



# CHINESE STEAMED BREAD

Steamed bread is a popular staple food in many parts of China. A host of variants exist that are eaten for breakfast or as a snack between meals. Consumers expect a large volume, a near-to-white surface, a fine crumb structure and a symmetrical shape. Besides the recipe and the mode of preparation, the properties of the flour are extremely important for the quality of the end products. So it is especially important to give attention to the variables of the flour.

Chinese steamed bread is a fermented wheat flour product that is cooked by steam at atmospheric pressure. Steamed bread accounts for about 60% of total flour consumption in northern China and 20% to 30% in southern China. As the cooking temperature is much lower than for bread baked in an oven, steamed bread is very different from baked bread. Steaming results in a thin, soft skin without a browning effect.

The common types of steamed bread weigh about 30 to 120 grams and are either pillow-like or round in shape. Unfilled

Steamed bread is a popular staple food in many parts of China. Photos courtesy of Mühlenchemie.

by Lutz Popper and Xuan Zhong

**This popular staple food in many parts of China is only as good as the flour used to produce it**

steamed bread is called “mantou.” The filled alternatives with vegetables, meat, bean paste etc., are called “steamed buns” or “baozi.”

#### RECIPES VARY BY REGION

There are three main types of steamed bread consumed in China: northern type, southern type (Guangdong), and Taiwan type. The traditional northern steamed bread has a very chewy and elastic bite. Southern-type steamed bread, which has long been popular as a “dim sum” item in Chinese restaurants, has

a softer texture and a sweeter taste. And Taiwan-type steamed bread is a combination of both, so it is less sweet than the southern type and less chewy than the northern type.

The formulas for Chinese steamed bread differ according to type. These are typical recipes:

**Typical steamed bread formulas (%)**

	Northern Type	Southern Type	Taiwan Type
Flour	100	100	100
Water	46-50	40-44	44-48
Yeast	0.8-1.2	0.8-1.2	0.8-1.2
Sugar	0.0	10-20	4-6
Salt	0-0.1	0	0
Shortening	0	2-5	4-6
Baking powder	0	0-1	0-1

### SPECIAL FLOUR FOR SPECIAL PRODUCTS

Flours used for making steamed bread have variable quality characteristics because each steamed bread type requires its own specific flour quality. The southern type requires soft wheat flour, and the northern and Taiwan types need medium-protein hard wheat flour.

Flour protein content affects the volume of the steamed bread. As the protein content is in the range of 6% to 11%, there is a positive correlation between steamed bread volume and protein content. However, if the flour protein is too high (more than 12.5%), the bread tends to shrink on the surface and takes on a dark color. If the flour protein is too low, steamed bread lacks a good bite and often becomes sticky.

Besides the protein content, flour ash content has been rated as one of the important steamed bread flour specifications because it has a negative effect on color and specks. Most flours for making steamed bread require an ash content of less than 0.45% (14% m.b.), but premium quality steamed breads are often made from flours with 0.4% or less ash (14% m.b.).

Within the ingredient source, the sugar addition level is very important for modifying steamed bread volume and texture. When a larger amount of sugar is used, the loaf becomes larger and has a softer texture. Not only does the use of shortening modify the texture of the bread, it also reduces the amount of water added in the formula. As in western bread making, an emulsifier improves the texture of the crumb and slows down starch retrogradation.

### FLOUR TREATMENT INCREASINGLY IMPORTANT

As the demand for flour with consistently high performance level increases, flour improvers – particularly oxidizing agents and enzymes – are steadily gaining importance.

Enzymes from microbial sources, e.g.  $\alpha$ -amylase, hemicellu-

lase, lipases and oxidases, improve the dough handling properties and result in a larger volume yield.

Some hemicellulases enhance the brightness by a physical effect: they result in a finer crumb structure, which reflects more light than a coarse structure with more “shadow zones.”

Lipase also improves the brightness by creating free fatty acids which are more easily accessible to flour lipoxigenase and oxygen, particularly when a dough sheeting step is included. In turn, the resulting hydroperoxides oxidize flour pigments.

