

## CHAPTER 1

# Making Kimchi

There are a lot of websites and books about making Kimchi. So why am I adding my two cents worth? Mainly because a lot of the places I have looked for information were written by folks who have done Kimchi all their lives, and don't quite understand the fear and trepidation felt by the average Westerner, who likely believes that if you leave anything out of the fridge for more than an hour it will instantly kill you if you eat it.

Koreans eat Kimchi for breakfast, lunch and dinner. They often have a pot of it fermenting out on the porch, and a special refrigerator just to keep the Kimchi stock. When I told one Korean woman how much I appreciated "probiotic vegetables" she screwed up her face and laughed. "That makes it sound so *weird!*" she said.

On the other hand, most Americans live in great fear of bacteria. We've been told that food should never stay at room temperature: "Keep hot food hot, and cold food cold!" is the mantra. Most of us have had food poisoning once or twice, so the mantra seems reasonable enough. We know you can die from botulism, which is caused by anaerobic bacteria growing in home-canned jars. We know you are not supposed to eat anything in a jar if gas escapes when you open the lid. So the concept of purposefully putting raw cabbage in a jar and eating it when it is fizzy with gas seems rather suicidal!

The problem is, that Kimchi is not at all suicidal, nor even dangerous. It is a lot safer than home-canned food (which does in fact get botulism easily). Kimchi is amazingly healthy for you. I've had ongoing digestive problems from undiagnosed gluten intolerance, and my "Kimchi diet" has pretty much done away with any lingering symptoms<sup>1</sup>. Kimchi has a lot going for it:

- The probiotic bacteria in Kimchi will help kill off any bad bacteria and yeast that are colonizing your intestine.
- Kimchi is full of enzymes that help digest a meal.
- If you use garlic, red pepper, and ginger, those spices are also digestive aids and help with general health.
- All those good vegetables you use in Kimchi are uncooked, so they retain more of their vitamins and minerals. In addition, the bacteria *create* vitamins during the fermentation process.

Once I started eating Kimchi with my meals, I noticed that when I ate a meal without Kimchi, the meal would sit heavy and undigested in my stomach. So I would find myself running to get a dish of Kimchi. Instantly, I felt great! I have no idea what causes this reaction, but I've been told the same story by a number of other people. It may be that Kimchi causes the acid to secrete more digestive enzymes or digestive acid.

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1. Note that eating Kimchi does NOT mean you can eat gluten, or casein, if you are intolerant to them! But it will help heal your gut from lingering damage.

But, you might say, what if I do it wrong? Isn't it still dangerous to make?

I asked myself the same question, and did some research. I asked some Koreans if they ever got sick from "bad Kimchi" and they looked at me like I was crazy. I did searches for botulism from Kimchi. As near as I can tell, making Kimchi is really a safe bet. It might be possible to get the wrong mix of bacteria in the batch, but if that happens, it is likely to smell very, very bad, or get moldy or slimy. If the correct bacteria grow, then the mix will get quite acidic, and the combination of acid plus live lacto bacilli is pretty deadly to any bad bacteria. In fact, if you eat Kimchi with a meal, you are more likely to fight off bad bacteria that may be in the meal, making it less likely you will get food poisoning.

The tricks to getting the good bacteria to grow have been learned by Kimchi and Kraut makers over the past thousand years or so, and verified by microbiologists. The secrets are:

- **Salt.** Salt is the main ingredient in lacto-fermentation that gets the right bacteria to grow. You need just the right amount. Lacto-bacteria don't mind a little salt, so a little salt will let them grow and inhibit the rest. Too much salt though, and no bacteria will grow. Salt also helps prevent mold.
- **Acid.** Lacto-bacilli don't mind acid at all, and they secrete a lot of it. Adding a little acid (Kimchi juice from the last batch, or vinegar) will help ensure success. Acid kills mold too. The Koreans do not traditionally add any acid though, and they have good success: I use it for insurance.
- **Good bacteria.** Cabbage happens to contain the right bacteria, living in the cabbage. So do some other vegetables, but cabbage seems reliable in this respect. Adding some Kimchi juice from the last batch, or half a cup of whey, is another way to ensure there are enough good bacteria present to drown out any bad ones. Also, even though lacto-bacilli are all over the place, some of them create a tastier product than others, and the ones in cabbage have a good flavor.

