

# **Adsorbent Treatment of Frying Oils and the Impact on Health and Nutrition**

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## **Abstract**

Regardless of origin, virgin frying oils are non-polar in nature. However, as these oils degrade due to oxidation, hydration, heat stress, etc., polar compounds are produced. It is generally accepted that polar compounds are the only oil quality parameter that correlate to the taste and quality of fried food. Synthetic magnesium silicate has been shown to have a strong affinity to remove polar materials from frying oils. The ability of the magnesium silicate to remove polar materials was shown by packing a column with synthetic magnesium silicate and passing a degraded frying oil through the column. Thin layer chromatography was used to show that there was 100% separation of the non-polar and polar compounds.

The acidic and basic active sites of several different active filter aids were studied using Temperature Programmed Desorption. Synthetic magnesium silicate was shown to have the most acidic and basic active sites of all materials tested and thus, the most sites available for adsorption.

When frying oils are heated and undergo oxidation, deleterious nutritional compounds are formed which have been shown to cause conditions such as necrosis of the liver, retarded growth, hair loss and dermatitis when fed to rats. Treatment of the oxidized frying oil with synthetic magnesium silicate decreased the deleterious nutritional effects shown by these degraded oils.

Acrylamide is a compound that has been shown to form in fried and baked snack foods such as potato chips. In order to determine the adsorptive capacity of magnesium silicate for acrylamide (a polar compound), oil was spiked with acrylamide and treated with synthetic magnesium silicate. The resulting treated oil contained no measurable amount of acrylamide.