This may result in different flavours from when all the ingredients are processed together. Niediek (1994) attributes this to the fact that, when sugar particle are broken, the surface becomes very reactive and is able to pick up any flavour components in the vicinity. These will be different if the cocoa is present, as in the combined milling, rather than if the ingredients are ground separately.

1.2.3 Conching – flavour and texture development

Although the fermentation, drying and roasting are able to develop the precursors of chocolate flavour, there are also many undesirable chemical compounds present. These give rise to acidic and astringent tastes in the mouth. The object of conching is to remove the undesirable flavours, while developing the pleasant ones. In addition, the previous grinding process will have created many new surfaces, particularly of sugar, which are not yet covered with fat. These uncoated surfaces prevent the chocolate flowing properly when the fat is in a liquid state. Because of this the chocolate cannot yet be used to make sweets and does not have the normal chocolate texture in the mouth. The conching process (Chapter 10), therefore, coats these new surfaces with fat and develops the flow properties, as well as modifying the flavour.

This is normally carried out by agitating the chocolate over an extended period in a large tank, known as a conche. The mixing continuously changes the chocolate surface and this, coupled with some heating and ventilation, enables the volatile components to escape and the flavour to be modified. Some manufacturers prefer to limit the conching time by restricting the conching process to primarily one of liquefying the chocolate. This is made possible by treating the cocoa mass at an earlier stage, in order to remove some of these less desirable volatile chemicals.

1.3 Concept of the book

Chocolate making was, for over 100 years, a traditional industry governed by craftsmen who developed individual methods of working, as well as “house” flavours for products. With increasing economic demands for higher throughputs and less labour, the industrial manufacture of chocolate has become more and more mechanized. There has also been an increased application of science and technology to control production plants and enable them to operate efficiently. In this situation the equipment manufacturers are introducing new machinery, whilst the literature abounds with new methods of manufacture and patents for “improved” techniques. Certain basic principles of chocolate making exist, however, and the aim of this book is to show what these are and how they can be related to the processes used in its manufacture. It has been intended to avoid making the book a catalogue of a selected number of machines and products. In order to try and achieve this and to give the book as wide a coverage as possible, authors have been chosen from a range of industries and research institutions in

Europe, North America and Australia. Chapters have deliberately been kept relatively short, and to a certain extent they follow the order of processing described in this chapter.

Certain topics have been divided into two, for example the chemical changes involved during conching have been presented separately from the physical and engineering aspects, as most authorities tend to concentrate predominantly on one or other of these aspects of conching. In addition to the technical side, plant hygiene, intellectual property and nutritional values have become increasingly important within the chocolate industry. Chapters have therefore been included to provide an overview of these subjects.

The manufacture of chocolate goods would not exist but for the consumer. What is seen on the market shelves is seldom the chocolate itself, but usually the container. For this reason the packaging, marketing and legal requirements for the product is of considerable importance and chapters on these three topics are included in the book.

Every author has contributed to the book as an individual. Each chapter, therefore, is the author's responsibility and may or may not be in agreement with the theories or principles adopted by the company by whom he or she is employed, or by the editors. As the chapters were written concurrently with little contact between the authors, several topics were duplicated. This has been minimised where possible, but retained where authors have given additional or even contradictory information. The latter is bound to occur owing to the present incomplete understanding of the processes involved. Minor differences in machinery or ingredients can produce major changes in the product. Each author, therefore, is merely reflecting his own experience within the wide range of combinations possible in chocolate making. The multinational authorship of the book highlighted the differences in terminology and units found throughout the industry. For example, the term "refinement" means flavour development in some countries and grinding in others. For this reason, and to aid people unfamiliar with the industry, a glossary of terms has been included at the end of book. The units given are those with which the author is most familiar, but frequently the most widely used alternative is also quoted. In addition, some of the more commonly used physical constants associated with chocolate making have been included in this edition.

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