

Sauerkraut

In search of a sixteenth century ferment



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Introduction

Sauerkraut, translated from the German as ‘sour’ or ‘acid’ cabbage, is a dish that has existed for many centuries (Fallon and Enig 9). It refers to a common food, which takes shredded cabbage and preserves it through the process of lacto-fermentation. Although evidence of the existence of fermented cabbage in sixteenth century Germany as a foodstuff exists (Adamson 8), an actual recipe for the tangy dish has yet to be unearthed. Nonetheless, through the study of ingredients, tools and processes available during this time, it is possible to extrapolate a recipe that could have existed.

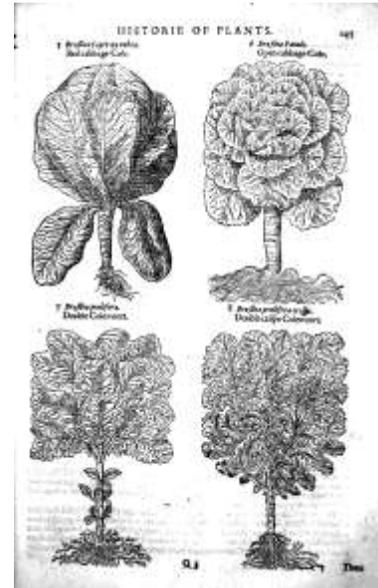
The Research

Cabbage in History

The most important ingredient of sauerkraut is Cabbage. This hearty vegetable, is an old one, growing wildly alongside prehistoric man, surviving well into the early modern period, and becoming a common food on sixteenth century tables. In the book *Food in History*, Historian Reay Tannahill asserts that members of the cabbage family existed as far back as prehistoric times (11). By the first century AD, Romans planted and cared for the vegetables in their gardens. Pliny the Elder devotes several chapters to cabbage in his multi-volume work, *The Natural History*. Centuries later, it was a common vegetable throughout Germanic regions. According to Tannahill, cabbage was a mainstay of the German, Polish and Hungarian diets in the early modern period (244). Adamson concurs, asserting that cabbage was eaten three to four times per day by Bavarian commoners (8). Germanic cookbooks, from the early modern period,

confirm this assertion with recipes and preparations of the vegetable ¹. Marx Rumpolt lists several preparations of the vegetable in his *Ein New Kochbuch* of 1581, as does Sabina Welserin in her cookbook in 1553.

Now that it is evident that the cabbage was a common vegetable in sixteenth century Germany, it is important to explore what types of cabbages existed. In 1597 in his *History of Plants*, John Gerarde, illustrates and describes several varieties of cabbage, including savoy, curly, red, and white (245-247). In the painting *Market Woman with Fruit, Vegetables, and Poultry*, Joachim Beuckelaer paints tightly headed type of cabbage similar to the light green cabbage available in modern grocery stores, as well as a darker, more loosely headed type similar to a Napa cabbage. Furthermore, Adamson explains that headed cabbage was favored in Germany, and was the type preferred for making sauerkraut (8). Based on these findings, it is plausible that the properties of the cabbage varieties existing in the period have not changed much and are similar to those readily available today.



Fermented Cabbage in History

The fermentation of cabbage into sauerkraut made its way into Germany from China, by way of Eastern Europe and was an established

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tradition by the sixteenth century. According to Sally Fallon, founding president of the Weston A. Price foundation and Mary Enig, PhD., Master of the American College of Nutrition, man has long capitalized on the benefits of fermentation. Fermentation is a naturally occurring process and fermented vegetables, including cabbage are mentioned throughout history. They report that the Chinese fermented cabbage as long as six thousand years ago (93). Then, according to Klaus Kaufmann and Annelies Schoneck, Genghis Kahn brought salted fermented cabbage over to Eastern Europe in the twelfth and thirteenth centuries (9). This is supported by Dembinska's assertion that the medieval Polish peoples ate cabbage year round, preserving it for use in winter through fermentation (24). This method of preparing sauerkraut using salt and fermentation made its way through Eastern Europe and into Germany (Kaufmann and Schoneck 9) and was a popular dish among the common people in early modern Germany (Adamson, Food in Medieval Times 8). This assertion is supported by references from the period including Marx Rumpolt, head cook to the Elector of Mainz, who lists seven different recipes calling for sauerkraut as an ingredient in his 1581 cookbook *Ein New Kochbuch*². Furthermore, Merry Weisner Wood notes that, according to period ordinances, women are noted as selling sauerkraut in stands they owned in the Nuremburg market (10). According to Mark Kurlansky, the fermented vegetable was so popular in early modern Alsace (a French region, bordering Germany that is culturally similar), that by the sixteenth century, there was an entire trade called *surkrutschneiders* (literally sauerkraut tailors) dedicated to the making of it (128).³ These contemporary references confirm that sauerkraut was a dish that was eaten in sixteenth century Germany.

² A rich text transcription is available online at <https://www.staff.uni-giessen.de/gloning/tx/rumpcast.htm>.