If you follow the recipe given here, it is very likely your Kimchi will turn out fine on the first try. Actually I've never had this kind of fermented veggie not work -- I had a batch of beets once, with no cabbage, that got some mold on it, but that was the worst. However, to be on the safe side, always smell the product before you eat it. If it smells bad, don't taste it!

## A note on terminology

"Kimchi" is what Koreans call their pickled vegetables. The process that is used is "lacto fermentation," and in fact it is used by most cultures, including our own. In times past, the pioneers made "pickles" using a process similar to the one used by the Koreans, and these processes are still used in Europe, Africa, China, Japan, Indonesia, and probably everywhere else too. In America, the refrigerator and home canning have taken over in recent years, but our "lacto fermented vegetables" used to be called "pickles" or "kraut" and they came in many varieties. Modern pickles, though, are almost never lacto-fermented, they are just cucumbers stuck in vinegar.

Recently, science has discovered that the bacteria involved in lacto-fermenting is really, really good for people. So, the market being what it is, we have discovered how to package those bacteria into pills, and the market for "probiotics" was born. Other people have been marketing "probiotic vegetables," which are a much tastier way to get those bacteria, and you get some nice enzymes and vitamins too.

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However, the Koreans have been making Kimchi for a long, long time, and to my mind they it down to a science. We have a wonderful local Korean store where I can buy ingredients such as bulk sea salt for a good price, so my “pickles” have mainly traditional Kimchi ingredients. Plus “Kimchi” is a lot easier to say, and sounds more appetizing, than “probiotic vegetables.” However, the instructions here can be used for pickles using any ingredients you like: the lacto bacteria really, really, don’t care about your nationality.

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## How to make Kimchi

### Step 1. Gather the Ingredients

The first step in making Kimchi is to decide what vegetables you want. I always include napa cabbage. You can ferment most vegetables, but if you have napa cabbage also, it seems to be a lot easier and more foolproof.

The mix shown here is my favorite. Going clockwise, it includes napa, carrots, daikon radish with lots of greens, broccoli, garlic (a whole package of it!), ginger, and green onions.

Another good mix is napa, par-boiled green beans, and sweet peppers.



You can also include apples, pears, persimmons, pine nuts, and sesame seeds. Korean Kimchi often includes raw squid, shrimp, mussels or fish also. Radish greens are surprisingly good, as are any greens. Green beans are good but should be parboiled. About the only thing that might not be good is raw potatoes.

The container shown here is a plastic bucket I got at a Korean store. It is very useful for mixing Kimchi -- you need a big bowl that will put up with a lot of salt. I used to use a big stainless bowl, but it was cheap stainless, and the salt started etching holes in it.

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## Step 2. Salt the cabbage



The next step is to salt the cabbage. Tear some of the bigger leaves off the outside of the cabbage and salt them. These will be used as a top layer over the kimchi as it ferments. Then cut the cabbage lengthwise into quarters, then sprinkle salt between the leaves.

Alternatively, you can soak the cut cabbage in salt water, with a mix of 1 cup salt to 10 cups of water.

The salt needs to be sea salt or kosher salt, so that it does not have iodine or anti-caking ingredients. Iodine has a harsh flavor, and in some circumstances can turn things black. The anti-caking powder floats to the top of the Kimchi juice and looks like mold.

You can get sea salt at a Korean store in large bags for a very reasonable cost

Soak the cabbage for a few hours or overnight, until it is wilted. This process kills some of the bacteria on the surface of the cabbage, which may not have the best flavor, and helps “jump-start” the fermenting process.

It does not matter much if you use too much salt. After the cabbage is done salting, rinse all the salt off the cabbage. The cabbage will have absorbed some of it, so it will taste a little salty still.



### Step 3: Cut up your ingredients



Next, cut up your ingredients. Traditionally, Kimchi is not cut up into very small pieces, but this is a matter of taste.

I like my pieces about an inch long, except the carrots, which are grated, and the garlic and ginger, which are cut into tiny pieces.

For a milder relish though, I use very tiny pieces, almost like sauerkraut, with green beans (par-boiled), sweet peppers, and dill. The issue here is aesthetics: the bacteria don't care.

