Camomile extracts are normally prepared from a whole drug which consists of the dried flower heads, including the associated pedicel remains. The flower heads consist of receptacles with calyx, 12 to 20 lingulate (ray) flowers and numerous tubular flowers. The percentage content of lingulate flowers in the whole drug is between about 5 and 6% while the percentage content of tubular flowers is between 67 and 69%, the rest being made up of receptacles with calyx and pedicel.

Depending on the ripeness of the flower heads at harvest time, the method of drying, processing, packaging and storage of the drug, part of the whole drug disintegrates into the individual constituents with accumulation of camomile husks consisting mainly of tubular flowers and the wing petals consisting chiefly of lingulate flowers. The wing petals and the camomile husks are generally sifted off during recovery of the drug.

The camomile husks and the wing petals are used in admixture with camomile fines (i.e. chopped camomile herb) to fill tea bags. In addition, camomile husks are also used for the recovery of seeds.

The whole camomile drug substantially freed from husks and wing petals is normally used for the preparation of camomile extracts. However, the important flavone apigenine and its glycosides are only present in traces, if at all, in this whole drug because these ingredients occur mainly in the wing petals. By virtue of the pronounced musculotropically spasmolytic effect of apigenine and its glycosides, which also show spasmolytic activity, extracts having a high content of these flavones are of therapeutic interest. Since these wing petals have a far lower content of essential oil than the tubular flowers or the intact flower heads, they have not hitherto been used for the extraction of camomile with the object of producing camomile extracts.

It has now surprisingly been found that, where extraction is carried out with the solvents typically used for extracting camomile, the flower heads or the whole drug hitherto used can be partly replaced by wing petals without any reduction in the content of essential oil and its constituents. It is possible in this way to obtain camomile extracts having an increased flavone content of at least 80 mg-% natural flavone (based on the extract, more particularly apigenine and its glycosides) for substantially the same content of essential oil obtained by extraction of a camomile drug and camomile wing petals.

A whole camomile drug as described above (without the husks and wing petals) or a typical camomile drug in which the partly fallen tubular flowers and wing petals have not been removed is used for the process according to the invention. The camomile to be extracted (for example camomile flowers, all varieties of the species Matricaria recutita) should not be stored for longer than one year under typical storage conditions because otherwise an excessive loss of essential oil and its constituents occurs. The camomile should have been dried in the usual way, for example by exposure to artificial air or even by drying in sunlight (temperature for example 30 to 70°C, possibly even as high as 100°C). Drying should preferably be carried out in thin layers (for example 5 to 20 cm thick) immediately after harvesting at an air temperature no higher than 50°C and away from direct sunlight. The moisture content of the camomile drug to be used is generally between 3 and 15% and more particularly between 8 and 10%.

A camomile drug (extraction material) containing at least 750 mg-%, for example 750 to 1200 mg-%, essential oil, at least 50 mg-%, for example 50 to 250 mg-%, azulene and at least 150 mg-%, for example 150 to 300 mg-%, bisabolol is particularly suitable for the process according to

the invention. The camomile may be a diploid or tetraploid camomile. A camomile drug according to German patent 24 02 802 and German patent applications P 34 23 207 and P 34 46 216 is preferably used for the process according to the invention. The wing petals used may come from the same camomile from which the drug was prepared. However, the wing petals may of course also come from a camomile of different origin. The camomile wing petals may be used fresh or dried. Fresh camomile wing petals are understood to be wing petals which are extracted or frozen within 24 hours of plucking.

The quantity of wing petals added to the camomile drug is, for example, between 5 and 30 parts by weight and preferably between 10 and 20 parts by weight dried wing petals per 100 parts by weight of the drug material used (drug having a typical wing petal content of 5 to 6% by weight or drug in which the wing petals (lingulate flowers) have been removed by sieving).

The ratio of dried wing petals added to dried camomile flower heads (tubular flowers and receptacles with calyx and pedicel component) is, for example, 1:9 to 1:2.3 and preferably 1:4 parts by weight. If the wing petals are used in the form of fresh wing petals, a correspondingly larger quantity by weight of wing petals (i.e. the quantity by weight which corresponds to the drug equivalent) has to be used. In general, fresh wing petals are used in 3 to 5 times and more particularly 4 to 5 times the quantity by weight used in the case of dried wing petals.

The wing petals (lingulate flowers) contain only about 12% of the essential oil present in the camomile flowers.

The camomile flowers and the wing petals may be used in size-reduced form. In the case of the flowers, however, it is more favourable if they are not size-reduced. The wing petals may be homogeneously mixed with the camomile drug before extraction. Where extraction is carried out

using mixing machines, a homogeneous mixture of the wing petals with the drug used is formed during extraction. In that case, preliminary mixing of the wing petals and the drug is not necessary. The camomile drug and the wing petals may be separately extracted with the agents mentioned and the extracts may then be combined, the wing petal extract best being concentrated under moderate conditions (for example vacuum).

Such mixing units as, for example, so-called trough mixing machines, percolators and other suitable extraction apparatus may be used to carry out the process according to the invention. The temperature prevailing during extraction is, for example, 10 to 50°C. There is no need for cooling.

