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## **Kitchen Chemistry: The Science of Herbs and Spices**

FAITH LAPIDUS: This is SCIENCE IN THE NEWS a program in VOA Special English. I'm Faith Lapidus.

BOB DOUGHTY: And I'm Bob Doughty. Today, we will tell about herbs and spices, and some of their many uses.

(MUSIC)

FAITH LAPIDUS: People have been using herbs and spices for thousands of years. Generally, herbs come from the green leaves of plants or vegetables. Spices come from other parts of plants and trees. For example, cinnamon comes from the hard outer cover of cinnamon plants. The spice ginger comes from the part of the ginger plant that grows underground.

Some herbs and spices are valued for their taste. They help to sharpen the taste of many foods. Others are chosen for their smell. Still others were used traditionally for health reasons.

BOB DOUGHTY: Some herbs and spices may be gaining importance in modern medicine. For example, American researchers say red pepper could help people seeking to lose weight. They say this could be especially true for people who do not usually add spices to their food.

Researchers from Purdue University reported about the effects of red pepper in the journal *Physiology & Behavior*. They found that small changes in diet, like adding the pepper, may reduce the desire to eat.

FAITH LAPIDUS: The spice used in the study was dried and ground cayenne red pepper. Cayenne is a chili pepper. Most chili peppers contain capsaicin -- a substance that makes chili peppers hot. Other studies have shown that capsaicin can reduce hunger and burn calories, the energy stored in food.

Over six weeks, twenty-five people of normal weight took part in the study. Thirteen of them liked spicy food. The twelve others did not. The researchers decided how much red pepper each group would receive.

One and eight-tenths grams of the pepper was given to each person who liked spicy food. The others received three-tenths of a gram.

BOB DOUGHTY: The people who did not normally eat red pepper showed a decreased desire for food. That was especially true for fatty, salty and sweet foods.

Purdue University Professor Richard Mattes said the effect may be true only for people who do not usually eat red pepper. He said the effectiveness of the pepper may be lost if spices are normally part of a person's diet. He said further study needs to be done. The goal is to learn how long the effect of red peppers will last and how to extend the effectiveness.

(MUSIC)

FAITH LAPIDUS: The spice turmeric comes from a tropical plant common to India. Research involving turmeric is not new. Scientists have been studying its medical possibilities for many years.

For example, researchers in Singapore completed one such study several years ago. The study was based on earlier evidence that turmeric has strong antioxidant and anti-inflammatory qualities. These qualities can help protect against damage to the body's tissues and other injuries.

BOB DOUGHTY: The researchers said turmeric may reduce evidence of damage in the brains of patients with Alzheimer's disease. For this reason, the researchers designed a study that examined results from a mental-performance test of older Asian adults. The study involved curry, which contains turmeric.

The adults were sixty to ninety-three years old. None had severe memory losses. Those who sometimes ate curry did better on the tests than individuals who rarely or never ate curry. This was also true of those who ate it often or very often.

FAITH LAPIDUS: The work of the Mayo Clinic and its medical experts is world famous. In its Health Letter several years ago, the Mayo Clinic provided more evidence that herbs and spices can aid health. Its experts said spices could reduce salt use for people with health conditions like high blood pressure.

The experts said some plant chemicals are high in antioxidants. In addition to turmeric, these include cinnamon, ginger, oregano, sage and thyme.

The experts also said antioxidants like garlic, rosemary and saffron have qualities that could fight cancer. They also said limited evidence shows that cinnamon, fenugreek and turmeric may affect blood sugar levels in people with diabetes.

(MUSIC)

You are listening to SCIENCE IN THE NEWS in VOA Special English. With Bob Doughty, I'm Faith Lapidus in Washington.

BOB DOUGHTY: Cooking meat at high temperatures in the open air is a favorite activity of many Americans. But the country's National Cancer Institute warns that this kind of meat preparation creates heterocyclic amines, also known as HCAs.

Scientists say HCAs contain substances that probably can help cause cancer. These chemicals form when amino acids react with creatine, a chemical found in muscles. Meats from organs and non-meat protein sources have little or no HCA.

Research on HCAs has made some people afraid to cook meat on a barbecue grill. On a grill, the meat heats over coals or a gas or open fire. But studies have found that adding spices to meat before cooking at high temperatures may reduce harmful chemicals. This can be done by preparing a marinade and placing it on the meat before cooking. Marinades usually contain spices and herbs added to vinegar, wine or oil. This liquid mixture also softens the meat.

FAITH LAPIDUS: Researchers from Kansas State University experimented with marinades and meat in a study published in two thousand eight. The researchers placed some steaks in already prepared marinades.

The meat then was heated for five minutes on each side at a temperature of more than two hundred degrees Celsius. The researchers also cooked steaks marinated without spices, and steaks that were not marinated. They were prepared at the same temperature as meat with the marinade mixes.

The researchers compared levels of the HCAs in all the steaks. They found that the HCAs in the meat marinated in spices had decreased up to eighty- eight percent.

BOB DOUGHTY: Other unwanted substances, called PAHs, can be found in some meat cooked at high temperatures. The United States Centers for Disease Control and Prevention says these chemicals probably cause cancer. PAHs form when animal fat drops onto hot coals. The fat makes flames from the coals rise, leaving the PAHs on the meat.

Purdue University experts have a suggestion for preventing this. They advise people to use cooking tools that do not break the skin of the meat when turning it on the barbecue grill. And they say placing the meat in a marinade before grilling is helpful.

(MUSIC)

FAITH LAPIDUS: Herbs and spices are not used just to lessen unwanted chemical effects. They make food taste better. Some spices also destroy bacteria. Spices have long been used to keep food safe to eat. In the past, spices also helped to prevent the wasting away of dead bodies.

Herb and spice plants grow in many countries. For example, the Molucca Islands in Indonesia are famous for producing spices like cloves, nutmeg and mace. Vanilla comes from orchid plants growing in South America and other places with warm, moist weather.

BOB DOUGHTY: Spices have influenced world history. Ancient trade routes brought spices and silk to the Mediterranean Sea area beginning more than six thousand years ago. The Goth people of Europe defeated Roman forces in battle more than sixteen centuries ago. After the fighting ended, the leader of the Goths is said to have demanded five-thousand pounds of gold and three thousand pounds of pepper.

In later years, Marco Polo and Christopher Columbus discovered new lands while seeking to extend trade with spice-growing areas in Asia. The Italian cities of Genoa and Venice became powerful because they were at the center of the spice trade. The trade was so important to national economies that rulers launched wars in their struggle to control spices.

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FAITH LAPIDUS: This SCIENCE IN THE NEWS program was written by Jerilyn Watson. Our producer was June Simms. I'm Faith Lapidus.

BOB DOUGHTY: And I'm Bob Doughty. You can find transcripts, MP3s and podcasts of our programs at [voaspecialenglish.com](http://voaspecialenglish.com). And you can find us on Twitter and YouTube at VOA Learning English. Join us again next week for more news about science in Special English on the Voice of America.