

Fresh Chicken Sausage – Formulation and Processing

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Introduction

With appropriate processing techniques and ingredient technology, poultry raw materials can be utilized to produce high-quality coarse ground sausages such as chicken bratwurst and those that contain dry fruits, herbs and nuts.



Raw Material

Chicken thigh meat has minimal value and is often sold as an export item by poultry processors in the United States. Use of thigh meat in specialty sausages allows for the production of high-quality coarse ground sausage and adds value to dark meat. Large sausage companies commonly use chicken or turkey thighs, drumsticks, and skin (natural proportion to the meat) to produce specialty chicken or turkey sausages. Smaller processors, who may only make chicken specialty sausages, often use chicken thighs, drumsticks, and skin, but they are also likely to use meat from other parts of the whole chicken.

Fresh Sausage

Fresh chicken sausage, such as bratwurst, can be made with chicken (usually thighs, preferably within 24 hours after slaughter, and chicken skin to the desired fat content). Other ingredients in the formulation include water, corn syrup, salt, potassium lactate, monosodium glutamate, natural flavors, flavorings, butylated hydroxyanisole (BHA), citric acid, and propyl gallate. To make this a clean label/natural product, the following ingredients can be used: chicken thighs (skin may be included depending on desired fat content), cane or turbinado sugar, sea salt, buffered vinegar, and natural flavors, such as rosemary, green tea, oregano, and their extracts.

- The salt and vinegar are the main antimicrobials with rosemary, green tea, or oregano providing additional antimicrobial effects at the concentrations used.
- Rosemary, green tea, and oregano are also used as antioxidants in the place of BHA and propyl gallate to preserve color and slow down lipid oxidation.

- Cherry powder could also be used in this formulation due to the antimicrobial and antioxidant properties from organic acids (ascorbic acid, citric acid, and malic acid) and phenolic compounds.
- The spice blend may include some of the following spices: salt, white pepper, black pepper, rosemary, sage, ginger, mace, and nutmeg. If salt is in the blend, it is important to make sure that the final sausage product has no more than 1.9% salt to limit salt's impact on product oxidation.
- The yeast extract provides a natural source of flavor enhancers, which serves the purpose that monosodium glutamate serves in the traditionally labeled product. Traditional and clean label formulations for chicken bratwurst are listed in Table 1.

Processing Steps (See Flow Diagram, Page 2)

The most important thing in sausage making is to keep everything cold. This includes the meat, grinder, mixer, casing, and stuffer.

1. Initial Grind: Grind chicken thighs and skin through a 12 mm or similar diameter plate. The skin and thighs should be very close to 0°C when grinding and should not exceed 4°C after grinding. It is common to put the meat in the freezer for 1-2 h prior to the initial grind so that the meat is firm when it goes through the grinder and remains as cold as possible. If not mixed with non-meat ingredients immediately, store the ground meat at approximately 0°C. Grind thighs and skin through the plate together or separately.

2. Mixing: After the initial grind, mix chicken meat and all non-meat ingredients in a paddle or ribbon blender for 2-3 min. Maintain meat temperature at 4°C or less. Determine the time of mixing by the amount of protein exudate on the meat surface. Ensure minimal protein exudate since it is a coarse ground sausage.

3. Second Grind: Grind the blended meat through a 3 mm or similar diameter plate to produce the sausage batter. Keep the batter as cold as possible to prevent fat from softening and smearing.

4. Stuffing: Stuff the sausage batter into natural (most likely hog casing at approximately 30 mm diameter) or collagen casing, preferably under vacuum. Treat the natural casing with a citric solution or similar antimicrobial solution to ensure low initial bacterial counts.

5. Freezing and Storage: Quickly freeze sausages at below -30°C to form small ice crystals, store frozen sausages for up to 6 months, and slack out when needed.

CONTINUED ON NEXT PAGE

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Table 1: General formulations for traditional and clean label chicken bratwurst.

Ingredient	Traditional formulation (%)	Clean label formulation (%)
Chicken thighs and skin	85 - 88	85 - 88
Water	3	3
Corn syrup solids	2	-
Salt	1.5 - 1.9	1.5 - 1.9 (sea salt)
Potassium or Sodium lactate	2	-
Cane or turbinado sugar	-	2
Buffered vinegar	-	2
Natural flavors	As needed	As needed
Natural flavors (spice blend)	> 2%	> 2%
Rosemary	0.2	0.2
Green tea, oregano, and their extracts	Optional	As needed
Cherry powder	Optional	0.1
Monosodium glutamate	As recommended by manufacturer	-
BHA, citric acid, propyl gallate	As recommended by manufacturer	-
Yeast extract	-	As recommended by manufacturer
Possible spices in the spice blend	Salt, white pepper, black pepper, rosemary, sage, ginger, mace, nutmeg	Salt, white pepper, black pepper, rosemary, sage, ginger, mace, nutmeg
Citric acid	As recommended by manufacturer	Natural ingredient containing citric acid

Chicken Processing Process Steps

