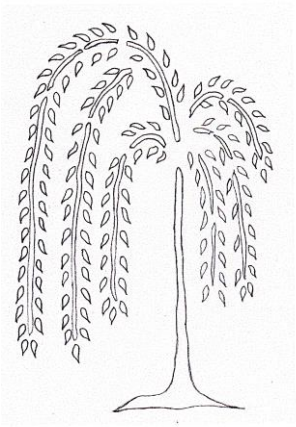
Sourdough Bread



Wheat flour naturally contains bacteria and fungi that vary according to the geographical region in which the wheat was grown. A typical sample of flour contains approximately 5 to 10 thousand bacteria and 300 fungal cells per gram and some fraction of these organisms are helpful in the production of naturally leavened bread because they provide both flavour and carbon dioxide that allows the bread to rise

There are about 1500 species of wild yeast and many have properties that are useful in food production. The baker's yeast that you can buy in the supermarket is a mono-culture of Saccharomyces cerevisiae and is used because during respiration it produces unusually large volumes of carbon dioxide. Under ideal conditions this yeast can metabolise its own weight of glucose in one hour and reproduce itself in an hour and a half!

Bacteria also have an important role to play in food production. In particular, some of the 180 species of lactobacillus are used in the production of dairy products such as yogurt, cheese and in fermented products such as salami, vinegar and sauerkraut. They generate acetic and lactic acids that enhance the keeping qualities of the food and provide flavour

When baking naturally leavened bread we do not add baker's yeast but instead press into service the bacteria and yeasts that are naturally present in the flour. By mixing the flour with water we can encourage the bacteria and yeasts to grow into a frothy mixture known as a starter. Over a period of several days any unwanted bacteria and yeasts die because the lactobacillus acidify the mixture and encourage the desired yeasts to grow. Problems with new starters that smell or start to bubble and then go flat are likely due to unwanted Leuconostoc bacteria that are the first to grow in the neutral PH of a new starter

The exact composition of each naturally developed starter is complex and may contain several types of yeast and a dozen types of lactobacillus. However the dominant yeast is usually Candida milleri and the dominant bacteria is often Lactobacillus sanfrancisensis. These particular organisms have an advantage because they form a stable partnership. This strain of yeast can metabolize all the sugars in the flour with the exception of maltose and, significantly, this strain of lactobacillus cannot metabolize sugars other than maltose and so the two organisms do not compete for food and form a symbiotic relationship. In addition this particular yeast prefers the acidic environment provided by the lactic and acetic acids excreted by the lactobacillus. Finally, the lactobacillus generates an antimicrobial compound that kills many competing organisms but fortunately has no effect on Candida milleri.

Bread baked using a natural starter generally has a more complex flavour than a loaf made with bakers yeast. The lactic, acetic acids and other more complex acids provide a sour note while the many alcohols, esters and carbonyls provide volatile flavour compounds.

Charles