To Characterize Fat Bloom in Uncontaminated Cocoa Butter Substitute Compound by Differential Scanning Calorimetry

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Due to the strong eutectic interaction between lauric based cocoa butter substitutes (CBS) with temper fats like cocoa butter, a blend of these can readily lead to the development of fat bloom. There are numerous extensive studies that were conducted characterizing the nature of these blooms under different storage conditions but . Principally, the resultant bloom can be traced to the depression in melting point of the contaminated CBS compound caused by eutectic softening. This in turn confer a much lower heat tolerance to the CBS compound causing partial liquefaction to occur when exposed to warmer temperature (>25°C).

However there are many instances where non contaminated CBS compounds are observed to bloom and in this study, an attempt is made to reveal the cause and mechanism behind this phenomenon applying primarily the differential scanning calorimetry (DSC) technique. According to experienced workers in confectionery productions, the warming of moulds and the cooling of the CBS compounds upon deposition are both viewed critical in ensuring bloom free products. Correlating to these experiences it is revealed in this work that various polymorphic transformation can occur in CBS fat during which is highly temperature dependent instead of the □` crystal commonly known to form in lauric fats. It is also noted that the rate of cooling relating to the temperature gradient has a major influence.

Depending on the variations in temperature to which a CBS compound is exposed, formation of lower melting crystal form is observed. This low melting fraction is shown to be liquefied by the latent heat present in the product which depending on the product's size and the length of the cooling, the core temperature of a product deposited at >40°C can hover at value above 30°C during the duration of cooling. This situation will of course be aggravated in samples with non lauric fat contamination. As observed by DSC analyses fractionation of distinctly different melting form within the CBS compound is shown which typically a major single melt peak should be obtained.

However it is demonstrated in this work that even with the presence of contamination, bloom in CBS compound can be significantly reduced or eradicated with suitable cooling.