The secret of the best foie gras

November 16 2011

Defying common sense, ducks that plump up less produce the finest foie gras — that rich, buttery French delicacy made from goose or duck livers and sometimes eaten as slices atop lightly toasted bread — scientists are reporting. The report appears in ACS' *Journal of Agricultural and Food Chemistry.*

Caroline Molette and colleagues explain that the luscious, smooth texture and buttery taste of foie gras, a traditional French dish, comes from its high fat content. "Foie gras" translates to "fat liver" in English. To make foie gras, geese or ducks are overfed large amounts of a wet mash of corn. Their livers balloon up to about 6-10 times their normal size and are packed full of fat. Heavier livers generally lose more fat when they are cooking (the sign of a bad foie gras), but this fact doesn't explain all of the differences in quality from one fatty liver to another. To find out why some livers retain fats during cooking while others don't, the scientists analyzed liver proteins in overfed ducks.

They found that higher quality livers came from ducks whose livers were still active, making and storing fats. However, lower quality livers came from ducks in a more advanced stage of a condition termed liver steatosis in which cells are struggling to cope with the high fat levels.

"These results are in agreement with practical observations showing that a reduced duration of over feeding improves the technological yield of duck fatty livers by reducing the fat loss during cooking," say the scientists.

More information: Identification by Proteomic Analysis of Early Post-mortem Markers Involved in the Variability in Fat Loss during Cooking of Mule Duck "Foie Gras" *J. Agric. Food Chem.*, Article ASAP. DOI: 10.1021/jf203058x

Abstract
Fat loss during cooking of duck "foie gras" is the main quality issue for both processors and consumers. Despite the efforts of the processing industry to control fat loss, the variability of fatty liver cooking yield remains high and uncontrolled. To better understand the biological basis of this phenomenon, a proteomic study was conducted. To analyze the protein fraction soluble at low ionic strength (LIS), we used bidimensional electrophoresis and mass spectrometry for the identification of spots of interest. To analyze the protein fraction not soluble at low ionic strength (NS), we used the shotgun strategy. The analysis of data acquired from both protein fractions suggested that at the time of slaughter, livers with low fat loss during cooking were still in anabolic processes with regard to energy metabolism and protein synthesis, whereas livers with high fat loss during cooking developed cell protection mechanisms. The variability in the technological yield observed in processing plants could be explained by a different physiological stage of liver steatosis.

Provided by American Chemical Society