³ For an interesting discussion about the possibility that making sauerkraut was a trade that supplied kitchens with the product is the reason that no recipes are known to exist, see Stefan's Florilegium <http://www.florilegium.org/?http%3A//www.florilegium.org/files/FOOD/pickled-foods-msg.html>

The Science Behind Fermented Cabbage

Although sauerkraut existed in sixteenth century Germany, a contemporary recipe has yet to be found. However, the science behind the process is law and leaves little to chance. Furthermore, there are references from other places and times that explain how it was made and can be used as a basis to be used to create a recipe.

Before refrigeration and pasteurization, several methods of food preservation existed, including fermentation. Defined as the chemical breakdown of a substance by a microorganism, the evidence of this inevitable transformation is evident in many early modern food and drink products including, beer, wine, mead, cheese, cured meat and of course fermented vegetables. The process that works to preserve these vegetables is lacto-fermentation. According to Fallon and Enig, “lactic acid is a natural preservative that inhibits [the growth of] putrefying bacteria (89).” This acid occurs as a byproduct when the bacteria *lactobacilli* break down the sugars and starches of the vegetable. Because these bacteria exist naturally and in great number on all vegetables (Fallon and Enig 89), the process of lacto-fermentation is bound to happen.

This inevitable process can be controlled and manipulated through modification of the environment in which the vegetables are fermented. The two most important factors one can use to encourage the *lactobacilli* include the addition of salt and the removal of oxygen. Sandor Ellix Katz, Fermentation expert, affirms this in his book *Wild Fermentation*, stating “the main difference between vegetables left to rot and those destined for...fermentation is usually salt (38).” Not only does the mineral protect against undesirable bacteria, but it also serves to encourage the growth of the *lactobacilli*. The amount of salt needed is variable and will affect how quickly it ferments as well as how sour it tastes and how crunchy it is. While it is entirely possible to ferment without salt, care must be taken, as too much can stop the process entirely.

Even more important than the use of salt is the protection of the vegetables from oxygen during the anaerobic process. If oxygen is introduced to the vegetable ferment, it can cause the growth of mold or yeast and it will be ruined. Oxygen can be kept away from the vegetables, by assuring they are submerged in a liquid. The liquid can be wine or water, but a salt brine provides the best of both worlds (Katz 42).

This process was not a mystery to medieval man as there are also some descriptions in history about the process used to make sauerkraut. According to Fallon and Enig, in 50 AD, Pliny the Elder describes two processes for making sauerkraut. In the first method, he describes sealing shredded and mashed cabbage into large earthenware containers, covering with salt and leaving it to change. The second, called *compositor*, involved covering mixed vegetables and herbs, with salt water (93). Dembinska quotes Mikolaj Raj, a medieval Polish writer of the sixteenth century, describing a method of making sauerkraut, “Having removed the outside leaves of some nice heads of cabbage, cut them in half and fit them neatly into a vat, spreading beet chard and dill between the layers (Qtd. in Dembinska 24).” Although these are not specific to Germany, it does show that the processes of salting cabbage and leaving it to ferment was a known method prior and during the period in question.

The Practical Application

Observations

In doing this project, I experimented with several different batches using different salts and salt levels, and during different ambient temperatures. I was completely unhappy with the first batch as it didn't taste like I would expect a sauerkraut to taste, instead it tasted like tsukemono (a milder Japanese fermented cabbage). After some research, I determined it was the

fact that the sea salt that I used was supplemented with iodine. I then went out and found some unadulterated French sea salt and it made a huge difference in the taste. I also experimented with the size of salt grind as well as the amount in order to come up with the recipe above. When I decided on a final recipe, that is when I used the Alpine salt. Furthermore, out of pure chance, another thing I noticed is that the larger cabbages seemed to produce a more flavorful sauerkraut. I also experimented with how the salt was added to the ferment. I tried mixing the salt and cabbage together before pouring the mixture into the fermenting vessel, I tried covering the cabbage with the salt and I tried mixing the salt with the cabbage and pressing it with my hands until it produced a brine. I had the best experience with the latter method as it meant the ferment started out covered with the brine. Lastly, I had started ferments at different times of the year, and so the temperatures of the environment varied from the sixties up to over one hundred degrees Fahrenheit, and this did have an impact on the time it took for the fermentation process to be completed. All told, I did six different ferments and the final four are included in Appendix B.

Recipe

Ingredients

5lbs Cabbage: Since this was started in October, I chose to use the white cabbage variety since it is a headed cabbage and bears a resemblance to the period paintings referenced and it was in season.

3 Tablespoons Salt: I used Alpine Salt, imported from Austria. This salt is mined from the Bavarian and Austrian Alps. This sea salt has been within the mountain for over two hundred fifty million years and most likely would be the salt used in sixteenth century Germany.

Equipment

Earthenware or glass vessel: I used a clear glass container for the fermentation so that I could see the changes to the mixture as it fermented. In period, a ceramic jar would have been used.

A fabric cover: I used a small circle of linen cut to the size of the jar opening.

Weight: I used a smaller jar filled with water because I wanted to ensure that it was sterile. In period, rocks would have been used.

