

The Weston A. Price Foundation

Lacto-Fermentation

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It may seem strange to us that, in earlier times, people knew how to preserve vegetables for long periods without the use of freezers or canning machines. This was done through the process of lacto-fermentation. Lactic acid is a natural preservative that inhibits putrefying bacteria. Starches and sugars in vegetables and fruits are converted into lactic acid by the many species of lactic-acid-producing bacteria. These lactobacilli are ubiquitous, present on the surface of all living things and especially numerous on leaves and roots of plants growing in or near the ground. Man needs only to learn the techniques for controlling and encouraging their proliferation to put them to his own use, just as he has learned to put certain yeasts to use in converting the sugars in grape juice to alcohol in wine.

The ancient Greeks understood that important chemical changes took place during this type of fermentation. Their name for this change was “alchemy.” Like the fermentation of dairy products, preservation of vegetables and fruits by the process of lacto-fermentation has numerous advantages beyond those of simple preservation. The proliferation of lactobacilli in fermented vegetables enhances their digestibility and increases vitamin levels. These beneficial organisms produce numerous helpful enzymes as well as antibiotic and anticarcinogenic substances. Their main by-product, lactic acid, not only keeps vegetables and fruits in a state of perfect preservation but also promotes the growth of healthy flora throughout the intestine. Other alchemical by-products include hydrogen peroxide and small amounts of benzoic acid.

A partial list of lacto-fermented vegetables from around the world is sufficient to prove the universality of this practice. In Europe the principle lacto-fermented food is sauerkraut. Described in Roman texts, it was prized for both for its delicious taste as well as its medicinal properties. Cucumbers, beets and turnips are also traditional foods for lacto-fermentation. Less well known are ancient recipes for pickled herbs, sorrel leaves and grape leaves. In Russia and Poland one finds pickled green tomatoes, peppers and lettuces. Lacto-fermented foods form part of Asian cuisines as well. The peoples of Japan, China and Korea make pickled preparations of cabbage, turnip, eggplant, cucumber, onion, squash and carrot. Korean kimchi, for example, is a lacto-fermented condiment of cabbage with other vegetables and seasonings that is eaten on a daily basis and no Japanese meal is complete without a portion of pickled vegetable. American tradition includes many types of relishes—corn relish, cucumber relish, watermelon rind—all of which were no doubt originally lacto-fermented products. The pickling of fruit is less well known but, nevertheless,

found in many traditional cultures. The Japanese prize pickled umeboshi plums, and the peoples of India traditionally fermented fruit with spices to make chutneys.

Lacto-fermented condiments are easy to make. Fruits and vegetables are first washed and cut up, mixed with salt and herbs or spices and then pounded briefly to release juices. They are then pressed into an air tight container. Salt inhibits putrefying bacteria for several days until enough lactic acid is produced to preserve the vegetables for many months. The amount of salt can be reduced or even eliminated if whey is added to the pickling solution. Rich in lactic acid and lactic-acid-producing bacteria, whey acts as an inoculant, reducing the time needed for sufficient lactic acid to be produced to ensure preservation. Use of whey will result in consistently successful pickling; it is essential for pickling fruits. During the first few days of fermentation, the vegetables are kept at room temperature; afterwards, they must be placed in a cool, dark place for long-term preservation.

It is important to use the best quality organic vegetables, sea salt and filtered or pure water for lacto-fermentation. Lactobacilli need plenty of nutrients to do their work; and, if the vegetables are deficient, the process of fermentation will not proceed. Likewise if your salt or water contains impurities, the quality of the final product will be jeopardized.

Lacto-fermentation is an artisanal craft that does not lend itself to industrialization. Results are not always predictable. For this reason, when the pickling process became industrialized, many changes were made that rendered the final product more uniform and more saleable but not necessarily more nutritious. Chief among these was the use of vinegar for the brine, resulting in a product that is more acidic and not necessarily beneficial when eaten in large quantities; and of subjecting the final product to pasteurization, thereby effectively killing all the lactic-acid-producing bacteria and robbing consumers of their beneficial effect on the digestion.

The lacto-fermented recipes presented in *Nourishing Traditions* are designed to be made in small quantities in your own kitchen. They require no special equipment apart from a collection of wide-mouth, quart-sized mason jars and a wooden pounder or a meat hammer. (For special sauerkraut crocks that enable you to make large quantities, see Sources in the back of *Nourishing Traditions*.)

