The Nib-grinding Process

Several steps are required to reach the particle size needed to produce liquor that is suitable for chocolate.

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THE BASIC INGREDIENT FOR THE production of chocolate is cocoa beans. These beans are first roasted and subsequently ground. Grinding transforms the solid particles of the beans (called *nibs)* into a liquid called cocoa liquor. The liquor grinding and refining process can be defined using the following considerations:

- Basic process line setup
- Quality parameters
- Principle of a ball mill
- Influences on process parameters

These parameters are important to obtain cocoa liquor that can be used for the production of chocolate and also cocoa powder.

BASIC PROCESS LINE SETUP

The goal is to make a liquid from solid roasted nib particles, which typically contain between 50 and 55 percent cocoa butter. This butter is encapsulated inside cell walls, forming small individual bubbles. By applying shear to these particles the cells break and the cocoa butter is released, turning the cocoa mass into a liquid. By applying more shear the particles will become smaller. In general, for liquor, the desired end fineness is 99.5% ≤75 micron, 0.5% wet sieve residue (WSR), measured on a 200-mesh (75 micron) screen.

One grinding step is not sufficient to reach this fineness; depending on capacity, three or more grinding steps are required. These grinding steps typically consist of the following:

- Coarse or pregrinding; the nibs are ground and transformed from a solid to a liquid
- Intermediate grinding; the coarse liquor is further refined
- Fine grinding: determines the end fineness and quality of the cocoa liquor

A flow schedule is shown in Figure 1.

Input Requirements

To produce liquor that is suitable for chocolate, input requirements must be formulated. These requirements indicate how the cocoa bean cleaning and roasting should be set up prior to the grinding process.

Typical requirements follow:

- Nibs, roasted, maximum moisture 1.75%
- Minimum fat percentage 50 to 55%
- Maximum shell content 1.5%
- Temperature after roasting approximately 158°F (70°C)
- Nib particles are quite big (3/8″, 1 cm) and solid

The above requirements are necessary to produce liquor that is suitable for producing chocolate. They prevent an excessive temperature increase during the grinding process, and minimize wear on the grinding system. ➤

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