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3,697,288

**VIBRATION ENERGY MILLING OF GROUND COFFEE SLURRIES**

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4 Claims

**ABSTRACT OF THE DISCLOSURE**

Vibration energy milling of ground coffee slurries to provide a sediment-free additive for instant coffee.

**BACKGROUND OF THE INVENTION**

Typical instant coffee processing generally involves three basic steps: countercurrently extracting roast and ground coffee with aqueous extraction liquor, concentrating the resulting extract, preferably to at least 50% solubles concentration, and finally, drying the extract to provide a dry instant coffee product. In line with the continuing effort towards an instant coffee product with exact flavor duplication of roast and ground coffee, from time to time various process improvements have been made upon these three basic hereinbefore described steps. Of the various methods which have been employed in an effort to replace the coffee flavor values lost during the basic instant coffee processing steps, the most commonly employed are (1) steam distilling of volatiles from roast and ground coffee prior to extraction and subsequently adding the distillate back to the extract concentrate, (2) extracting coffee oil from roast coffee beans and subsequently spraying the coffee oil on the resulting instant coffee product, and (3) adding steam-stripped aroma volatiles to instant coffee by spraying the aroma volatiles thereon. Each of these techniques has enjoyed some success and are used throughout the coffee industry.

Since the basic object of each of these process improvements is to duplicate the flavor and aroma of roast and ground coffee, it has been suggested by some workers skilled in the art that roast and ground coffee per se could be added to instant coffee in small amounts in an effort to improve the flavor and aroma of instant coffee. However, heretofore the addition of roast and ground coffee to instant coffee at levels sufficiently high to provide flavor and aroma improvement of the instant coffee caused a high level of cup sediment to appear in the prepared cups of instant coffee beverage. The cup sediment appeared for the principal reason that the solubility level of roast and ground coffee (i.e. about 25) is substantially lower than the solubility level of instant coffee. Therefore, while flavor and aroma were improved by adding roast and ground coffee, a high level of cup sediment was produced when the required amounts of roast and ground coffee were added. Consumers regarded the high level of cup sediment as undesirable and accordingly, while flavor and aroma were improved, consumer acceptance was decreased because of the accompanying cup sediment.

In an effort to overcome the cup sediment problem while retaining the benefits of adding roast and ground coffee to instant coffee, some workers have turned to the idea of finely dispersing the roast and ground coffee by colloid milling. For example, see French Pat. 1,495,566, and South African patent application 68/1387, which was published in 1968. The French patent discloses suspending in water roast and ground coffee and thereafter reducing particle size by use of a colloid mill to produce a suspension of fine roast and ground coffee in water. The colloidal suspension produced by the colloid milling

process is thereafter admixed with liquid coffee extract and spray-dried to produce a soluble coffee product. The South African application discloses making colloidal suspensions from pre-extracted coffee grounds and not from unextracted high aroma and flavor roast and ground coffee.

While the French patent does describe colloidal suspension of roast and ground coffee in water and thereafter using the colloidal suspension to add back to an instant coffee extract, the French patent does not disclose vibration energy milling. This distinction is critical because colloid milling does not work to form high levels of roast and ground coffee suspended in water, and on the other hand, vibration energy milling does. The term "high levels of roast and ground coffee suspended in water" is intended to encompass levels in excess of 70% by weight of the roast and ground coffee employed. The low level of suspension is actually brought out in the French patent in which the dispersibility range is shown to be from about 37% to 43%. Accordingly, the process of the French patent does not represent a feasible method of colloiddally dispersing roast and ground coffee in water at high levels, which, when added back to an instant coffee extract and subsequently dried, provides a flavor and aroma improvement without also providing a high level of cup sediment.

Accordingly, it is an object of this invention to provide colloidal dispersions of roast and ground coffee in water wherein the percentage of dispersibility is in excess of 70% by weight of the roast and ground coffee employed.

An additional object of this invention is to provide high levels of colloidal dispersion of roast and ground coffee in water such that when said dispersion is added back to an instant coffee extract and subsequently dried, a significant amount of flavor and aroma improvement in the instant coffee can be seen. Yet another object is to provide a flavor- and aroma-improved instant coffee product having small amounts of roast and ground coffee dispersed therein which does not provide high levels of cup sediment upon preparation into an instant coffee beverage.

The method of accomplishing these and other objects will be apparent from the following description.

**SUMMARY OF THE INVENTION**

This invention relates to a method of producing a colloidal dispersion of roast and ground coffee in water, wherein the level of dispersibility is in excess of 70% by weight of the roast and ground coffee employed, said method comprising vibration energy milling a water/roast and ground coffee slurry, said slurry comprising from 5% to 10% by weight of roast and ground coffee.

**DETAILED DESCRIPTION OF THE INVENTION**

Normal size reduction methods such as colloid milling provide from about 40% to about 65% dispersibility of a 5% to 10% ground coffee slurry. As used herein, the "percent dispersibility" refers to the weight percent of roast and ground coffee present in a roast and ground coffee slurry which actually goes into solution and/or into the state of colloidal suspension. The phrase "percent ground coffee slurry" refers to a slurry which is comprised of water and ground coffee and, for example, in a 10% slurry, is 10% roast and ground coffee and 90% water. The levels of dispersion, i.e. 40% to 65% obtainable by colloid milling, are insufficient to provide a sediment-free dispersion of roast and ground coffee capable of being added back to instant coffee because (1) 40% to 65% dispersibility is too low to provide any significant flavor and aroma improvement, and (2) where the level of dispersibility is as low as 40% to 65%, a substantial amount