to both the lightener itself and more importantly to the lightened coffee beverage. The caseinates have been found to be an ideal source of protein since these materials possess a natural emulsifying property which is thought to aid in forming a stable emulsion in the lightener. This emulsifying property of these protein materials is desirable since it has been found that some of the commercial emulsifiers tend to lose emulsifying power during spray drying. Sodium caseinate has been found to be the preferred protein material. Calcium caseinate can be used, but it is less rapidly dissolved in the aqueous phase and is less stable to separation than sodium caseinate. Potassium caseinate may be used for low sodium lighteners, and soybean proteinate is useful if an all vegetable product is desired.

A water soluble carbohydrate is added to the lightener to serve as a carrier for the fat and also to act as a bodying agent and to impart a slight sweetness effect. The carbohydrate can be of any type, such as for example, sugars or corn syrup solids but it has been found that corn syrup solids have been preferable since they are substantially less sweet than a sugar such as sucrose.

A small amount of buffering agents should also be included in the lightener to counteract the acidity of the coffee which otherwise might be sufficient to precipitate a certain amount of the protein, thereby causing what is known in the art as "feathering." Care must be taken in the selection of both the amount and type of buffering agents employed, if the development of off-flavors is to be prevented. The use of more than about 4% of buffering agents in the solid lightener formulation will normally be detectable to the taste. The most common buffering agents are the phosphates such as dipotassium phosphate and sodium tripolyphosphate. It has been found, however, that between about 1% and 3% of sodium citrate is desirable as one of the buffer agents since it is especially effective in preventing "feathering" when water above 180° F. is used to prepare the coffee beverage.

The lightener may also contain a small but effective amount of a sequestering agent in order to minimize any appearance problems in the coffee beverage due to the use of hard water. Typical sequestering agents are sodium hexametaphosphate (Calgon RS) and disodium ethylene diamine tetraacetate.

It may also be beneficial to pre-treat the water used in the formation of the liquid lightener prior to spray drying. Such pre-treatment may consist of distillation, mineral addition or buffering. These steps should further assist in lowering the acidity of the prelightened coffee beverage thereby decreasing the probability that any undissolved protein material will appear in the prelightened coffee beverage.

In addition to the basic formulation, minor amounts of color and flavor additives may be included as permitted by law. The production of a golden hue in the final coffee beverage is especially desired in order to present a pleasing appearance to the consumer. It has been found that the use of yellow type coloring agents such as beta carotene and tartrazine are especially useful in producing the desired color. Various cream flavors have been found useful as flavor additives.

Suitable formulations for the spray dried lightener solids used in this invention are described but not limited by the following compositions:

	Percent
Water soluble carbohydrate	35 to 65
Vegetable fat	20 to 50
Water dispersible protein	3 to 15
Buffer agent	1 to 4
Emulsifier	0.5 to 3
Sequestering agent	1 to 3

A process for the production of the lightener solids comprises forming a liquid lightener formulation of about 50% to 70% solids concentration by maintaining water in a blend tank at about 160° F., and mixing therewith the water dispersible proteins, water soluble sugars, buffering agents and color and flavor additives. Next a pre-blended mix of the melted fats and emulsifiers is blended into the tank while the elevated temperature is maintained. This blended formulation is fed through a homogenizer where a stable emulsion is formed and then passed onto a spray drier where the dried lightener solids are produced. The conditions for spray drying will be readily apparent to those skilled in the art.

It has been found that when the blended lightener formulation is elevated to the temperature of about 160° F. a good homogenization efficiency is achieved, and ordinarily a single pass through a commercial homogenizer will be sufficient to produce a thoroughly homogenized blend. Ideally the temperature of the homogenized lightener should be about 180° F. just prior to its entry to the spray drier. This elevated temperature of 180° F. is preferably achieved by the use of a heat exchanger since batch heating at 180° F. has been found to produce off-flavor build-up and discoloration.

It is possible to improve the flowability of the spray dried lightener solids by adding to the dry solids a small amount (about 1.5%) of a known anticaking agent such as sodium aluminum silicate.

These suitable dry lightener solids, such as spray-dried solids having a typical particle size distribution between 100 and 500 microns, are preferably blended with dry soluble coffee solids, such as conventional spray-dried coffee having a typical particle size distribution between 100 and 500 microns, to produce a substantially homogeneous blend. This coffee-lightener blend is then ground in accordance with the provisions of this invention whereby the particle size of the solids is reduced to a point where substantially all of the particles are between about 90 microns and 150 microns. This grinding may be done in conventional hammer mill under conditions which will be readily apparent to those skilled in the art.

Alternatively the dry lightener solids and the dry soluble coffee solids may be separately ground in accordance with this invention and thereafter the ground solids are uniformly blended.

The ground blends are agglomerated under suitable conditions such as those known and used by those skilled in the coffee art.

As previously indicated, acceptable products have been produced containing from 35% to 55% by weight of coffee. However, consumer studies have shown that the most desirable products should contain at least about 45% coffee. This is a convenient level since the consumer is easily able to measure about two teaspoons of the prelightened product in order to produce a cup of coffee equivalent in coffee taste to one teaspoon of regular instant coffee.

It has also been found that at a 45% coffee level it is desirable for the lightener to have a fat content of about 40% in order to produce the coffee beverage having the highest degree of consumer preference. The use of fat contents much above 45% will usually create emulsion problems as may be evidenced by the presence of free oil droplets on the surface of the lightened coffee beverage.

This invention is further illustrated but not limited by the following examples:

Example 1

Lightener solids:	Weight percent
Corn syrup solids (24 D.E. Frodex)	48.50
Hydrogenated palm kernel oil	40.00
Sodium caseinate	5.00
Mono and diglycerides (Atmul 124)	1.56
Sodium citrate	2.00
Dipotassium phosphate	1.34
Sodium hexametaphosphate (Calgon, RS)	1.60
Flavor/color	As desired

55 lbs. of these spray-dried lightener solids having an average particle size of about 290 microns are blended