

Chocolate Crumb— Dairy Ingredient for Milk Chocolate

INTRODUCTION

Milk chocolate crumb is a vacuum dried, crystallized mixture made from milk, sugar and cocoa liquor. If there is no cocoa liquor in it, it is called milk crumb or blokmilk. Both crumb products are used in large quantities as an ingredient for milk chocolate.

In the past the reason for its development was to give the milk a good shelf life up to 9–12 months at room temperature. This was achieved by the heat treatment during the process, the low moisture content of the product and the preservative components which are present in the cocoa. This enabled the chocolate manufacturers to

make use of cheaper milk and to build up stocks during the “milk flush” periods. But the use of crumb in chocolate is no longer determined by tradition, but there are other aspects that are more important. Using crumb, the manufacturing process can proceed more quickly and economically than by incorporating the separate ingredients as milk powder, sugar and cocoa liquor. Milk crumb has also a very special and characteristic flavor profile and this typical flavor is due to the crumb process.

In this paper an overview will be given of the most important dairy ingredients that are used for chocolate manufacturing. Then the different crumb processes are discussed in more detail, followed by the major processing parameters and the effects on the milk chocolate crumb.

MILK POWDER: SPRAY DRIED, ROLLER DRIED OR VACUUM DRIED

There are important differences between the several sources of dry milk considering the application in chocolate. They differ in the manufacturing process, the physical properties and the flavor of the milk product.

In the first place there are dried milk products that contain milk

solids only, for instance, full cream milk powder. The milk powder can either be spray dried or roller dried.

Spray Dried Milk Powder Characteristics

The process of spray drying is very gentle and results in a powder with a very milky and creamy flavor. There is no deterioration of the product and the reconstituted milk powder has almost the same organoleptic properties as the original fresh milk.

During the drying process the milk fat emulsion keeps its stability which results in a very low free fat content. The free fat content of full cream milk powder ranges from 1 percent to a maximum of 10 percent of the total fat content.

Because of the quick drying process the lactose has no time to crystallize, so it will be present in the amorphous state. Amorphous lactose is very hygroscopic and it will quickly take up moisture from the environment.

The powder consists of more or less globular particles and the surface of the particles is slightly porous.

Due to the way of drying, spray powders contain dispersed air inside the particles. This requires more cocoa butter in chocolate making. When spray particles are broken the remaining globular holes in the fractured surface need to be filled with the continuous phase, thus resulting in the extra need for cocoa butter.

Roller Dried Milk Powder Characteristics

During the process of roller drying the temperatures of the product are higher as with spray drying. This leads to the typical cooked milk flavor and a more or less pronounced burnt taste. This product is not as creamy when compared to the spray dried milk powder.

In contradiction to the spray dried powder the fat is not present in



Annasiet Siebenga

**Mirjam Bouwman-Timmermans
and Annasiet Siebenga**
Coberco Isoco

Presented at the Pennsylvania Manufacturing Confectioners' Association 49th Annual Production Conference.