

UNITED STATES PATENT OFFICE

2,384,532

METHOD OF PROCESSING SPICE

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No Drawing. Application November 12, 1941,
Serial No. 418,852

12 Claims. (Cl. 99—140)

This invention relates to a method for processing spices and the like, and to improved spice powders.

Natural materials used for spices, condiments, flavors or perfumes, such as for example cloves, capsicum, chili peppers, ginger, cubebs, caraway, coriander, and the like, are reduced to fine powders with considerable difficulty by the usual methods, largely because of the presence of oily materials which cause agglutination in the grinding operations. In some materials, this agglutination effect is aggravated by the increased stickiness resulting from the exposure of oily surfaces of the material to air during the grinding, certain contained oils being oxidized under these conditions to sticky films similar to those of the drying oils of the paint industry. The problem of reduction to a fine powder is complicated by the fact that long exposure to air, especially at high temperatures, deteriorates the color, flavor and odor of the powdered products, and long time of grinding and consequent long time of exposure to air is a necessary accompaniment of the difficulty of grinding.

We have found that these difficulties may be largely overcome by first removing all or a portion of the oily substance prior to the fine grinding operation, followed, after a suitable fine powder is obtained, by replacing the oily constituents in the powder. The oily materials may be removed by any suitable means, for example, by extraction with a solvent. However, for those materials whose value depends upon natural unimpaired flavors and odors, this method is not always satisfactory, because the solvent almost invariably effects some change in the flavor or odor, and because it is usually difficult to remove the last traces of solvent from a solid material of the nature of spice and the like. We prefer to remove the oil, or a portion of it, by mechanically pressing it out, which is possible because of the relatively high oil content of the particular materials to which our process is applicable. The solid residue containing a relatively small proportion of the originally contained oil, is readily powdered in hammer or attrition mills of the usual types, after which the expressed oily materials, which contains much of the flavor and odor, and some color, is dispersed into the powder, thereby restoring all of the original ingredients unimpaired or unaltered, except that the product is in powdered form.

One object of our invention is to provide a method for powdering high oil-containing spices without alteration of the color, odor or flavor.

After the oil has been separated from the solid material as indicated above, the oil may be subjected to various forms of treatment to improve its strength, flavor, odor, or its keeping qualities, before restoring it to the powdered solid material.

Another object of the invention is therefore to provide a method for improving the quality of powdered high-oil-containing spices and the like.

Another object is to provide finely ground spices which are less subject to deterioration by aging. Still another object is to provide spice powders having increased or decreased flavoring or scenting power. Another object is to provide spice powders in which selected flavoring constituents are altered in concentration.

Our process may be illustrated as applied to the reduction to powder of dried chili peppers. This material is very difficult to reduce to a fine powder because of the presence of oils and oleoresins which cause the disintegrated particles to stick together and to the grinding machines, during the grinding operations as ordinarily carried out. In grinding the whole pods, including the seeds which contain as high as 22 percent of fixed oil, the grinding is particularly difficult because at some stages this oil lubricates the grinders and retards grinding. The agglutination effect is particularly troublesome in grinding chili peppers because the oil contains much linoleic glyceride and similar compounds, which becomes sticky upon exposure to air. By pressing out a portion of the oil and oleoresins, powdering the comparatively oil-free residue, and dispersing the expressed oil in the powder, for example by spraying in the oil while stirring the powder, a powdered product is obtained which retains the original red color, and is unimpaired in odor and flavor. The whole pods are first macerated or crushed to release the contained oily substance, and then as much as possible of the oily content is removed by pressing. While batch or intermittent processes may be used, we prefer to use a continuous macerating and pressing machine such as the continuous expellers used in the recovery of vegetable seed oils. The material during this treatment of maceration and pressing is not allowed to get to a higher temperature than about 60° centigrade, to avoid possible deterioration of the color, odor or flavor. The press cake is friable and easily reduced to a fine powder in a hammer mill. After reducing the press cake by usual grinding and screening operations to the desired fineness, the powder is placed in a mixer, and while it is being agitated, the expressed oil containing the natural oils and oleoresins, is added as a fine spray to thoroughly

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disperse it in the powder. When using a continuous seed oil expeller, it is the usual practice to add sufficient water to get a satisfactory plasticity in the cake so that it will extrude, as well as to prevent "burning" of the cake. This moisture is of the order of about five percent.

For some uses, it is necessary to reduce the burning flavor, largely due to capsaicin, which is characteristic of chili products, while retaining the desired other flavors and odors. This has been accomplished by extracting the expressed oily liquid with a suitable selective solvent such as for example 87-percent isopropyl alcohol. Any desired portion of the capsaicin may be removed by choosing the suitable relative amount or kind of selective solvent, or the number of times the expressed liquid is extracted by portions of the solvent. When using isopropyl alcohol extraction, it is only necessary to draw off the extract, and remove the last traces of solvent from the oily liquid residue by low temperature evaporation under a partial vacuum, the last traces of the solvent being "swept" out by an inert gas such as carbon dioxide. The purified expressed oil and oleoresin may then be sprayed or otherwise dispersed into the powdered press-cake, giving a cooler chili powder, without loss or impairment of the other desired flavors and odors. The excess capsaicin may be recovered from the extracting solvent.

Because of its intense red color, chili powder has valuable properties as a harmless red coloring agent for certain food products, but the amount which can be used for coloring is limited somewhat by the concentration of the associated capsaicin which can be tolerated in the food product which it is desired to color. By removing part or all of the capsaicin, as above described, a useful food coloring product may be made.