### PREPARATION DEMANDS SKILL, INSTINCT

Traditionally, Chinese steamed bread was made at home by hand, and this is still the case in many parts of Asia. However, in the past two decades steamed bread has been mass produced as more and more people prefer the convenience of commercial products.

One of the key steps in making good quality steamed bread is controlling its proofing process. The degree of proofing affects the shape, color, texture and flavor of the finished products.

The proofing temperature and relative humidity determine the proofing time. A typical proofing temperature is 32-37 degrees C, with a relative humidity of 70%-80%. Proofing time is associated with flavor development and crumb structure. It also affects bread volume and spread.

Suitable mixing assists gluten development. Sponge fermentation affects product volume and flavor. Sheeting has a great impact on skin smoothness and crumb structure. And steaming gelatinizes the starch and influences appearance and eating quality.

### MINIMIZING FAULTS IN THE PRODUCTS

The sensitive production process often results in typical faults in the products, whether they are made by hand or industrially. The following is an overview of the most common defects in product quality, and possible ways of avoiding them:

**Problem:** Shrinkage and collapse.

**Possible causes:** Strong flour, dough under or over developed, steamer pressure too high, sprout-damaged wheat.

**Solution:** Select correct and sound wheat, well developed dough, correct steamer pressure, add lipase to improve stability and hemicellulase for extensibility. (e.g. Alphamalt LP&EFX series, Alphamalt HC series)

**Problem:** Surface cracks and break-up.

**Possible causes:** Hard dough, under-developed dough, proofer humidity too low.

**Solution:** Increase added water, control dough development, increase proofer humidity to prevent dry surface.

**Problem:** Blisters.

**Possible causes:** Soft dough, proofer humidity too high, over-proofing, water dripping on the skin, steamer pressure too high.



Shrinkage can be a problem in the sensitive production process of steamed bread.

**Solution:** Reduce added water, control proofer humidity, control proofing time, prevent water from dripping on the skin, reduce steamer pressure. Add lipase and emulsifier to improve dough stability.

**Problem:** Yellowish color.

**Possible causes:** High ash content, higher protein, wrong wheat type, poor dough development, over-proofing.

**Solution:** Reduce ash, use white wheat, well-developed dough, control

proofing time, add lipase and emulsifier (e.g. Alphamalt LP&EFX series, Tigerzym series, Mulgaprime).

**Problem:** Open crumb.

**Possible causes:** Under- or over-mixing of dough, over-proofing.

**Solution:** Optimum dough development, optimum proofing time, add lipase or emulsifier to improve dough stability and texture (e.g. Alphamalt LP&EFX series, Tigerzym series, Mulgaprime SSL 6).

**Problem:** Soft bite.

**Possible causes:** Low protein, over-proofing.

**Solution:** Reduce added water, increase flour protein, shorten proofing time, add ascorbic acid, azodicarbonamide or glucose oxidase (e.g. ELCO P-100K, Oxem, Alphamalt Gloxy series).

**Problem:** Gummy bite.

**Possible causes:** Low-protein flour, flour with low falling number, too much damaged starch.

**Solution:** Increase flour protein, use sound wheat, reduce damaged starch, add ascorbic acid (e.g. ELCO P-100 K).

**Problem:** Compact and/or small volume.

**Possible causes:** Not enough yeast, hard dough, under-proofing.

**Solution:** Increase yeast dosage, increase added water, extend proofing time, add alpha-amylase, lipase and hemicellulose (e.g. Alphamalt A 9085 F, Alphamalt HC series, Alphamalt LP&EFX series). **WG**

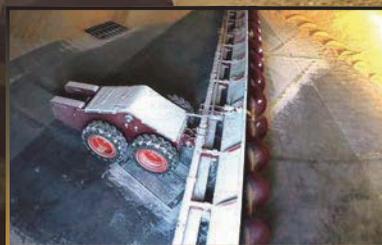
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