Where extraction is carried out using mixing machines, the rotational speed of the mixer should be adjusted in particular in such a way that the speed of rotation of a point on the periphery of the mixer is between 2.8 and 1.4 m/second, the extraction time preferably being between 15 minutes and 3 hours and more preferably between 30 and 120 minutes.

For a mixer having a radius of 55 cm, a suitable rotational speed is, for example 50 to 250 r.p.m., in which case the extraction time is, for example, 15 minutes to 3 hours. Where a mixer of this size is used, the preferred rotational speed is 50 to 250 revolutions per minute, an extraction time of 15 to 120 minutes being sufficient.

Suitable solvents are, in particular, linear or branched aliphatic, monohydric or polyhydric alcohols containing 1 to 6 carbon atoms, such as for example methanol, ethanol, propan-2-ol, butanol, glycerol, solketal (2-dimethyl-4-hydroxymethyl-1,3-dioxolane) and the like and also mixtures of these solvents with water.

Mixtures of these solvents may also be used. The minimum quantity of solvent is 2 parts solvent to 1 part

drug. The solvent is generally used in a quantity of 2 to 20 parts to 1 part drug and, more particularly, in a quantity of 3 to 10 parts to 1 part drug.

The camomile extracts obtained in accordance with the invention contain at least 80 mg-% and preferably 90 to 170 mg-% natural flavones, essentially apigenine and apigenine glucosides (expressed as apigenine). The content of essential oil in the camomile extracts according to the invention is at least 80 mg-% and preferably from 120 to 150 mg-%. The content of natural flavones (apigenine and its glucosides) in the camomile extracts according to the invention is at least 0.4% by weight and preferably from 0.425 to 0.8% by weight, based on the quantity of drug containing 5 to 30% by weight wing petals used.

The azulene content of the extracts according to the invention is, for example, 3 mg-% and preferably from 3 to 15 mg-%.

Examples

Example 1

A mixture of 320 g camomile flowers (essential oil 750 mg-%; azulene 42 mg-%) and 80 g wing petals (ethereal oil 196 mg-%; azulene 0.4 mg-%) is extracted with 2100 g ethanol (40% by weight) in a trough mixer at a rotational speed of the mixer of 65 r.p.m. After 90 minutes, the drug material is pressed off and the extract is filtered. The active-substance content of the extract is determined in known manner:

Azulene	:	10.4 mg-%
Essential oil	:	98.6 mg-%
Apigenine and apigenine glucosides (expressed as apigenine)	:	141.0 mg-%
Extractive material	:	6.85 %

Comparison Example (known process)

400 g camomile flowers (as described above) are extracted with 2100 g ethanol (40% by weight) in a trough mixer at a rotational speed of the mixer of 65 r.p.m. After 90 minutes, the drug material is pressed off and the extract is filtered. The active-substance content of the extract is determined in known manner:

Azulene	:	11.2 mg-%
Essential oil	:	101.3 mg-%
Apigenine and apigenine glucosides (expressed as apigenine)	:	65.3 mg-%
Extractive material	:	6.53 %

Example 2

A mixture of 240 g camomile flowers (essential oil 750 mg-%; azulene 42 mg-%) and 60 g wing petals (ethereal oil 196 mg-%; azulene 0.4 mg-%) is extracted with 2100 g propan-2-ol (33% by weight) in a trough mixer at 65 r.p.m. After 90 minutes, the drug material is pressed off and the extract is filtered. The active-substance content of the extract is determined in known manner:

Azulene	:	4.9 mg-%
Essential oil	:	87.6 mg-%
Apigenine and apigenine glucosides (expressed as apigenine)	:	106.4 mg-%
Extractive material	:	7.09 %

Comparison Example (known process)

300 g camomile flowers (as described above) are extracted with 2100 g propan-2-ol (33% by weight) in a trough mixer at 65 r.p.m. After 90 minutes, the drug

material is pressed off and the extract is filtered. The active-substance content of the extract is determined in known manner:

Azulene	:	6.7	mg-%
Essential oil	:	82.1	mg-%
Apigenine and apigenine glucosides (expressed as apigenine)	:	53.0	mg-%
Extractive material	:	6.6	%

CLAIMS

1. Camomile extracts having an increased flavone content of at least 80 mg-% natural flavones (based on the extract), which are obtained by extraction of a camomile drug and camomile wing petals.

2. A camomile extract having an increased content of natural flavones, this flavone content emanating from the addition of wing petals before or during the extraction.

3. A process for the production of camomile extracts rich in flavones, characterized in that they are obtained by extraction of a camomile drug with addition of camomile wing petals.

4. A process for the production of camomile extracts rich in flavones, characterized in that they are obtained by extraction of a camomile drug with addition of camomile wing petals with optionally aqueous aliphatic, mono- or polyhydric alcohols at temperatures of 10 to 50°C.

5. Camomile extracts obtainable by the process claimed in claim 3 or 4.

6. The use of camomile wing petals in the extraction of a camomile drug.

7. The use of camomile wing petals as an additive to a camomile drug and, optionally, subsequent extraction of the product obtained from the camomile drug and the wing petals.