A chili pepper powder may also be produced with increased capsaicin by dissolving additional amounts over the naturally occurring amounts, in the oily liquid prior to mixing it into the powdered solids.

The linoleic glycerides and similar compounds, which were noted above as being one cause of agglutination when grinding these oily spice materials by ordinary grinding methods, also cause the development of undesired odors and flavors in the product when it is exposed to air. In the past it has always been found necessary to keep the ground spices in sealed containers, or to use only freshly ground materials. This difficulty is particularly true of chili pepper powders. To correct this deterioration, the linoleic glycerides may be separated from the expressed oil of chili peppers, prior to dispersing it into the powdered solid material, as above described, by successive extractions of the liquid with a suitable selective solvent, for example practically anhydrous ethyl alcohol, which does not dissolve the glycerides. The alcohol may then be removed from the desired oils and oleoresins by vacuum evaporation or otherwise, before dispersing the improved liquid back into the powdered solids. This treatment to remove linoleic glycerides may be carried out on the expressed oil either with or without the removal of some of the capsaicin. The powder so prepared will remain fresh in flavor and odor for a much longer period than the natural powder, or longer than the powder made by the restoration of the untreated oil to the powdered solids materials.

The concentration of the flavoring and odorous

ingredients in the powdered solids from spices and the like may be altered to be either the same, or more, or less than in the natural materials, by changing the proportion of added oily substance and powdered solids. In this way, following our invention, concentrated spices may be produced which are still in the form of powders, which have long been accepted by the public, and yet which have the advantage of producing the same flavoring and perfuming effects by the use of smaller quantities than is customary.

Our process may be used for treating any powdered spices, condiments, perfumes, flavors and the like which in their natural form are difficult to powder because of their high oil content. The quality of the powdered reconstructed spice material may be altered as a flavor, odor, color, keeping quality, etc. by the methods which have been illustrated with the specific material chili peppers. Also the same strengths may be attained as in the natural powders, by using the improved grinding procedure of our invention, omitting the extraction steps.

We claim:

1. The process for powdering spices comprising coarsely crushing the spice, removing a major portion of the flavoring oil, finely grinding the low-oil-containing solid material, and restoring the flavoring oil to the finely ground solid material.
2. The process for powdering high-oil-containing spices comprising coarsely crushing the spice, pressing out a major portion of the flavoring oil, finely grinding the low-oil-containing solid material, and restoring the flavoring oil to the finely ground material.
3. The process for powdering high-oil-containing spices comprising coarsely crushing the spice, extracting out a major portion of the flavoring oil by means of a solvent for said oil, removing the solvent from said flavoring oil without impairment of its flavor and odor, removing the solvent from the extracted solid, finely grinding the extracted solid material, and restoring the flavoring oil to the finely ground material.
4. The process for improving high-oil-containing spices comprising coarsely crushing the spice, removing a major portion of the flavoring oil, treating the flavoring oil to remove undesired constituents without impairment of its flavor and odor, finely grinding the low-oil-containing material, and dispersing the treated flavoring oil in the finely ground material.
5. The process for improving high-oil-containing spices comprising coarsely crushing the spice, removing a major portion of the flavoring oil, extracting the flavoring oil with a solvent which will selectively separate out the unsaturated glycerides, finely grinding the low-oil-containing solid material, and then dispersing the purified flavoring oil substantially free from unsaturated glycerides in the finely ground solid material.
6. The process for powdering dried chili peppers comprising coarsely crushing the peppers, removing a major portion of the oily liquid, finely grinding the low-oil-containing solid, and restoring the oily liquid to the finely ground solids.
7. The process for powdering dried chili peppers comprising coarsely crushing the peppers, pressing out a major portion of the oily liquid, finely grinding the low-oil-containing solid material, and restoring the oily liquid to the finely ground solid material.
8. The process for powdering dried chili peppers comprising coarsely crushing the peppers,

extracting out a major portion of the flavoring oil by means of a solvent for said oil, removing the solvent from said oil, finely grinding the low-oil-containing material, and restoring said flavoring oil to the finely ground solid material.

9. The process for improving dried chili peppers comprising coarsely crushing the peppers, removing a major portion of the oily flavoring liquid, treating the oily flavoring liquid to remove undesired constituents, finely grinding the low-oil-containing solid material, and dispersing the treated oily flavoring liquid in the finely ground material.

10. The process for improving dried chili peppers comprising coarsely crushing the material, removing a major portion of the oily liquid, extracting the oily liquid with a selective solvent such as ethyl alcohol to separate out unsaturated glycerides, finely grinding the low-oil-containing solid material, and then dispersing the oily liquid substantially free from unsaturated glycerides in the finely ground solid material.

11. The process for improving dried chili pep-

per spice material comprising coarsely crushing the peppers and expelling a major portion of the oily liquid, removing a portion of the capsaicin from the oily liquid by extracting it with a selective solvent such as 87 percent isopropyl alcohol, finely grinding the low-oil-containing solid material, and then dispersing the extracted oily liquid in the finely ground solid material.

12. The process for improving dried chili pepper spice material comprising coarsely crushing the peppers and expelling a major portion of the oily liquid, removing a portion of the capsaicin from the oil liquid by extracting it with a selective solvent such as 87 percent isopropyl alcohol, extracting the oily liquid again with substantially anhydrous ethyl alcohol to separate out the unsaturated glycerides, removing the solvent from the extracted oily liquid, finely grinding the low-oil-containing solid material, and then dispersing said extracted oily liquid in the finely ground solid material.

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