

Umami is key to making a plant-based Christmas dinner taste like Christmas, says researcher

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Charlotte Vinther Schmidt in the kitchen at Department of Food Science. Credit: Bettina Illemann Larsen

How do you combine plant-based foods to bring out the flavors of Christmas? A food engineer and Ph.D. from the University of Copenhagen has experimented in Gastro Science Lab. Boosting of umami taste is key.

Meat will be the focal point of most families' Christmas feasts this year. In Danish homes, duck, goose or roast pork typically share the plate with caramelized potatoes, [red cabbage](#), pickled veg and brown sauce.

But what if you want to swap the duck or pork out with something plant-based this year? Or, perhaps there will be a vegetarian guest or two at the Christmas table? There can be many reasons to find alternatives to the Christmas classics. Can you do so without abandoning the flavors of Christmas?

Food scientist Charlotte Vinther Schmidt, postdoc at the University of Copenhagen at Department of Food Science serves up a suggestion. Her research focuses on exploiting the umami taste potential of sustainable foods.

Several things are crucial in developing the "flavors of Christmas" in plant-based fare. One of the most important, according to Charlotte Vinther Schmidt, is for dishes to have enough of the fifth basic taste—umami.

Umami and the creation of Christmas flavor

"Meat is known for its powerful umami taste. If you plan on doing away with meat in your Christmas dinner, you can boost the umami taste of the plant-based ingredients by umami synergy, and in doing so, bring umami taste to [food items](#) that don't normally taste of umami," says Charlotte Vinther Schmidt, who does just that in her alternative Christmas menu suggestion.

Scientifically, the taste of umami occurs when the free amino acid glutamate is present in food. Charlotte Vinther Schmidt explains that the umami synergy principle makes it possible to enhance the umami taste of glutamate significantly, important for the overall deliciousness when you look out to decrease or leave out meat entirely:

"You can achieve the umami synergy effect by combining foods with glutamate with foods that have a high content of specific other substances called nucleotides. While nucleotides don't give off umami taste per se, they boost the umami taste greatly when combined with glutamate in the same mouthful. A general rule of thumb is that 1-part glutamate + 1-part nucleotides gives an umami taste intensity equivalent to 8 parts glutamate."

We are familiar with this effect from famed 'pairings' like champagne and oysters, ham and cheese, and bacon and eggs.

Furthermore, Charlotte Vinther Schmidt suggests that—to keep the flavors Christmassy—one can make use of traditional yuletide ingredients that aren't animal based, like red cabbage, cranberries and spices such as cloves, cinnamon and allspice.

"Overall, one should think about what makes a classic Christmas dinner taste so good; for example, what basic taste are present, what textures, what aromas? By dividing the meal into subcomponents like this, you can recreate it in another meal using completely different ingredients. Doing so will deliver the same food properties and stimulate the same senses and secure the overall deliciousness and satisfaction of the meal," says the researcher.



Charlotte Vinther Schmidts Christmas dinner meal. Credit: Bettina Illemann Larsen

Charlotte's Christmas menu

Charlotte Vinther Schmidt has put together a plant-based Christmas dinner based on the principles above. The meal includes:

- Sweet and umami tasting miso potatoes—Baked layered yellow and [sweet potatoes](#) in light miso, yeast flakes, cloves and allspice.
- Fried oyster mushrooms with caramelized onions and beets in red wine
- Fresh Christmas salad of finely sliced cabbage, endive, chopped apples and fresh sunflower shoots served with a dressing with

clementine juice, light miso and walnut oil, topped with roasted walnuts and cranberries.

"The first component on the plate is a reimagined, 'umamified' version of caramelized potatoes. The umami synergy occurs when the glutamate-rich miso interacts with the touch of glutamate in potatoes and yeast flakes, the latter which contain both glutamate and nucleotides. The spices help to evoke classic Christmas aromas," says Charlotte Vinther Schmidt.

The second component of the dish is whole shallots and sliced beets simmered in the extract from vegetables and red wine.

"The unique thing about the onions is that when cooking their extract contains a number of so-called kokumi peptides, which give mouthfeel and continuity which is enhanced by umami taste from the fried oyster mushrooms which contain both glutamate and nucleotides and are very umami in taste. Together with the onions which caramelize and become sweeter—they giving rise to our two basic taste cravings, sweetness and umami," says the researcher.

The frying of the mushrooms, such as oyster mushrooms, at high dry heat will develop so-called Maillard aromas which can further improve perceived [umami taste](#). These aromatic substances are triggered in a chemical reaction between free amino acids and sugars when food is browned, an aroma that we know from freshly baked bread or seared meat.

The final component is a fresh red cabbage, endive and apple salad dressed with clementine juice and a light miso paste, that contributes both Christmas ingredients and freshness to the dish.

The entire dinner takes between 60-90 minutes to prepare.

Shopping tips

Charlotte Vinther Schmidt composed the dish based on the criterion of seasonal ingredients being used.

"If you are focused on eating as sustainably as possible, the rule of thumb is to eat what's in season in whichever country you find yourself. But It's not just about local products. Because, even though you can buy Danish tomatoes in winter, they are grown in energy intensive greenhouses that need to be heated," Charlotte Vinther Schmidt points out.

The most 'exotic' element of Christmas dishes is the soya bean paste miso, originally from Japan. Miso can be found in many large supermarkets and Asian grocers, but Charlotte Vinther Schmidt emphasizes that Danish producers have also come on the market that miso is produced using local ingredients.

More information: Full recipes: [science.ku.dk/english/press/ne ...
tmas Recipes CVS.pdf](https://science.ku.dk/english/press/news/2022-12-umami-key-plant-based-christmas-dinner.html)

Provided by University of Copenhagen

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