Turning vegetable oil into a gel creates healthy hotdogs with good ‘mouth-feel’

What is this research about?
Excessive consumption of saturated fat (found in animal fat) is unhealthy and can lead to a greater risk of cardiovascular disease. Unsaturated fat (found in vegetable oils like canola, soybean, and flaxseed) is a healthier alternative. However, replacing solid animal fats with vegetable oils in foods like sausages and hotdogs can lead to unpleasant and rubbery textures.

A solution is to transform the liquid vegetable oils into a gel. A modified fiber called “ethylcellulose”, made from plant cell walls, can provide a framework for turning liquid oils into gels. The oil gel has the same amount of healthy fatty acids as found in the original liquid oil plus the extra benefit of some dietary fiber.

The goal of this research was to combine ethylcellulose with vegetable oils, creating a healthy hotdog with an appetizing texture.

Keywords:
Saturated fat, unsaturated fat, vegetable oils, hotdogs, texture, ethylcellulose, oil gels.

What you need to know: Healthier unsaturated fats, such as canola oil, can be changed into gels by adding a plant-based fiber called ethylcellulose. Changing oils into gels allows them to replace animal fat in foods like hot dogs and sausages so that the end product is similar in texture, but healthier.

How can you use this research?
Food researchers can use this research to develop other uses for oil gels (oleogels) that increase the amount of fatty acids in food products.
Food manufacturers can use this research to create healthier, appealing and marketable food products.
Governments can use this research to further the development of the production of safe and healthy food products.

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**What did the researchers do?**

Three different samples of oil gels were created using 90% oil (canola, soybean, or flaxseed) and 10% ethylcellulose. Canola oil gels were also made that differed in the amount of ethylcellulose added, the size of the ethylcellulose molecule, or in the ratio of ethylcellulose to thickeners added. The researchers tested the hardness and chewiness of the oil gels and pure vegetable oils by measuring the force needed to compress the gel or oil.

Finally, hotdogs were made with beef fat, canola oil, or canola oil gel. After cooking, the hardness and average fat droplet size in the hotdogs was measured.

**What did the researchers find?**

The strength or hardness of an oil gel made with ethylcellulose depends on three things. First, harder gels result from more unsaturated vegetable oils. In this research, canola produced the softest oil gel and flaxseed the hardest. Second, using heavier ethylcellulose molecules also led to stronger gels. Third, using more ethylcellulose increased the hardness of the gel produced.

The hotdog made with canola oil gel was very similar to the hotdog made with regular beef fat, except it was lower in saturated fat. They were similar in hardness, springiness, chewiness and how well they stayed together. Under the microscope, they also looked quite similar.

The hotdog made with regular canola oil was not similar to the other two. It was three times chewier than the hotdog made with regular beef fat and had a much finer texture.

The process of changing canola oil into a gel created a healthier hotdog that had a texture like the original beef fat hot dog.

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**About the University of Guelph researchers:**

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