attitude and work style.

The experimental course claim students to expertly grasp various analytical methods and operational technique. It will also train students to have the ability to carry out the processing of traditional Chinese herbal medicinals work indepengdently, and to master the processing method of each kind of representative medicine in the experimental book accurately. To sure the quality of experimental teaching, every experimenter should observe the terms seriously as follows:

(1) Preview the experiment content seriously before carrying out an experiment. Make good understanding of the experimental purpose and demands, be familiar with the principle, experimental procedures. Full consideration should be given to the precaution of accident and to the settlement of the accident happened in any case, prepare to answer the questions which teacher should ask.

(2) To prevent reagents and drugs pollution, carefully observe the label of them before using. Eradicate the occurrence of covering a wrong bottle capping or without cover after use reagents. While the immodesty reagents pollution occurrence, be sure to report to teachers in time. The public reagents, drugs should be used at appointed place. In addition, reagent and drugs taken out must not be poured back to original bottle.

(3) Record original experiment date directly in experimental record notebook in time completely and accurately. Write with fountain pen or ball - pen. Forbid to record on note paper of other books.

(4) Take good care of equipment, use carefully, in case the instruments damaged, register and report to replacing in time. It must be obtained by teacher, and be sure to register the signature after usage.

(5) Perform the experiment strictly according to the experimental procedures, observe experiment phenomena carefully. Summary experimental result seriously. Fill in the experiment report according to appoint format, hand in report on schedule.

(6) Take good care of public property, economize the electricity, water, drugs and reagents. Waste solvent which can be recovered should be poured into the appointed container. It must not be leaved arbitrarily. Causticity aqua should be poured into waste liquor cistern, absolutely do not pour into the sink.

(7) Guarantee the safety during experiment. Pay attention to prevent from fire and explosion all the time. Any indication of trouble should be reported in time. Do not do any disposal if you can not deal with correctly.

(8) After the experiment, clean up the experiment bench, all the instruments used should be cleaned and put in order. With all above been done and the tutor's permission students can leave the laboratory. Students on duty should clean the public agent bench, floor, rubbish and the dirty in waste liquor cistern. Check the water, electricity, door and windows finally.

第二章　中药炮制实验

Chapter 2　Experiment for Process of Traditional Chinese Herbal Medicinal

实验一　清炒法

【目的要求】

1. 掌握清炒法的目的和意义。

2. 掌握炒黄、炒焦、炒炭的基本操作方法及饮片质量要求。

3. 掌握炒黄、炒焦、炒炭 3 种炒法的不同火力、火候，炒后药性的变化及炒炭“存性”的含义。

【实验原理】

炒法分为清炒和加辅料炒两种。根据炒法所用的的火力、火候不同，清炒法又分为炒黄、炒焦和炒炭。炒黄多用“文火”，炒焦多用“中火”，炒炭多用“武火”。

炒制的目的是为了改变药性，提高疗效，降低毒性和减少副作用，矫味、矫臭及便于制剂等。

【实验器材】

铁锅、炉子、铁铲、瓷盆、筛子、温度计、竹匾、天平等。

【实验内容与方法】

1. 炒黄（炒爆）　目的：增强疗效，缓和药性，降低毒性，并破坏某些药物中的酶，以保存苷类成分（杀酶保苷）。

（1）莱菔子　取净莱菔子，用文火炒至鼓起，有爆裂声，并有香气逸出时，取出放凉。用时捣碎。

成品性状：本品呈类圆形或椭圆形而稍扁，表面黄棕色或红棕色或灰褐色，味辛苦，炒后鼓起，色泽加深，具油香气。

炮制作用：生品涌吐风痰；制品降气化痰，消食导滞（生升熟降）。

（2）王不留行（炒爆）　先将锅烧热，投入王不留行，中火不断翻炒至大部分（80%）爆成白花，迅速取出放凉。

成品性状：本品呈圆球形，黑色或黑棕色，略有光泽，味微甘，炒后鼓起，80%以上爆裂成白色爆花，体轻质脆。

炮制作用：生品消痈肿；炮制后易于煎出有效成分，且走散力增强。

注意事项：锅要预热，中火炒制，可先投少量试锅，不断翻炒，出锅迅速，要求：80%以上爆成白花。（王不留行名字来源：性善走而不守，虽有王命不能留其行。）

（3）决明子　取净决明子，置炒制容器内，用文火加热，炒至微有爆裂声，并有香气逸出，取出放凉，用时捣碎。

成品性状：炒决明子种皮破裂，颜色加深，偶有焦斑，质稍脆，微有香气。

炮制作用：生品长于清肝热，润肠燥；炒制后寒泻之性缓和，有平肝养肾的功效。

（4）酸枣仁　取净酸枣仁，称重，置热锅内，用文火炒至鼓起微有爆裂声，颜色微变深，并嗅到药香气时，出锅放凉。用时捣碎。

成品性状：本品呈紫红色，鼓起，有裂纹，无焦斑，手捻种皮易脱落。具香气。

2. 炒焦　目的：增强疗效，减小药物刺激性。

（1）山楂　取净山楂，用中火加热，炒至外表焦褐色，内部焦黄色，取出放凉。

成品性状：本品炒焦后，表面呈焦褐色，内部焦黄色，酸味略减，微香。

炮制作用：生品长于活血化瘀；炒焦后可缓和对胃的刺激性，长于消食化积。

（2）麦芽　取净麦芽，称重，置热锅内，先用文火后用中火加热，不断翻动，炒至表面焦褐色，喷淋少许清水，炒干取出，放凉。筛去碎屑。

成品性状：本品呈焦褐色，膨胀，少部分爆花。

炮制作用：炒焦后增强助消化作用。

（3）槟榔　取净槟榔片，称重，分档，置热锅内，用文火加热，不断翻炒至焦黄色，有焦斑，取出放凉。筛去碎屑。

成品性状：本品大部分为完整片状，表面焦黄色，具焦斑。有香气。

炮制作用：炒焦后降低副作用。

3. 炒炭　目的：使药物增强或产生止血作用（炒炭要求“存性”）。

（1）山楂　取净山楂，用武火加热，炒至表面焦黑色，内部焦褐色，取出放凉。

成品性状：本品炒炭后，表面呈焦黑色，内部焦褐色，味涩。

炮制作用：生品长于活血化瘀；炒炭后止血止泻。

（2）地榆　取净地榆片，武火炒至外表焦褐色，内部棕褐色，取出放凉。

成品性状：本品炒炭后呈黑褐色，味涩。

炮制作用：生品以凉血解毒力胜；炒炭后长于收敛止血。

（3）槐米　取净槐米，称重，置热锅内，用中火加热不断翻炒至黑褐色，发现火星，可喷淋适量清水熄灭，炒干，取出放凉。

成品性状：本品表面呈焦黑色，保留原药外形，存性。

【实验记录】

（1）记录炒黄、炒焦和炒炭中各种药物形态、颜色、气味的变化。

（2）记录实验中出现的问题并说明原因。

【注意事项】

（1）药物炒制前应按照大小分档，根据不同炒法及其要求控制火候、时间，注意药材外观的变化。如：酸枣仁炒黄时火力不宜过强，且炒的时间也不宜过久，否则油枯失效。王不留行翻炒不宜过快，否则影响其爆花率及爆花程度。

（2）炒制操作过程中，要勤翻动，使药物受热均匀，避免生熟不均的现象。