KEATING
OF CHICAGO, INC. ®

CAUSES OF FAT BREAKDOWN

As long as food has been fried in deep fat, restaurant operators have been aware that the frying fat deteriorates, and they have believed it necessary to discard the frying fat every three, four or five days, or at the longest at one-week intervals.

Today, thousands of restaurant operators know that this belief is not always true. They know that under certain circumstances they can use frying fat continuously from one year's end to the next and suffer absolutely no deterioration in the quality of their fried foods.

Unfortunately, it is not possible for every restauranteur to operate his establishment in such a manner that the frying fat will last indefinitely, and because of this the useful life of frying fat becomes a subject of confusion and dispute. We are, therefore, giving the reasons why frying fat deteriorates. It must be understood that even though certain restaurants use fat for a year or more without deterioration in quality of the fat or the food, the restaurants are not using the same fat continuously. The fat they are using does deterioate, but this deterioration is offset by the fact that they use such huge quantities of fat for the preparation of their great volume of fried foods that the make-up fat, the new fat that must be added to replenish the fat which has been absorbed in the foods, keeps the free fatty acid content below a dangerous level.

FIVE CAUSES OF FAT BREAKDOWN

1. The first and major cause of fat breakdown is the contact of air with the hot surface of the fat. Several things happen to the fat. Actually the air dissolves in it, and the oxygen in the air attacks the fat, bringing about deterioration. How do we know this is true? How can we make these statements without fear of contradiction? We took two identical fryers and heated them to 350 degrees. In one the surface of the fat was left exposed to the air, while in the other a metal cover floated on the fat, excluding the air. The fryer that was exposed to the air, and which had no new or replacement fat added to it, attained a fatty acid level in excess of 1.5% within four days, but the fryer with the floating metal cover reached a level of only .27% at the end of thirty days. Therefore, we concluded that air is a major enemy of frying fat and that this attack by air can be controlled only by reducing the frying temperature. We found that reducing the temperature of the fat in turn reduces the effect of the air on the fat. Therefore, when you use the Keating Fryer with the low temperature features you can expect tremendous improvement in the life of your frying fat.

2. The second cause of fat breakdown is crumbs and food particles which carbonize in the fat. For years we had thought that frying fat became dark and unsightly because of its accumulation of fine pieces of carbonized crumbs and food particles. We discovered, however, that these carbonized particles in the fryer actually cause a chemical breakdown of the fat. To prove this, we took a quantity of crumbs which had been carbonized, washed them with chloroform to remove the fat, dried them by permitting the chloroform to evaporate, weighed them carefully and then placed them in the frying fat. In forty-eight hours the frying fat became black and worthless as a frying medium, at which time we removed the crumbs. Again we washed them with chloroform, and weighed them, and found that we had the full weight of the crumbs which had been placed in the fryer. **But the fat was still black.** It had picked up an accumulation of carbon. Now fat is composed of hydrogen, oxygen, and carbon and the only way carbon can be released from frying fat is from the cracking of the fat, breaking it down in to its components parts. This releases the carbon and this effect is accelerated by the pressure of crumbs and food particles which carbonize. In the Keating Fryer the cold zone prevents the crumbs from carbonizing.

3. The third cause of fat breakdown is the heat transfer surfaces. Contact with iron, steel, aluminum and other metals causes the breakdown of frying fats. You may prove this for yourself. Clean a hamburger grill and place on it a small amount of the highest quality fat. In a few minutes you will see that a film forms where the fat comes in contact with the grill. This film is of a different character than the original fat and is a carbon deposit. The fact that the carbon film forms is physical evidence that the metal causes the breakdown of the frying fat.

Some metals do not have this damaging effect on frying fats; among them is polished stainless steel, such as is used for the vessel and heat transfer tubes of the Keating Fryer.

