CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)
Naomi Licht

Project Number
J1415

Project Title
Keep Your Temper: Maintaining Beta Crystal Forms of Cocoa Butter in the Preparation of Molded Chocolates

Abstract

Objectives/Goals
My primary goal is to make tempered chocolate molded items so they won't melt in my hands. My primary hypothesis is that if tempered chocolate is melted and reformed at a temperature less than 95°F, it will retain its temper qualities.

Methods/Materials
Dove milk and dark chocolate pieces and Nestle semi-sweet chocolate chips, frog molds, microwave, thermometer, grater, scale, bowls, spoons.
The different chocolates were prepared as grated and ungrated samples, and were melted at low temperatures, poured into molds, allowed to cool, and tested for temper qualities.
The control was semi-sweet, ungrated, melted at a high temperature.
Each chocolate type and grated or ungrated preparation was repeated three times.

Results
I assigned point values to the observed temper qualities: meltiness, shininess, snapability. I averaged the sums of the temper points over the three samples in each category. Higher points mean better tempering. The low temperature samples showed higher temper points than the high temperature samples.

Chocolate Category	Average Temper Points
Semi-sweet (ungrated, high temp., control)	0.66
Semi-sweet (ungrated, low temp.)	4.33
Dove Dark (grated, low temp.)	5.33
Dove Milk (grated, low temp.)	5.00
Dove Dark (ungrated, low temp.)	5.00
Dove Milk (ungrated, low temp.)	6.00

Conclusions/Discussion
I achieved my primary goal of finding a quick way to make tempered chocolate molded items that would not melt in my hands. The results support my primary hypothesis that melting tempered chocolate below 95°F will retain its temper qualities.
Home chefs can benefit from these results by using tempered milk chocolate (best temper results), not grating the chocolate before melting (saves time), and keeping the chocolate below 95°F (retains temper qualities).

Summary Statement
My project is about finding an efficient method and the best materials to create tempered molded chocolates by melting and reforming the chocolate below 95°F.

Help Received
Alton Brown's "Good Eats" show about chocolate provided the initial idea for my hypothesis about melting chocolate below 95°F. Food Scientist Adina Licht (my mom) confirmed and expanded on Alton's science, and taught me how to make molded chocolate frogs using the high temperature procedure.