We recommend adding a small amount of homemade whey (recipe on page 87 of *Nourishing Traditions*) to each jar of vegetables or fruit to ensure consistently satisfactory results. Whey supplies lactobacilli and acts as an inoculant. Do not use commercial concentrated whey or dried whey. You may omit whey and use more salt in the vegetable recipes, but whey is essential in the recipes calling for fruit.

About one inch of space should be left between the top of your vegetables with their liquid and the top of the jar, as the vegetables and their juices expand slightly during fermentation.

Be sure to close the jars very tightly. Lacto-fermentation is an anaerobic process and the presence of oxygen, once fermentation has begun, will ruin the final product.

We have tried to keep these recipes as simple as possible without undue stress on ideal temperatures or precise durations. In general, a room temperature of about 72 degrees will be sufficient to ensure a lactic-acid fermentation in about two to four days. More time will be needed if your kitchen is colder and less if it is very warm. After two to four days at room temperature, the jars should be placed in a dark, cool spot, ideally one with a temperature of about 40 degrees. In days gone by, crocks of lacto-fermented vegetables were stored in root cellars or caves. A wine cellar or small refrigerator kept on a "warm" setting is ideal; failing that, the top shelf of your refrigerator will do. Lacto-fermented fruit chutneys need about two days at room temperature and should always be stored in a refrigerator.

Lacto-fermented vegetables increase in flavor with time—according to the experts, sauerkraut needs at least six months to fully mature. But they also can be eaten immediately after the initial fermentation at room temperature. Lacto-fermented vegetable condiments will keep for many months in cold storage but lacto-fermented fruits and preserves should be eaten within two months of preparation.

Some lacto-fermented products may get bubbly, particularly the chutneys. This is natural and no cause for concern. And do not be dismayed if little spots of white foam appear at the top of the pickling liquid. They are completely harmless and can be lifted off with a spoon. The occasional batch that goes bad presents no danger—the smell will be so awful that nothing could persuade you to eat it. The sign of successful lacto-fermentation is that the vegetables and fruits remained preserved over several weeks or months of cold storage.

Lactic-acid fermented vegetables and fruit chutneys are not meant to be eaten in large quantities but as condiments. They go beautifully with meats and fish of all sorts, as well as with pulses and grains. They are easy to prepare, and they confer health benefits that cannot be underestimated.

Scientists and doctors today are mystified by the proliferation of new viruses—not only the deadly AIDS virus but the whole gamut of human viruses that seem to be associated with everything from chronic fatigue to cancer and arthritis. They are equally mystified by recent increases in the incidence of intestinal parasites and pathogenic yeasts, even among those whose sanitary practices are faultless. Could it be that in abandoning the ancient practice of lacto-fermentation and in our insistence on a diet in which everything has been pasteurized, we have compromised the health of our intestinal flora and made ourselves vulnerable to legions of pathogenic microorganisms? If so, the cure for these diseases will be found not in vaccinations, drugs or antibiotics but in a restored partnership with the many varieties of lactobacilli, our symbionts of the microscopic world.

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About Sally Fallon and Mary G. Enig, PhD

Sally Fallon Morell is the founding president of the Weston A. Price Foundation and founder of A Campaign for Real Milk. She is the author of the best-selling cookbook, *Nourishing Traditions* (with Mary G. Enig, PhD) and the *Nourishing Traditions Book of Baby & Child Care* (with Thomas S. Cowan, MD). She is also the author of *Nourishing Broth* (with Kaayla T. Daniel, PhD, CCN).

Mary G. Enig, PhD, FACN, CNS, is an expert of international renown in the field of lipid chemistry. She has headed a number of studies on the content and effects of trans fatty acids in America and Israel and has successfully challenged government assertions that dietary animal fat causes cancer and heart disease. Recent scientific and media attention on the possible adverse health effects of trans fatty acids has brought increased attention to her work. She is a licensed nutritionist, certified by the Certification Board for Nutrition Specialists; a qualified expert witness; nutrition consultant to individuals, industry and state and federal governments; contributing editor to a number of scientific publications; Fellow of the American College of Nutrition; and President of the Maryland Nutritionists Association. She is the author of over 60 technical papers and presentations, as well as a popular lecturer. She is the author of *Know Your Fats*, a primer on the biochemistry of dietary fats as well as of *Eat Fat Lose Fat* (Penguin, Hudson Street Press, 2004). She is the mother of three healthy children.

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