If you will repeat the experiment in a stainless steel frying pan, or if you will use a Keating Fryer and place

melted fat in the fryer before lighting it, you will see that there is no carbon deposit on the heat transfer or other surfaces.

The presence of carbon in a frying pot, or on the heat transfer surfaces or the heating elements of a fryer is physical evidence that the fryer is of a design that is damaging to the frying fat, causing the fat to break down. It can be readily understood that a deep fat fryer should be the last thing in the world that would damage frying fat, but many fryers on the market are extremely damaging in their effect on frying fat.

4. The fourth cause of fat breakdown is entirely different from the other three, it is electro-chemical. All of us, as students in high school, became acquainted with the electro-chemical series. We learned that if any metals occupying dissimilar positions in the electro-chemical series are present in a vessel containing an electrolyte, and electrolytic cell is formed. Zinc and copper, and an electrolyte for example, make a wet celled battery. Frying fat is an electrolyte. Therefore, if dissimilar metals are present in a fryer, such as copper and zinc, or aluminum and steel, or cadmium plated parts and steel, a cell forms and electrolysis takes place. We do not thoroughly understand what takes place chemically when fat is subject to electrolysis. We do know that there is some form of organic breakdown. To illustrate and substantiate this, potato chips spoil readily if fried in a deep fat fryer made of steel which has a copper thermostat bulb in it.

The Keating Fryer uses no combination of metals which give rise to this electrolytic action. In the Keating Fryer there is no damage to the fat due to electrolysis.

5. The fifth cause of fat breakdown is contamination. To understand contamination, just imagine frying bacon in a fryer. It is obvious that the bacon fat will render out of the bacon and intermingle with every molecule of the frying fat. Actually, with the low frying temperatures of the Keating Fryer, frying of bacon does not damage the fat. If you have bacon grates, do not hesitate to fry bacon in your Keating Fryer. Remember, however, that the contaminating materials intermingle with all of the frying fat. For instance, if you use breading which was baked many months ago, the shortening that was used in the mix of this breading prior to baking has become stale and this stale shortening leaches out from the breading and intermingles with the frying fat and gives rise to premature foaming.

Many things contaminate frying fat. Free salt is one of them. Sodium sulfite and sodium bisulfite are others. If these materials are in the solution or a part of the ingredients of the food, they do not damage the fat. But any free salt or sodium sulfite in the frying fat causes it to take on an inky blackness; it causes a brownish deposit to form around the top of the fryer and renders the frying fat useless for further frying in a few days.

Sodium sulfite is the chemical generally used for treating potatoes so they will stay white. This material is very harmful to the frying fat and if you treat your own potatoes, they should be treated with only one-third the amount of the chemical recommended by the manufacturers of these products. If you buy treated potatoes, the potatoes should be thoroughly washed before they are used.

If you have read the foregoing and studied it carefully, you can understand that it is possible to extend the life of frying fat in a restaurant where the fat is breaking down prematurely. But the hardest thing on fat is long hours of high temperatures and a low volume of frying foods.

It is not uncommon to find a restaurant wherein the fryers are lighted at eight o'clock in the morning and not turned off until one a.m. the following morning. In many instances, dining car operators keep their fryers on twenty-four hours a day. These operators are all without exception, accustomed to discarding their frying fat. Frying fat does not act differently for one operator then it does for another. The fat acts only in accordance with the way it is used.

The switch located on the panel of the Model "B" and "C" Keating Fryers make it very easy for the kitchen help to switch off the fryer when it is not actually in use. When they get an order they can flick the switch on. The temperture at which the food is placed in the fryer is actually far less important than the temperature at which the food finishes frying. The Keating Fryer will heat back up to the thermostat setting long before the food finishes frying.

The Keating Fryer contains nothing which is magic. It is simply the finest tool or the finest mechanical device that has ever been made to fry foods.

8901 WEST 50TH STREET • MCCOOK, IL 60525
1-800-KEATING • WWW.KEATINGOFCHICAGO.COM