Cocoa Alkalization

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Cocoa solids in their many forms are used in a wide range of food products. Whether it be chocolate liquor or more correctly cocoa mass, or cocoa powder, the cocoa component is unique in that it is called on to fulfill two functions. These are to impart both flavor and color to the end product. In order to expand the effective ingredient range of what is a pure natural ingredient, the process of alkalization has been developed.

Cocoa in its natural form is slightly acidic, with a nominal pH range of 5 to 5.6. The alkalization process neutralizes the normal cocoa acidity and raises the pH into the 7 to 8 range.

This neutralization process is carried out by treating cocoa nibs, cocoa mass or cocoa solids with a solution of water and alkali, first heating and then drying the cocoa back to the proper working moisture.

In actual practice, the cocoa to be alkalized is first heated in a closed mixing vessel, warm alkali solution is added to the cocoa, a reaction time is allowed and then the excess moisture is driven off by heating or drying. The end product of the alkalizing process will be cocoa solids with a higher pH and darker color than in the natural state.

The degree of change is controlled by:

- the strength of the alkali solution,
- the alkali selected,
- the moisture level of reaction stage,
- the length of the reaction stage,
- the process temperature, and
- drying temperature and duration.

If the process conditions selected are all at the low end of the scale, the end product will have a pH at the bottom of the commercial range with a slightly darker than natural color. If the process conditions selected are at the high end of the scale, the end product will have a higher pH and a dark color.

The flavor obtained as the process conditions change will range from a mild chocolate flavor to a very bland flavor to a bitter harsh cocoa note. This flavor change is primarily the result of the pH change, which in turn is an expression of the neutralization of the normal acidity of the cocoa solids. The effectiveness of the neutralization cannot be measured by a pH change alone however. Neutralization is related to the moisture content of the reaction stage and duration, rather than to any other condition. There is a minimum reaction moisture level required. If an overly concentrated alkali solution is used, there is a danger that there will be free alkali left in the cocoa solids. The presence of unreacted free alkali in cocoa solids can be detected by a metallic or chemical flavor note, and in the worse case, liberation of CO during later processing.

When the alkalizing process is carried out on cocoa nibs or cocoa

Kostic has been in the cocoa processing field for more than 27 years. After earning a degree in mechanical engineering he began his career with Intercontinental Cocoa Products Ltd, which eventually became a part of Gill & Duffus Products. While employed by ICP he started its Canada division and rose to the role of president.

Later Kostic became general manager of Upali Singapore PTE, a cocoa bean processor, before joining Chadler (USA) Inc. as its president.

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