

H K M S

Suffering pain and itching,
mugwort and orange peel bath
balls help you

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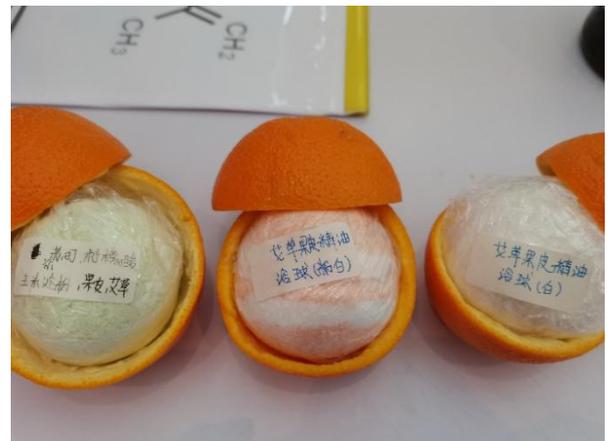
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"Unique Formula"

"Turn waste into treasure"



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I. Research background

1-1 Research Motivation

When the weather changes, many of our skin feels uncomfortable, such as itching or dry peeling. Old people will choose some antipruritic Chinese herbal medicine to boil water to bathe us. Young people always find this method very troublesome. They often choose to apply various skin care products to their bodies.

Since we were young in the country, we have known that wild grass has a special aroma and can relieve itching and promote blood and anti-inflammatory. So we want to extract its essential oil from grass and apply it to the production of bath balls.

Based on this topic, we mainly want to explore the extraction method of essential oil of *Artemisia argyi* and pericarp suitable for family DIY, and to effectively dissolve the extract into the production of bath ball to obtain the products with good cost and low effect.

1-2 Purpose of study

The essential oil extracted from the peel has moisturizing, anti-inflammatory and antibacterial effects. The essential oil extracted from *Artemisia argyi* contains the effect of eliminating inflammation, removing dampness and relieving itching, the production process is convenient, the material is safe and natural, the cost is low, it can not only achieve the curative effect, but also achieve the effect of beauty and beauty. Bath ball is the best choice in daily life.

In the aspect of extracting essential oil, we use a variety of methods to explore which method is more convenient and suitable, among which we adopt distillation method, solvent extraction method and microwave solvent method. After comparison, we think that microwave solvent method is the most suitable method for extracting essential oil.

1-3 Research Significance

There are still many problems with the bath balls on the market:

1. Some brands contain harmful or other substances that can cause allergies;
2. Unpleasant strong smell or greasy bath balls or uncomfortable usage;
3. After soaking, it will cause itch on the skin.

II. Design objectives

2-1 Easy to make

Bath ball materials are easy to obtain, they can be made of some common items even at home and can be replaced, The production process is very simple, which can be used as a parent-child activity to enhance the family relationship. It is convenient and safe to use the bath balls.

2-2 Affordable

The bath ball materials are common and use low-priced materials in life, so the cost is lower, and people can make the bath ball with lower prices than ordinary ones which do not have the special function. It is convenient for life, so our bath balls can be better promoted in the market and occupy a place.

2-3 Natural Material

Bath ball materials are pure natural, do not worry about being harmful to human bodies.

2-4 Bath ball is not greasy, moisturizing effect is excellent

The reason many people don't like soaking is simply because they feel greasy and they're not used to the feeling of covering a layer of oil. On the contrary, our bath ball is not only very thin, but also moisturizing and having anti-inflammatory effect.

III. Innovative points

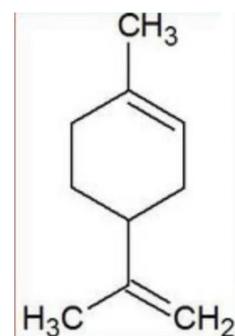
3-1 Unique formula, add its own extracted essential oil and peel essential oil in the bath.

3-2 Turn waste into treasure, extract essential oil with moisturizing, anti-inflammatory and antibacterial from waste peel. The essential oil with antipruritic, dispelling dampness and activating qi and blood circulation was extracted from *Artemisia argyi*.

3-3 Extracting peel essential oil and *Artemisia argyi* essential oil by microwave + solvent.

3-4 No extra preservatives, the peel contains limonene which has a certain antiseptic effect.

3-5 Suitable for home DIY, materials can be purchased in supermarkets.



IV. Description of Works

4-1 Materials

4-1-1 pericarp

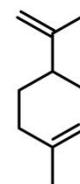
Such as pomelo peel, lemon peel, orange peel, they are rich in vitamins C 、 vitamins P 、 limonene and other nutrients can maintain beautiful skin. Grapefruit is more healthy than flavor

limonene

Citrene, scientific name 1 methyl-4 isopropyl cyclohexene, molecular formula

$C_{10}H_{16}$ Monocyclic monoterpenes, was mainly found in orange peel essential oils.

