



Do Sweet Acorns Still Need To Be Leached?

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INTRODUCTION

The question posed by the title of this article is non-nonsensical. It is comparable to asking do beans grown by Leprechauns need to be soaked. Just as there are no beans grown by Leprechauns (at least to my knowledge), there are no sweet acorns. This persistent wild food myth has been dealt with by several authors. There are acorns that do not taste bitter, but there are no acorns that actually taste sweet. I've eaten the acorns of oaks from the east and west coasts of North America, as well as species native to Europe. None were sweet. Even species from far away that are referred to as sweet in the literature, such as the holm oak (*Quercus ilex*) of northwestern Africa, was scored as moderately bitter by researchers who didn't realize they were supposed to be sweet (i.e., by objective tasters). Given that there are no sweet acorns, let us examine the latter part of the original question.

Do all acorns need to be leached? If you are interested in maximizing the nutrition received from this food, the answer is yes (and I'll explain why below). If you rarely, if ever, consume acorns and don't care a great deal about nutrition, the answer would be different. The problem for humans (and for other-than-human persons as well) is that all acorns contain *phytochemicals* (i.e., plant compounds) that function as *antinutrition*. Please note the word "all" in the previous sentence. There are no acorns that don't contain antinutrients. These compounds include tannins and phytic acid. Though they are different compounds, both chelate with minerals in our digestive tract, which means they bind to the minerals and prevent their absorption. Therefore, the consumption of unprocessed acorns reduces the amount of calcium, iron, magnesium, potassium, zinc, etc., that we receive in our diet. These minerals are critical to our health, and reducing the already low amounts of mineral nutrition that most people receive is a poor nutritional strategy. In fact, a recently published article that examined archeological remains of paleo humans living in a cave in Morocco demonstrated (without the authors realizing it) that the consumption of unprocessed acorns was highly detrimental to the dentition of the people - there was extensive tooth loss, and approximately 50% of the observed teeth showed evidence of dental caries.

THE ANTINUTRIENTS

Tannins are large, water-soluble, phenolic compounds that are found in many plant organs. Though they have some benefit to human health (they can function as antioxidants), they also can be detrimental when consumed

in excess due to their protein-precipitating and mineral-chelating abilities. Many people interested in wild food are aware that the species of oak whose acorns taste bitter and feel astringent in the mouth contain tannins. However, those same people are not always aware that all acorns contain tannins (I know I'm repeating myself, but it bears a second mention). Even acorns from the white oak group (*Quercus* section *Quercus*), which possess relatively mild tasting acorns, usually possess significant amounts of tannins. For example, northern red oak (*Quercus rubra*), a member of the black oak group (*Quercus* section *Lobatae*) and familiar to many people of the eastern United States and adjacent Canada, has bitter and astringent acorns with 8.6% tannins (this figure the mean of two published reports). Eastern white oak (*Quercus alba*), a member of the white oak group, has mild tasting and only slightly astringent acorns with 4.4% tannins (this figure the mean of four published reports). Anyone who has tasted these two acorns raw will realize that while eastern white oak has approximately ½ the tannins of northern red oak, it does not taste half as bitter - it is much less bitter. The tannins are "concealed" from our palate (to an extent) in the white oak group (for reasons that no author has yet fully elucidated). To further push this point, mountain chestnut oak (*Quercus montana*), also a member of the white oak group found in the eastern United States, has been measured with up to 10.4% tannins in its acorns, meaning it is the most tannic acorn found in the northeastern United States (based on available published measurements). Yet, it does not taste as bitter, nor is it as astringent, as northern red oak, with a maximum tannin content of 9.8% in its acorns (again, based on available published measurements). Raw acorns of the white oak group taste less bitter and feel less astringent in the mouth than acorns from the black oak group almost regardless of their actual tannin content. The point of this entire paragraph is: just because it does not taste bitter and does not feel astringent, that does not mean the acorn in question lacks tannins and is appropriate to consume without processing.

