

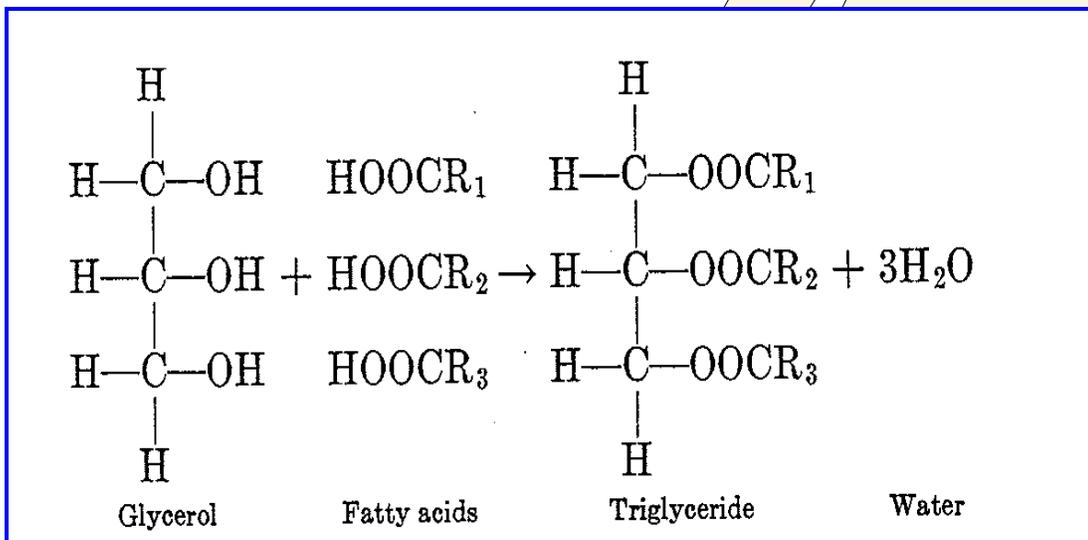
**Frequently Asked Question:**

**What can you do about my FFA?**

Our most common question and possibly the most complex to fully answer.

**Why do we look at FFA value?**

FFA is part of the oil break down process and very easy and cheap to measure. FFA, or free fatty acid, is as it describes, it is a fatty acid chain that is free in the oil. Oil is made up of a glycerol backbone with 3 x fatty acid chains attached to it. In this form it is a triglyceride, and this is actually oil.



During part of the oil degradation (hydrolysis) water reacts back with the oil and breaks a fatty acid off of the glycerol backbone to produce 1 x free fatty acid and a diglyceride with 2 remaining fatty acid chains attached to it. Diglyceride is not oil. And if another fatty acid chain breaks off this leaves a monoglyceride with only 1 fatty acid chain left attached, this is also not an oil.

So, in measuring the FFA we can see how much oil has been converted to diglyceride or monoglyceride, which is not oil anymore. Easy, but not the whole story.

**Oxidation:**

The oxidation process is the complex side of the oil breakdown. We have primary and secondary oxidation stages leading to the formation of over 300 known other products. These oxidative products are what determine the colour change the odour, foaming, smoke and rancid



### **What do we do with FFA?**

The easiest way to get rid of FFA is to convert it to a soap by reacting it with an alkaline metal ion. This has done nothing to improve your oil quality, but if you were to measure FFA, it would be reduced dramatically, which with FFA as a quality measuring tool would mean your oil is in great shape. In reality all that has happened is you have increased the soap content and hidden the FFA value. The oil is still in the same degraded state as before you converted the FFA by now with a higher soap content that will lead to an accelerated oil degradation curve.

### **So why remove the FFA?**

You don't actually want to remove the FFA, or convert it, as this is just hiding your oil quality indicator.

But again, that is not the whole story. FFA is actually more prone to oxidation than if it is still attached to the glycerol backbone. So, it is a good idea to reduce it, but in doing so you also need to remove the additional soap you have created, as the extra soap will do far more damage. So, with a balanced treatment you can do this.

### **Is the measured FFA, really all FFA?**

When you measure FFA you are actually measuring acid value in the oil. This is made up of FFA and some acid formed as part of a secondary oxidation process (see components formed from fission of the hydroperoxide in the above chart). The ratio of FFA to these acids will vary depending on all the variables of the frying operation.

### **What does the CarbonPad media do with FFA?**

We do actually adsorb a small amount of FFA, not converting it to a soap, but what we actually do is treat the oil for the components that lead to overall oil degradation, like soaps and free metal ions. We remove these in the active powders incorporated in the structure of the CarbonPad, so when the CarbonPad is used in the treatment of frying oil we expect to see the slower formation of FFA, which overall indicated that the overall quality of the oil has been improved and oil degradation has been slowed down.

With the balancing of oil take out and the addition of fresh oil, along with filtration and treatment, the oil quality can be maintained at a higher level and can reach a point of being in equilibrium and not need discarding, in some applications.

**A statement to remember is that we can not convert old oil to new oil. Once it has degraded it can not be renewed. Removing or hiding the quality indicator (FFA) does not reverse the oxidation process or remove the non-oil components from the oil.**