Limonene has two configurations, D and L, mainly in the form of D isomers. D limonene which is mainly found in essential oils such as orange peel oil, grapefruit oil and lemon oil.



Its main functions are as follows:

1) Anti-corrosion and preservation

Limonene is a kind of plant essential oil, which has obvious inhibitory effect on the common spoilage bacteria that cause meat corruption, so it has a broad application prospect in the field of anticorrosion and preservation, for example it can inhibit the spoilage of food such as *Staphylococcus aureus*, *Aspergillus Niger*, *Escherichia coli* and so on.

2) bacteriostasis

limonene is a safe and non-toxic bacteriostatic substance. a large amount of limonene accumulates on the surface of microorganisms, which leads to a large reduction of unsaturated fatty acid content in the membrane, which makes the composition change or integrity of the membrane be destroyed, and the proton motive force can also be reduced, thus achieving bacteriostatic effect.

3) Antioxidants

Oxidative damage caused by free radicals is related to the production and development of cancer. The ability of antioxidant damage is positively related to the prevention of cancer to a large extent, while the essential oil extract rich in D - limonene has good antioxidant properties and safety. Studies have found that kumquat essential oil rich in D - limonene has good bleaching β - carotene, antioxidant ability, DPPH free radical scavenging ability, can supplement some antioxidants to the human body, so that the body from oxidative damage.

4) anti-inflammatory

The inflammatory response is closely related to cancer. For example, there is a mediator between inflammatory response and cancer is nuclear transcription factor- $\kappa\beta$, and pro-inflammatory cytokines (such as tumor necrosis TNF α and interleukin IL6) play an important role in the initiation and development of cancer. TNF α or IL6 signaling can be effectively inhibited by inhibiting NF $\kappa\beta$ activity. D - limonene can prevent inflammation and cancer by inhibiting NF $\kappa\beta$ signaling pathways.

4-1-2 mugwort

Mugwort is a warm, bitter, non-toxic medicine. It has the effect of restore yang, regulating qi and blood, removing dampness and cold to stop itching, and is often used in acupuncture and moxibustion, so it is also called "medical grass ". It also improves lung function and is good for people with chronic bronchitis and easy cough of white phlegm. The extract also has therapeutic and preventive effects on diabetes and cancer diseases, which can inhibit the occurrence of cell inflammation and apoptosis, inhibit platelet production and promote vasodilation.

4-1-3 baking soda

Improve the balance of acid and base, prevent acidosis, neutralize gastric acid. It can also prevent mild lactic acidosis, acidosis; it itself has alkaline components, acid symptoms of gastric acid, gastric ulcer has a neutralizing effect, can indirectly achieve the purpose of preventing tumor and other infections.

4-1-4 citric acid

Citric acid can exfoliate, anti-oxidation, soften blood vessels and so on. It has the effect of beauty, which can dissolve black head to make skin melanin fall off. It can improve the environmental acidity of microorganisms, so that bacteria are difficult to grow and reproduce.

4-1-5 corn starch

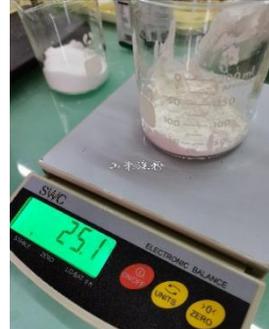
Corn starch contains vitamins E, linoleic acid can reduce cholesterol levels and reduce arteriosclerosis. The bath ball can be used as adhesive.

4-2 Production methods

4-2-1 Formula Soda 50 g, citric acid 25 g, corn starch 25 g, peel essential oil 20 drops, grass essential oil 20 drops, a small amount of water, a small amount of pigment

4-2-2 Production process

1) Get 50 g baking soda, 25 g citric acid, 25 g corn starch



2) mix the top three together

3) add 20 drops of essential oil and 20 drops of essential oil peel, a small amount of pigment

4) stir well



5) add a small amount of water, continue stirring until the powder is completely dyed and pressed to form a block

6) loading die forming



7) place it for two days to volatilize water

8) Demoulding, completed, labelling



Attention! There is a point of attention, citric acid and baking soda after mixing, if the water content is too large immediately reaction to produce bubbles. Be careful about the amount of water added (10 ml), once the amount of water will automatically grow.

