Inhibition of Cocoa Butter β_V to β_{VI} Transformation

Kevin W. Smith[1], Krish Bhaggan[2], 1. Fat Science Consulting Ltd., Bedford, UK, 2. Loders Croklaan B.V., Wormerveer, The Netherlands

Although not the exclusive factor in the incidence of fat bloom development in chocolate, the polymorphic transformation of cocoa butter from β_V to β_{VI} is clearly implicated. Consequently, many additives have been explored as inhibitors of this transition and bloom retarding fats are commercially available. We have explored the relative efficiency of several fats enriched in specific triacylglycerols, combining either stearic (C18) or palmitic (C16) with lauric (C12) acyl groups. These were added to cocoa butter at intervals up to 5%. The cocoa butter was tempered, deposited into moulds and cooled in a cooling tunnel. After demoulding, the cocoa butter bars were stored in a cabinet at 20°C for one day, following which they were transferred to a cabinet cycling between 15°C and 25°C every 24 hours. Samples were removed from the bars at intervals over a six month period and the polymorphic form determined by x-ray diffraction. The relative proportion of β_{VI} was calculated in order to determine the effectiveness of the various triacylglycerols in inhibiting its formation. All of the additives studied had an impact on the development of β_{VI} but the most efficient was found to be *rac*-1,2-dipalmitoyl-3-lauroylglycerol. This is one of the principal triacylglycerols present in a commercial bloom retarding fat, Prestine^{TM}, which was consequently studied in the same way as the other additives and was proven to be very effective at inhibiting the β_V to β_{VI} transition in cocoa butter.