### Step 4: Add spices

At this point you need to decide what spices you want. In this batch I used:

- Two handfuls of sesame seeds
- A handful of Korean red pepper
- A half cup of finely-chopped ginger
- A sprinkling of salt and sugar
- 2 cups of salted shrimp, run through the blender
- Some Kimchi juice from the last batch

#### *A note on red pepper*

Korean Kimchi usually uses a *lot* of red pepper. Red is considered a lucky color, it is considered to be healthy, and it acts as a preservative. But it is not required to make the Kimchi turn out well, and in fact “White Kimchi” has no red pepper. You can use any spices you like, or no spices at all. Some people prefer the taste of dill (then the Kimchi tastes like dill pickles), or coriander, or juniper berries, or rosemary. Really, experiment and see what you like the best!

Keep in mind that the red pepper used in Kimchi is somewhat milder than a lot of red pepper you might buy in the store. It more like paprika than like cayenne. Be careful to moderate the amount of pepper based on how hot you want the finished product.

Also keep in mind that using ginger and garlic contributes to the “bite” of the finished product. Ginger in particular is rather spicy! I like the taste of it, and it helps digestion, but start out with just a little bit.

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### *Salted shrimp*

One of the typical Korean ingredients in Kimchi is salted shrimp or anchovies. They really do add a nice flavor, though the process is a bit weird for Westerners. Something about a jar of tiny shrimp or fish is rather unnerving. You don't need these to make good Kimchi, however.

The shrimp come in a jar, usually labelled "salted shrimp" in the refrigerated section of a Korean store. They are just tiny shrimp in salt, that is all. Pulverize a cup or two in the blender and add them to your Kimchi. The anchovies come in a jar too. Boil them in water, then strain them to remove the bones, and add to your mix.

You can use dried shrimp or anchovies instead, if you want. Or leave out this ingredient altogether.

### *Kimchi juice*

I always add a bit of juice from the last batch of Kimchi, to "jump start" the process, and/or a bit of vinegar. Again, this is not required. But it helps ensure a good result, by making the solution a bit acidic and adding the right bacteria.

### *Salt and sugar*

The amount of salt is very important, but Kimchi is also very forgiving. I just taste the mix at this point -- it should taste a little salty. If it does not, add some salt. Some people make probiotic vegies without salt, by using whey or starter to make sure the process gets going, but I think it is better to just use the salt.

I also add a little sugar. Sugar feeds the bacteria and will probably make the mix more bubbly and sour -- there will not be any sugar left when the Kimchi is ready. However, it is not required at all.

## **Step 4. Mix**

Next, you just mix everything up good. It is helpful to wear gloves at this point: the salt and spices are rough on the hands.



### Step 5. Mash

The purpose of this step is to get some of the juices out of the veggies, so there won't be air spaces. Oxygen in the mix can cause mold.

Now when the Kimchi starts to ferment, gas will be produced, but that gas will be CO<sub>2</sub> which does not promote mold.

Here I'm pounding the Kimchi with a dowel. You can pound it all you want -- it does not get mushy from pounding. Another method is to add water to fill the air spaces, by using 2 tablespoons of salt per quart of boiled/cooled water.



### Step 7. Place in your fermentation vessel



The next step is to put your veggies in their fermentation container. I use a Harsch crock usually, and do the pounding step right in the crock as you can see above. Kimchi isn't very particular about the container though. You can use a glass jar, plastic or steel container, or even a plastic bag! Plastic isn't recommended because of leaching and maybe taste issues though. Harsch crocks are nice because they have a water lock on top which seals in the smells and seals out air and flies.

The main thing you want to avoid, whatever vessel you choose, is air. When the cabbage hits the air, if there is oxygen in the air, the cab-

bage will mold. Now, if you use a jar and it isn't completely sealed, that is ok, because CO<sub>2</sub> is heavier than air and it will fill the jar, forcing the oxygen out. As an added precaution, you can fold a couple of big salted cabbage leaves over the top, and give those leaves a bit of added salt on top. You can also put a clean

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rock or jar filled with water on top of the cabbage leaves to hold them under water. In this picture you can see the cabbage leaves on top of the Kimchi, waiting for the stones.



Here is the same batch, with the Harsch crock stones. Note how the liquid from the pounded cabbage comes up over the stones.