4-3 Extract essential oils

4-3-1 essential oil:

Method 1: Distillation

Equipment: Distilled Equipment Material: Artemisia, anhydrous ethanol

1. first we need a distillation unit
2. prepare somemugwort (wash, shred, put in a beaker)



3. pour in anhydrous ethanol until no herb



4. cover with plastic wrap for one day



5. put the herb containing anhydrous ethanol into the flask and then put it into the distillation unit in figure 1. The distillation temperature is 80°C, and the oil will come out after about three hours, and the distilled is ethanol.



Method 2: Solvent extraction

1. prepare some mugwort (wash, shred, put in a beaker)



2. pour in anhydrous ethanol until no herb



3. as shown in the picture, seal the film for two days



4. separate the soaking herb and anhydrous ethanol in the beaker into the device as shown



The boiling point of ethanol is 78.4°C, the boiling point of essential oil is 247°C, the boiling point of anhydrous ethanol is less than that of *Artemisia argyi*, so anhydrous ethanol is steamed out and the essential oil of *Artemisia argyi* is left in the original bottle.

Method 3: Microwave solvent method

1. prepare some mugwort (wash, shred, put in a beaker)



2. seal it with a film and put it in the microwave



3. use midsole heat for 15 minutes until the grass becomes dry



4. pour in anhydrous ethanol until no herb



5. set still for 3 days and filter it into a flask



6. separate under the device shown



The boiling point of ethanol is 78.4°C, the boiling point of essential oil is 247°C, the boiling point of anhydrous ethanol is less than that of *Artemisia argyi*, so anhydrous ethanol is steamed out and the essential oil of *Artemisia argyi* is left in the original bottle.



4-3-2 essential oils for pericarp:

Method 1: Pressing

Heat the essential oil extractor for an hour and put the peel in the press, press the rod, break the oil bag in the peel, and collect the essential oil after pressing.

Method 2: Distillation (as in mugwort)

Method 3: Microwave solvent method (as in mugwort)



In comparison, we think that microwave solvent method is the best and most suitable. Microwave can quickly convert into heat energy and make the temperature inside the cell rise rapidly. When the pressure inside the cell exceeds the capacity of the cell, the cell ruptures and the active component flows out of the cell. Then the solvent method is used. This method greatly shortens the extraction time, and can reduce the amount of solvent.

4-4 Experiment

First fill the bathtub with water and put the bath ball into the bathtub. When the ball has just been put into the water, the ball will dissolve immediately and produce bubbles. In a few minutes, the bath ball was completely dissolved. Because of the addition of a little pigment, The colors in water will also be changed. The texture has a little oil, the taste of Artemisia is also more obvious.



We looked for experimenters of different ages and experienced the products we made, most of which were satisfactory in quality, convenient in production, creative, low in cost and good in use, but some still thought single curative effect and difficult material collection, this is also our direction of improvement.

One or two of them reacted and the bath ball was too strong to accept, so desalination of the smell of essential oil, leads to refreshing smell rather than "smoked ".It has become another problem we need to overcome.

Others said that after the bath, the smell of the bath ball can be attached to the body for a long time, and it is hard to shave off, and with the smell of perfume fusion, the taste will be strange, which makes them very confusing. And this requires us to add new materials to the original materials to suppress the taste of the grass attached to the body, which is where we need to improve.



Soak hands (left hand) lubricated comfortably

V. Improvements

1. In addition to using essential oils of grass and pericarp, you can look for other herbs or daily necessities. For example, yellow chrysanthemum, mulberry leaves, ginger and so on.



2. Pigments can be replaced by natural pigments in petals instead of synthetic pigments, which is more natural. Because synthetic pigments for long-term use will also do some harm to the skin.



VI. Summary

Compared with all kinds of bath balls on the market, our family bath ball is more environmentally friendly and has no additives. The whole production process is conducted by the "own" gatekeeper, which is secure and safe. The product is easy to make, and the price is reasonable to the consumers, The material selection is convenient, The curative effect is outstanding while characteristic exerts incisively and vividly, which can satisfy the contemporary person's life need. The young people's demand for "ointment" has prompted the appearance of this bath ball. Ai orange bath ball is not only very thin, but also has the effect of moisturizing, anti-inflammatory, anti-bacterial and anti-wetting and itching. It also solved the quality problems of online shopping and material selection problem. With the maturity of technology, the efficacy of bath balls will become more and more significant. We mainly studied the extraction methods of essential oil of *Artemisia argyi* and pericarp. We used distillation, solvent extraction and microwave solvent method respectively. The use of microwave ovens can quickly convert into heat and make the temperature inside the cell rise rapidly. When the pressure inside the cell exceeds the capacity of the cell, the cell ruptures and the active component flows out of the cell. Then the solvent method is used. This method greatly shortens the extraction time, and can reduce the amount of solvent. After comparison, we think that microwave solvent method is faster than the other two methods, which is suitable for home production. Materials can also be found in daily life.