Phytic acid is a storage form of phosphorous in seeds (phosphorous is an important mineral for germinating plants). Phytic acid, which is found in acorns and other nuts, grains, legumes, and achenes, is another antinutrient that is capable of chelating with dietary minerals. Therefore, phytic acid, like tannins, makes minerals unavailable to the body (and those mineral pass through the system without being absorbed). Additionally, phytic acid can interfere with enzymes we need to digest our food, such as amylase (for carbohydrates), pepsin (for



Acorns of burr oak (Quercus macrocarpa). Despite being a relatively mild tasting and weakly astringent acorn, this fruit was nevertheless still processed with soaking (often with wood ash) by many Native Americans that consumed it.

proteins), and trypsin (also for proteins). Therefore, it is important to limit our intake of phytic acid so that we do not experience mineral deficiencies and inhibit digestion of food. It is worth noting that most foods commonly eaten in the United States today that contain phytic acid have not been prepared in a way to minimize the levels of this antinutrient.

Given that acorns (again, all species) contain two important antinutrients, tannins and phytic acid, are they safe to eat at all? This question is easily answered. Considering that acorns have been consumed (even cherished as a staple) by indigenous and traditional cultures in North America, Europe, Africa, and Asia, it stands to reason that this food is not detrimental to human health. Multiple anthropological studies have demonstrated that hunter-gatherers around the world have lived relatively free of the frequent chronic diseases seen today in affluent countries. These diseases include diabetes, cardiovascular disease, neurological diseases, cancer, periodontal disease, and obesity (among many others). Further, as Weston Price documented in his work, hunter-gatherers obtained significantly more nutrition from their diets and, as a result, could produce healthy and well-formed children (i.e., children with broad faces who had mouths large enough for

all of their teeth to emerge). Given that some California natives obtained as much as 50% of their yearly calories from acorns, without experiencing harm, and producing children with uncrowded dentition, we can infer from direct observation that acorns can be a part of a healthy, nutrient-dense diet - but not in their raw form.

TRADITIONAL PROCESSING

If we examine the preparation used for acorns by Native Americans, we see that they employed several different techniques to minimize antinutrient concentrations in this wild food. Most indigenous people of this continent employed leaching and/or soaking. With both of these methods, water (sometimes with the addition of wood ashes) was used to extract tannins and deactivate phytic acid. Technically speaking, leaching extracts phytochemicals intact (so the water must be discarded), whereas soaking deactivates phytochemicals (so the water does not need to be discarded). In this case, acorns contain two separate phytochemicals, one of which, the tannins, is extracted intact (i.e., chemically reactive), so the water must be discarded. With soaking, an endogenous enzyme, called phytase, is enabled, which deactivates phytic acid (i.e., it is not chemically reactive anymore). The level of

deactivation of phytic acid is dependent on the length of time a food is soaked and the content of phytase within the food.

What is very important to point out is that Native Americans frequently leached and/or soaked acorns from the white oak group (i.e., the ones that many people today consume raw). For example, California white oak (*Quercus lobata*) was leached by the Kawaiisu of southeastern California. Burr oak (*Quercus macrocarpa*) was leached with water and the ashes of American linden (*Tilia americana*) by the Dakota of the northern plains. Eastern white oak was soaked in water with wood ashes and then simmered to remove the lye by the Menominee of the Great Lakes region. This list of white oak group species and Native American groups is highly abbreviated. The point is that wild people, those who still retained their dietary wisdom, processed even the mild tasting acorns (not just those that were highly bitter and astringent). Through soaking and leaching, they minimized the amount of tannins and phytic acid, creating a nutritious staple.

