

**CHEESE
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Havarti Cheese Make

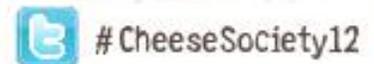


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Havarti is a creamy semi-firm Danish cheese, named after the farm where it was developed at the turn of the twentieth century. Havarti is a mild cheese, similar somewhat to Tilsit flavor, and is peppered with small holes and irregularities. The cheese has a distinctive flavor which develops on the tongue, and can pack a subtle punch. In addition to being sold plain in blocks, Havarti is often flavored with dill, caraway, cumin or other spices.



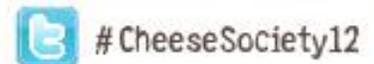
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As reported in the 2011 “Dairy Facts” by IDFA, Supermarket Sales of Havarti Cheese 2010 reported at 5.7 million pounds which represents an approximate 15% increase from prior year.

Prices average \$7.99 - \$8.77 per pound as compared to:

Mild Cheddar	=	\$4.46
Monterey Jack	=	\$4.19
Mozzarella	=	\$4.60
Gouda	=	\$6.99



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Havarti uses three main types of cultures:

- “ Lactococcus lactis subsp lactis – (acid production)
- “ Lactococcus lactis subsp cremoris – (acid production)
- “ Lactococcus lactis subsp lactis biovar diacetylactis – (acid/flavor/gas)
- “ Leuconostoc mesenteroides subsp cremoris – (flavor/gas)

These cultures produce a mild acid flavor with creamy and buttery notes. The combination of gas production and light pressing results in many irregular openings in the cheese appearance. Some aged Havarti may have a washed rind with a red smear added, similar to a Brick or Muenster style cheese.



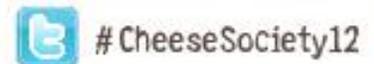
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Milk used is typically pasteurized and standardized to a fat content to achieve the desired FDB between 30-60% in the finished cheese.

- “ 30% FDB = 1.4-1.6% MF
- “ 45% FDB = 2.8-3.0% MF
- “ 60% FDB = 4.8-5.2% MF

The 60% FDB typically scores higher with consumer preference in both flavor and texture. Higher fat content can result in higher/longer cook due to moisture. Annatto color is added to achieve a richer, yellow appearance, especially for lower FDM makes.



Determining Time to Cut

There are two basic stages of coagulation that occur for rennet curd. These phases are:

1. **Enzymatic Phase** – This is the initial stage when the protease enzyme (rennet) cleaves the kappa-casein on the surface of the casein micelle. This action exposes the remaining micelle to the calcium ions present in the milk.
2. **Aggregation Phase** – this stage occurs after approximately 80% of the casein micelle has been cleaved and the micelles start to stick together due to the action of the calcium. This coagulation phase is when water, fat, mineral, lactose and whey proteins are trapped in the resulting curd.



Determining Time to Cut

Total rennet time is calculated by using a multiplying factor. For Havarti, the formula would be to multiply the time to reach the aggregation phase by 2.5 –3.0. This will provide the optimum total time of coagulation from time of rennet addition (ex: 13 minutes to reach aggregation phase x 2 = 26 minute rennet time before cut).

Monitoring flocculation to determine cut time helps address daily variances in milk quality (ie: Protein, TS, Acidity). Testing is done by using a flat tool that when dipped in the milk will show flocculation beginning.



New Brine Formula

Small Scale Brine –

As presented by Peter Dixon in Farmstead Cheesemaking Collection (2006)

For Every 10-11 pounds of brine solution add:

36 ounces salt

8.34 pounds water (1 gallon water)

1 Tbs Calcium Chloride (30% solution) or 10 grams dry powder

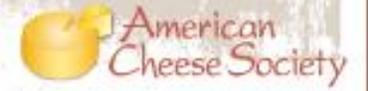
1.5 tsp white vinegar (5% acetic acid) to achieve a pH of 5.2



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