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## CHAPTER 5

# Ingredients from milk

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### 5.1 Introduction

Milk chocolate is the most popular type of chocolate, the favourite of more than 50% of adult consumers (Global, 2011). Milk ingredients are essential in delivering the desirable flavour profile and texture that is characteristic of milk chocolate. Milk ingredients influence the flavour, colour, texture, flow properties and gloss, provide nutrition and improve the storage stability of milk chocolate (Campbell and Pavlasek, 1987).

The typical composition of cow milk is approximately 87% water, 4.9% lactose, 3.5% fat, 3.2% protein and 0.7% minerals. Milk is a biological product, so some variation in overall component concentrations and variation within components are to be expected. The fat and protein components show the most variation, which is influenced by breed, animal to animal differences, stage of lactation, feed, season and location. From an industrial ingredient perspective, some of this variation is minimised because ingredient processors typically use large volumes of commingled milk. However, for some ingredients this natural variation can have a great impact on ingredient functionality.

The incorporation of milk components into chocolate has both functional and legal limitations. The high water content of milk requires that it be processed into concentrated ingredients prior to incorporation into chocolate and the addition of too much milk fat can interfere with cocoa butter crystallisation. Milk chocolate typically contains 20–25% milk solids, and the legal minimum content of milk solids differs among countries. In the European Union, milk chocolate is required to contain at least 14% milk solids and not less than 3.5% milk fat. The milk solids may be obtained by partly or wholly dehydrated whole milk, semi- or full-skimmed milk, cream, dehydrated cream, butter or milk fat. The Codex standards (Codex, 1999b) specify a minimum milk solids content of 12–14% and a minimum of 2.5–3.5% milk fat. The United States requires a minimum of 3.39% milk fat. In many countries, milk fat is the only fat other than cocoa butter that is permitted in pure chocolate.