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# The Application of Cocoa Powders in Chocolate Confectionery

## ABSTRACT

Cocoa is used in confectionery and other foodstuffs as a flavor ingredient and a colorant. There is a wide variety of cocoa powders available on the market, differing in type, quality and performance.

In confectionery, cocoa powder is—unlike many other flavorings and colorants—used in rather large quantities. Apart from its effect on color and flavor, cocoa powder, therefore, also has a considerable impact on other properties of the end product. Because of its chemical composition, cocoa powder influences the nutritional values and shelf life of the food stuff. The small size and the negative zeta-potential of the cocoa powder particles causes

cocoa powder to have a strong impact on the texture of certain products.

In this article the application of cocoa powder in chocolate confectionery and the impact of various properties of cocoa powder—such as alkalization, fat content, flavor and color—on the confectionery products are discussed.

## INTRODUCTION

Cocoa powder is used in the confectionery industry as a flavoring and coloring agent. Over the years many types of cocoa powder have come onto the market, varying in flavor, color and other physical and chemical properties. These different types of cocoa powder are obtained by variation of the process used for the production of cocoa powder. In Figure 1, a flow sheet shows the most important steps in the production of cocoa powder. The impact of various production steps on the properties of cocoa powder in relation to its application in confectionery products is discussed in the following paragraphs.

## THE PROCESSING OF COCOA BEANS

By varying the blend of cocoa beans from various origins, it is possible to vary the flavor of cocoa

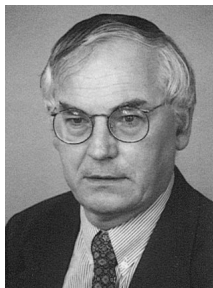
powder. In Figure 2 the impact of various origins of cocoa beans on the flavor is visualized in a bi-plot of principle components. Coatings were made from powders produced on a pilot-plant scale on the basis of cocoa beans from various origins. Subsequently, the coatings were evaluated by a trained panel of twelve members.

There is quite a difference in flavor profile between the major areas: cocoa beans from South America have more fruity or wine-like top notes; those from West Africa are most typically cocoa; and beans from Southeast Asia show a more acidic flavor profile. However, within these different areas flavor may vary quite considerably too. This is, for instance, the case if we compare Cameroon with Ghana.

The next step in the process is the removal of shell, which is an almost worthless waste material. Technically it is impossible to obtain 100 percent separation of the shell from the cocoa bean kernels (in jargon called nib). For reasons of economy, it would be important to lose as little nib as possible during the process. On the other hand, it is important for the quality of the cocoa powder to remove as much shell as possible, which means loss of nib.

As is shown in Table 1, shell has quite an impact on the quality of cocoa powder. The flavor profile of shell is quite different from that of cocoa and not very pleasant. The musty off-flavor becomes particularly noticeable at higher levels of shell in cocoa powder. Cocoa shell is also a well-known cause of corrosion in grinding and mixing equipment used in the confectionery industry, such as roller refiners, ball mills and homogenizers. Apart from wearing of the equipment, corrosion also causes contamination of cocoa by trace metals in general and iron in particular.

After harvesting the beans, insecticides are used to protect the beans from deterioration. Traces of these



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