

PORK FAT AND IODINE VALUE FAQs

1. What is Iodine Value (IV)?

Iodine value is an indirect method of estimating the firmness of pork fat. It is an indication of iodine absorption by unsaturated fatty acids. Iodine absorption level is directly related to the unsaturated fatty acid content of the fat (Eggert et al. 2001).

2. Why does IV matter?

The IV provides a quantitative estimate of unsaturated fat in the sample. Unsaturated fatty acids contain double bonds, that are susceptible to oxidation. The amount of unsaturated fatty acids is related to the fat firmness, oxidative potential and several qualitative characteristics including shelf life, processing loss or shrink, appearance, cooking and taste/smell qualities. A lower IV indicates a less unsaturated fat, that will have firmer texture and a higher melting point.

3. How is IV measured?

The standard IV test measures the quantity of six specific unsaturated fatty acids where the iodine absorption characteristics are well known (AOCS, 1998). The IV can be measured via chemical analysis or NIR technology. A lower IV means less unsaturated fat which equates to a firmer carcass fat. More than one equation exists with some equations measuring as few as five and others measuring as many as eight fatty acids.

4. What factors affect IV?

The IV of pork fat is affected by many factors including: feedstuffs, genetics, environment, growth rate, gender, age/weight and fat sampling location. Diets that are high in carbohydrate and low in fat will produce a lower IV because this type of diet increases the pig's own (de novo) fat synthesis, which is primarily saturated in nature. Feeding dietary fat inhibits de novo synthesis, so the pig will directly deposit fatty acids from the fat in their diet. Therefore, diets high in unsaturated vegetable oils will directly increase carcass IV. Feeding more saturated fat sources such as choice white grease or tallow have a less detrimental effect on carcass IV.

Pigs of a lean genotype tend to have a higher IV. Barrows and older, heavier pigs typically have lower IV than gilts or younger, lighter pigs. Pigs that grow faster may have firmer carcass fat than slower growing, leaner pigs (Nurnberg et al., 1998).

Carcass IV is affected by the location at which it is measured. The ideal location to measure IV has yet to be determined. Fat sampled from the back is typically firmer than fat sampled from the jowl or neck (Benz et al., 2007). Fat layers in the backfat also vary in IV content. The inner layer is the most saturated, followed by the middle and then the outer layer (Apple et al., 2009). In addition, the inner back fat layer and the intramuscular belly fat may respond to dietary inputs during later stages of growth. The outer fat layer is generally unresponsive to dietary inputs (Boyd, 2007). Because so many factors affect IV at slaughter, it is important to realize that while nutrition is an important predictor of carcass fat IV, efforts to reduce carcass IV can be complex.

5. What is the IV of various feedstuffs?

Vegetable oils typically fed in the US have higher IV than animal fats like tallow or choice white grease. The IV of various feed ingredients is proportional to the unsaturated fat content. Most small grains like wheat, milo, and barley will have lower IV than corn or DDGS simply because of their lower oil content. Similarly, soybean oil has a high IV, but solvent extracted SBM has a low IV because the oil level is lower. Extruded soybeans, expeller or pressed soybean meals, poultry meals and fish meals tend to have higher IV because of the higher fat content and high proportion of unsaturated fatty acids. Alternative ingredients like midds and soy hulls have low fat levels, and thus low IV. Conversely, bakery co-products and DDGS will have higher vegetable oil content, thus higher IV. Diets with DDGS and/or bakery typically contribute to higher carcass IV.

6. **What carcass IV is desirable?** It is dependant upon sampling location (i.e. belly, loin, or jowl) and processor demands. The literature indicates an acceptable range as 65-74. Some packers recommend lower levels of DDGS and/or bakery be fed prior to slaughter. Others encourage restriction of ingredients by discounting carcasses with high IV.
7. **Can Akey predict the IV of pigs?** It is difficult to accurately predict IV of pigs. Formulas exist to predict dietary IV based upon the fat sources in the feed, and the IV of each fat source (Madsen et al., 1992; Boyd et al., 2007). Regression equations have then been developed using dietary IV to predict carcass backfat IV for pigs fed the complete ration (Madsen et al., 1992; Boyd et al., 2007). There are limitations to these equations and major dietary formulation decisions should not be made strictly using predicted dietary IV. As mentioned above, nutrition is just one of the many factors affecting carcass IV.
8. **How may Akey lower carcass IV through diet formulation?** This can be done in several ways, although efforts to reduce carcass IV may result in increased diet costs. DDGS, for example, contains about 10% corn oil, which is highly unsaturated. If 30% DDGS are fed in a corn-SBM diet (corn contains about 3.5% oil) an unacceptable rise in carcass IV could occur. Akey research has shown that for every 10% DDGS in the diet, carcass IV increases 2-4 points. A typical strategy is to restrict or remove DDGS in finishing diets from 180 lbs to market. Akey research has shown that reducing DDGS from 30% to 0% the last 60 d prior to slaughter reduced jowl IV by 3 points. Other strategies may include limiting use of DDGS, bakery, and fat in late finishing. Another commercially available technology is feeding conjugated linoleic acid (CLA) at the end of the finisher period to firm up carcass fat. However, CLA will have to dramatically decrease in cost in order to be a viable alternative in the commercial industry.

References available upon request.

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