Process

First shred the cabbage. I found that cutting it up into long shreds made for a better texture to the final project.

Next, place a quarter of the cabbage in a bowl and sprinkle it with a quarter of the salt. Knead it with your hands until the cabbage begins to release its liquid. Pour into the glass container. Repeat this process until you have gone through all the cabbage and salt. Make sure to fill the container only about two thirds full as the amount of brine will increase as well as expand and bubble during fermentation and you want to avoid it spilling over. Place a second shallow container under the glass container to catch any spillover.

Cover the cabbage with fabric and then weigh it down with a rock or a closed jar weighted using water.

Check the sauerkraut within 24 hours to make sure it is completely submerged in the brine. If not, prepare a salt brine and add to the cabbage until it is completely covered. Replace the fabric and the rocks.

Set aside and check periodically to make sure that the cabbage is still completely submerged in the brine. Watch for bubbles to come up through the brine as this is the evidence that fermentation is happening. In about 3-5 days, depending on temperature and salt content,

the kraut should be done fermenting and the bubbles should have ceased. At this point, it should be cured in the refrigerator for another 3 weeks in order to allow the flavor to develop.

Conclusion

Although no surviving recipes for sauerkraut exist, based on written references coming directly from the period, it was a food known in sixteenth century Germany, and a recipe can be extrapolated based on the science and short ingredient list. This was an incredibly interesting experience; from doing the research, to the experimentation and to enjoying the final product, I learned about the science behind what makes a fermented vegetable work. I love the sharp, salty tang with a hint of sweetness that comes from a basic recipe. It is now a staple food in our household and will continue to be.

Appendix A- Rumpolt Recipes

117. Chopped sour kraut is also not bad/ when it is cooked/ then one mixes it with sour cream and butter.

The fourth course.

Wild Boar cooked in a pepper sauce / A sauerkraut boiled with a smoked bacon / and dry sausages / and also with roasted capons and chickens.

The first course for the early meal/ on a meat day

A sauerkraut cooked with smoked bacon/ and with old chickens.

The third course for the early meal/ on a meat day.

A cooked sauerkraut/ and with smoked bacon and laid with bratwurst.

The third course for the early meal/ on a fast day.

A sauerkraut with boiled dry salmon/ and fried fish/ and roasted fish on the cabbage/ everything dressed in a dish,

35. Pike prepared in sourkraut. Take sourkraut/ that has whole heads/ carve it nicely coarse/ set it on (the fire) with a cabbage broth/ and let simmer.

14. Strained peas well larded/ and given warm on the table/ pour sour kraut with vinegar around it/ an sprinkle with salt. Like this they enjoy eating this on the Rhine river (in the Rhine valley).

Saur Kraut with a boiled hen / and smoked bacon / is not bad to eat

Appendix B: Notes on Experiments

Specimen A

Date	Temp AM	Temp PM	Notes	Bubbles Present?	
10/2		70		No	
10/3	65			no	
		70		yes	
10/4	70			yes	
		71		Yes-slow	
10/5	66		Very salty and cabbagey, crunchy	Yes slow	Added water
		70	Starting to change from green to white	Yes	
10/6	68			Yes	
		73		Yes	
10/7	65			At touch	
		75	No more green color	At touch	
10/8	65		Salty, crispy, crunchy, slightly sweet, sour	At touch	Added water
		72		At touch	

Specimen B

Date	Temp AM	Temp PM	Notes		
10/2		70		No	
10/3	65			No	
		70		No	
10/4	70			Yes	
		71	Change in color	Yes	Lots of scum
10/5	66		Salty, crunchy cabbage	Yes slow	Added water
		70	Almost completely white	yes	
10/6	68			Yes	
		73	No more green in color	Yes	
10/7	65			At touch	
		75		At touch	
10/8	65		Salty, crispy, crunchy, slightly sweet, sour	At touch	Added water
		72		At touch	

Specimen C- Pickling salt

Date	Temp AM	Temp PM	Taste notes		
10/2		70		No	
10/3	65			No	
		70		No	
10/4	70			Yes	
		71	Change in color	Yes	Lots of scum
10/5	66		Salty, crunchy cabbage	Yes slow	Added water

		70	Almost completely white	yes	
10/6	68			Yes	
		73	No more green in color	Yes	
10/7	65			At touch	
		75		At touch	
10/8	65		Salty, crispy, crunchy, slightly sweet, sour	At touch	Added water
		72		At touch	

Specimen D- German mined salt and Final Product

Date	Temp AM	Temp PM	Taste notes	Bubbles?	Observations
1/28		79	Some of the salt still had not dissolved. That is the dark spot in the picture		
1/29	76	79	Had an overflow of liquid. Very slight change in color	yes	
1/30	73	76		yes	
1/31	73	76	Big loss in color. Scummy bubbles on top. Another overflow of the liquor.	yes	
2/1	74	78	Bubbles have slowed considerably	Yes, at touch	
2/2	73		Bubbles have stopped, no movement even when touched. Kraut covered and placed in fridge	none	

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