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## Comparing plant teas made with alcohol or water Part 2: does it change how the plants act on fat cells?\*

### Purpose

This study looked at whether the healing plants have different effects on body fat if they are made into tea using water instead of alcohol (ethanol). It also looked at *how* the plants produce their effects. And it tried to find markers that would help us to identify plants that affect how much fat we store.

### Introduction

We know that being obese raises people's risk of getting diabetes. Yet one theory says that diabetes is partly caused by a person not being able to make *enough* fat cells to store all the calories they are taking in. Instead, some kinds of fats build up in muscle cells and the liver, and this helps create insulin resistance. According to this theory, things that help fat cells to grow and to store fats would actually help with diabetes. Some diabetes drugs--including Avandia--work by helping cells to store more fat.

In our earlier studies, we looked to see if the healing plants had effects on fat cells. In this one, we redid some of those tests, using plant teas made with water, and with ethanol. We wanted to see if the plants had different effects depending on what they were steeped in.

### Effects on how fat cells grow and store fat

First, we tested all 17 plants using plant tea made with ethanol. We found that ten of the plants helped cells store more fat. This is similar to what we saw in our

earlier studies. This is a good effect, because it can make cells accept insulin more easily.

Two plants had the opposite effect: they kept fat cells from reproducing. This too might be a useful effect, as it could help people keep their weight down.

Next, we did the same tests using plant teas made with water. This time, only three of the plants helped cells store fat — and they didn't do it as well as before. And the two plants that kept fat cells from reproducing, when plants were steeped in ethanol, had no effect when steeped in water.

### How do the plants work?

Fat storage involves many different stages and actors. We chose five plants, and found clear links between how strongly each plant affected fat storage and how much it influenced three specific actors. This tells us something about which actors the plants use to produce their effects.

### Looking for “markers” of plants that lowers sugar levels

Finally, we “fingerprinted” all the plants. This “fingerprint” is a picture of the many different ingredients that are in the plant. Then we used statistics to see if there is something recognizable in the fingerprints of the plants that affect fat storage. We think the results show that plants in the heath and pine families have some ingredients in common—a sort of family resemblance. We think these common ingredients are the ones the plants use to help cells store fat.

The same thing applied to the two plants that keep fat cells from reproducing (speckled alder and balsam poplar). They too seemed to have some ingredients in common. In this case, the ingredients would be ones that fight fat.

## Some thoughts about the results

This study showed us that it makes a big difference whether you make a plant tea using ethanol or water. Most of the plants that helped cells store fat when made into tea with ethanol did not work when made with water.

In this study, Labrador tea and sheep laurel both held lots of promise for helping cells store fat and accept insulin more easily. These plants might be good to use instead of western diabetes drugs, or along with them. But first we would need to see if they still have strong effects when made into tea the way the elders do it.

Many plants are known to fight fat. In our earlier tests using ethanol teas, balsam poplar and speckled alder both fought fat in lab tests. Further, balsam poplar also had fat-fighting effects in live mice. But in this study, we found that both plants lost their fat-fighting action when brewed in water. It seems that the plants' fat-fighting ingredients dissolved more readily in ethanol than in water. But we think lots of things could change this result—like how long we boil the water, how much plant material we use, and whether we use lake water or distilled water. In future, we need to take a closer look at exactly which ingredients in the plants are the active ones, and what they dissolve in.

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\* This is a plain-language version of an article by Nan Shang, Lina Musallam, Ammar Saleem, Brendan Walshe-Roussel, Alaa Badawi, Alain Cuerrier, John Arnason, and Pierre Haddad, called “Comparative cellular and molecular effects of ethanol and hot water extracts of several Canadian medicinal plants of Cree Eeyou Istchee on adipocyte lipid homeostasis.” (Version of August 1, 2013)