Feeding canola meal to brown-shelled laying hens can result in the production of eggs with a fishy odor. Fishy-egg tainting is a nutrigenetic condition because both genetic and dietary factors must be present for egg tainting to occur. The purpose of this study was to characterize the inheritance pattern of fishy-egg tainting when hens are fed canola meal at levels reflecting maximum use based on conventional formulation of laying hen diets. Researchers concluded that fishy-egg tainting is recessively expressed when hens are fed canola meal at levels of 12 to 24% inclusion.

Previous research shows that when brown-shelled layers are fed canola meal (CM), some hens within the flock lay eggs with fishy taint. This fishy taint is caused by the accumulation of trimethylamine (TMA) in the yolk. Trimethalimine is produced by the bacterial fermentation of choline in the lower gut. Fishy egg tainting is a heritable condition caused by a single nucleotide polymorphism (SNP), a DNA sequence variation or mutation, in flavin-containing monooxygenase 3 (FMO3), rendering the hen unable to metabolize TMA into the nonodorous TMA N-oxide. Fishy-egg tainting is a nutrigenetic condition because both genetic and dietary factors must be present for egg tainting to occur.

The purpose of this study was to characterize the inheritance pattern of fishy-egg tainting when hens are fed canola meal at levels reflecting maximum use based on conventional formulation of laying hen diets. Researchers also wanted to examine the effect of two different choline sources, choline chloride compared to canola meal, on egg tainting. Choline, an essential nutrient for laying hens, is routinely added to laying hen rations but does not lead to the production of tainted eggs.

The study showed a significant response in yolk TMA concentration with the canola meal diets but not the choline chloride diets. Researchers concluded that fishy-egg tainting is recessively expressed when hens are fed canola meal at levels from 12 up to 24% inclusion. The recessive nature of the trait is highly advantageous for commercial breeding companies wishing to market hens that do not produce tainted eggs. They only need to remove the T allele from one, rather than both, parental lines in their crossbreeding scheme. They also concluded that choline chloride does not lead to the production of fishy-tainted eggs at typical commercial levels of inclusion.
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