Despite what is commonly reported in foraging books and on websites, acorns, even those that are mild tasting, contain tannins and phytic acid. Similar to other nuts, grains, legumes, and achenes, acorns should be processed using traditional methods to remove or deactivate antinutrients. One of the most efficient ways of properly

preparing acorns and preserving most of the nutrition is to grind the acorns into flour (the finer the texture, the better the leaching will progress) and allow an extended soaking process in cold water, changing the water the water twice a day (morning and night). For many members of the white oak group, this process can be accomplished in a few days (it can take one to two weeks for most members of the black oak group). Though there are several methods of effectively leaching acorns (some much faster than what was briefly presented here), the one described above is one of the easiest and creates the most nutritious product (this method is described in *Ancestral Plants* (Haines 2010, published by Anaskimin, Southwest Harbor, ME) and is demonstrated in detail at <http://www.youtube.com/watch?v=QitkIGNwUgs>).

If you are someone who simply doesn't want to take the time to properly prepare acorns (like many who have become accustomed to rapidly prepared, though nutritionally poor, meals), I encourage you to at least roast them. Roasting is a quick manner of reducing the phytic acid concentration of seeds/fruits (though it also destroys the enzyme responsible for deactivating phytic acid - called phytase - so additional soaking will be ineffective). Roasting is one of the least useful methods for dealing with phytic acid, but it is better than doing nothing. Mild tasting acorns can be roasted in an oven, cooked in a skillet, and even



Cold-leached acorn flour. This ball of acorn flour from northern red oak (*Quercus rubra*) has undergone soaking and leaching to remove and deactivate the antinutrients that were present in the raw nuts. It is now ready to be used in food preparation.

baked in a pit. Though there are many methods that will work, relatively lower temperatures - approximately 77 degrees C (170 degrees F) - may offer the most benefit because this temperature would not cause damage to the polyunsaturated fatty acids found in the acorns (oxidized fats are very detrimental to human health and contribute to cardiovascular disease).

NUTRITION

After extensive discussion of the phytochemicals found in acorns that operate to limit our intake of nutritional elements, a brief discussion of the beneficial components of acorns is in order. Acorns vary widely in their macronutrient, micronutrient, and mineral profile. Generally speaking, the acorns of the white oak group are higher in carbohydrates, whereas those from the black oak group have a more even mix of carbohydrates and lipids. Of particular interest is that oleic acid, the same healthful monounsaturated fatty acid found in olive oil, is one of the primary lipids found in acorns. As much as 65% of the total lipids in acorns may be oleic acid (olive oil is about 75% oleic acid). Acorns range from 3–9% protein. Though not extremely high in protein, what is present is complete (i.e., contains all eight essential amino acids that humans cannot manufacture within their bodies). Acorns are an appreciable source of some minerals, depending on the species and the soils they originate from. Calcium, phosphorus, and potassium are some of the minerals that have been reported in appreciable amounts in acorns (however, the bioavailable levels would be severely diminished if the acorns are consumed raw). Finally, several B-complex vitamins are also found in acorns.

CONCLUDING REMARKS

The fruit of oak trees represents one of the most misunderstood and poorly utilized wild foods in North America. All of the misinformation serves only to limit the use and usefulness of this wonderful tree nut. The people of European descent who now inhabit this continent have, for the most part, a decided dislike of bitter foods. As a result, they have mistakenly assumed that the Native Americans sought out less bitter acorns. Ethnobotanical literature suggests otherwise - size and availability were factors of primary importance. Anyone who harvests significant amounts of acorns and understands the chemical profile of this food will realize there are several advantages to acorns in the black oak group. Reasons for their preferred status include: (1) the fact they can be harvested for a longer period of time (i.e., they don't germinate in the fall shortly after they land on the ground), (2) they dry quicker and thus require less time to reach a stable state where they can be stored in a traditional manner, (3) they are higher in lipids, making them a more balanced food that does not generate elevated blood glucose levels, and (4) they do not mold as easily during slow food processing methods. Because acorns of the white oak group still need

to be leached/soaked, this is not an advantage for gathering fruits of this group (though with some species, the amount of time needed for processing is shorter). Given that indigenous people, some of who relied on acorns as an important staple in their diet, processed most all acorns (not just the bitter tasting ones of the black oak group), it stands to reason that anyone consuming acorns in an appreciable amount should follow suit and emulate the practices of those who had more vibrant health than we experience today.



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