Now in this batch not all the Kimchi would fit in the Harsch crock, so I put the rest in a Mason jar. Then I put the lid on a little loosely, so gases can escape. The problem with Mason jars is that, if the mixture produces too much gas and the lid is too tight, the jar can explode.

You can't quite see it well in this picture, but a leaf of cabbage is folded over the top and salted.





Another kind of jar you can use is a wire-top jar, sometimes called “French canning jars” (though these were made in Italy). They are available online. A nice thing you can do with these is shown on the left -- instead of using the wire clasp to close it, I just wound a rubber band around the edge. That way, the rubber band can stretch to let out gasses if the pressure gets too great.

The container on the right is mostly liquid. I like to make extra liquid, which I use instead of vinegar in cooking.

### **Step 8. Ferment**

Now just let your Kimchi sit for about 2 days. The longer it sets, the more sour it will get, but 2 days seems to be the usual amount of time. Then put it in a refrigerator. It will continue to ferment and age in the refrigerator.

Different sets of bacteria are active depending on the temperature of the process. That is, there will be a different mix at household temperature than in the fridge. If you leave Kimchi out too long, the vegies will lose their crunch and get mushy. Traditionally, Kimchi is made out on the porch or buried in the earth, where the temperature is about 50 F degrees.

If you use traditional Kimchi spices, with lots of garlic, your Kimchi will really smell up the house if your container isn't closed. The Korean Kimchi pots aren't closed really, so they usually make it out on the porch, and it is pungent! If you use a Harsch crock or a semi-closed jar, as shown above, you won't have that issue -- but if your container doesn't close well, you might consider letting it ferment in the garage.

### **Step 9. Enjoy!**

Now you have enough Kimchi to last, oh, at least a month, depending how addicted you are! Kimchi keeps indefinitely in the fridge, but it might get too sour or mushy to be enjoyable. At that point, it is good for making soup or stir-fry.

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## What can go wrong

### Mold

Mold is the commonest problem with making probiotic vegies. The main cause is having air contact the vegies. Salt and acid help prevent mold, and keeping the vegies submerged.

### Slime

If the wrong bacteria get going, you can get slimy vegetables. I've never had this happen with cabbage, but I've heard of it when people are fermenting just carrots. The cure would be using a starter culture (Kimchi juice or whey) and/or more salt.

### Flies

The little tiny "vinegar flies" just love fermenting vegetables. In the old days, they commonly laid eggs and their larvae hatched into the broth, and the little wiggles were called "vinegar eels." Today we just consider this gross, so you need to make sure the container is fly-proof.

### Mush

If you allow things to ferment more than two days at room temp, sometimes they get mushy. This can also happen with an unfortunate mix of bacteria. Cabbage Kimchi seems to not do this easily, but when I tried making pickles from cucumbers they got mushy spots. Using a lower fermenting temperature would be a way to avoid this. Also, when you store Kimchi, I'm told it keeps better if you drain the liquid from it. Once it is sour, it does not mold or spoil easily.

### Off Taste

The taste depends largely on the mix of bacteria growing in the Kimchi. When it is first ready to eat, after 2 days, it still may not taste as good as it does after a week "ripening" in the fridge. The taste may vary a bit from batch to batch too, depending on the fermentation temperature, how long you salted the cabbage, how much salt you used, and other spices.

However, if it smells *bad*, then don't taste it. It should smell cleanly acidic (and if you used Korean spices, then it will also smell like ginger and garlic and pepper!). If it smells like garbage, then the wrong bacteria are growing. I've never had that happen though.

### Food poisoning

So far I've never met anyone who actually got sick off Kimchi. It is theoretically possible, however. It is a good idea to keep raw chicken and beef away from the mix, and keep your hands and work tools clean. Do NOT heat or otherwise try to sterilize the Kimchi before putting it in the fridge: the living bacteria are what protects it and helps it keep so well.

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I have met a couple of people with multiple chemical sensitivities who react to Kimchi. These people also react to a lot of other foods, and we never could quite figure out what it was in the Kimchi that bothered them. However, when you ferment a food, lots of organic compounds are created. Most of them are good for you, and they are compounds that are also created in your gut when you digest foods, but if you have a chemical sensitivity they might be a problem.

