



Hard Butters and Confectionery Coatings

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ABSTRACT

The art on confectionery coatings and hard butters is reviewed showing the evolution and acceptability of such products over the years. The various types of hard butters are identified, and their application in confectionery coatings is indicated. The practices and the areas of application for the different products are discussed as well as the raw materials used to produce the confectionery fats. Raw material cost of chocolate and hard butters is projected over the years to demonstrate the advantages of hard butters for confectionery coatings.

HARD BUTTERS AND CONFECTIONERY COATINGS

In a climate of soaring cocoa bean and cocoa butter prices, in an era of shortages and profit squeezes, it is appropriate to hold a symposium on hard butters and confectionery coatings. Several years ago on another occasion we projected some figures to illustrate the economic advantages of hard butters over cocoa butter and chocolate in the manufacture of confectionery products. We updated and extended those projections to 1977, and they are reflected in Fig. 1. In the last few years, cocoa bean, cocoa butter and cocoa powder prices have become even higher than ever before. If we were to make a prediction for the future as to prices and availability for cocoa and chocolate products, we would have to say the outlook is not very bright. Supply and demand for these commodities has been very erratic and unpredictable over the years, and it reflects in the fluctuation in the prices for the raw materials. Note the nature of the curves in Fig. 1. reflecting the prices since 1950. Note the steep slope of the curves since 1973 and especially since 1975.

Confectionery coatings developed as an offshoot of the chocolate coatings demands of industry and the high prices of cocoa beans and cocoa butter. We experienced a dramatic situation back in 1953-54 when cocoa butter prices went up over \$1.50 per pound. Demands for confectionery coatings reached an all time high during those years. Since then, confectionery coatings have held their own and have shown appreciable growth and diversification. The demands become particularly noticeable when cocoa butter prices and availability are a factor. Price gyrations have been experienced more often and more recently as in 1974-75 and again in 1976-77 with cocoa butter prices hitting almost \$3.00 per pound. Cocoa beans have reached a price of almost \$2.00 per pound, and cocoa powder (12% fat) is presently selling at well over \$2.15 per pound.

Confectionery coatings made in the 1930s were cheap replacements for chocolate and were known in the trade as grease coatings. In all honesty they were just that and nothing more than a cursory effort to replace cocoa butter by another fat. As the need persisted, however, the concept of "tailormade" fats became more acceptable and people such as Barsky, (1) Cochrane (2), Gooding (3), Zinzalian (4), and others, patented processes for the manufacture of hard butters with specific physical and chemical properties. Industry stressed the versatility and uniformity of the hard

butters as well as their flexibility for all-year use. Since chocolate does not handle too well in summer heat, this advantage of the hard butters became a definite plus factor.

The confectionery industry, for its part, discovered that the confectionery coatings did have a number of advantages as well as economic savings. What chocolate offered was flavor and aroma. If one could capture the flavor and aroma of chocolate in combination with a hard butter, then the confectionery coatings could become an item of true benefit to their industry. Over the years this is what essentially has happened since many firms which have learned to use hard butters have stayed with confectionery coatings even in such periods when the price of chocolate has come down. The confectionery industry has come to accept confectionery coatings with greater ease and easier handling of opportunities.

As the acceptance and use of confectionery coatings grew in volume, it became obvious that the formidable obstacle to their across-the-board use in the candy industry was the Standards of Identity (5) established for chocolate and chocolate products. One could use hard butters and confectionery coatings under the optional ingredient clause, but one could not call such products chocolate. The term "imitation" had a stigma, and the confectionery coatings had to battle the same inferior connotation experienced with such products as margarine and nondairy products. The chocolate standards were not about to be changed from their rigid and narrow definition of the term "chocolate," since the chocolate industry desired to keep the ex-

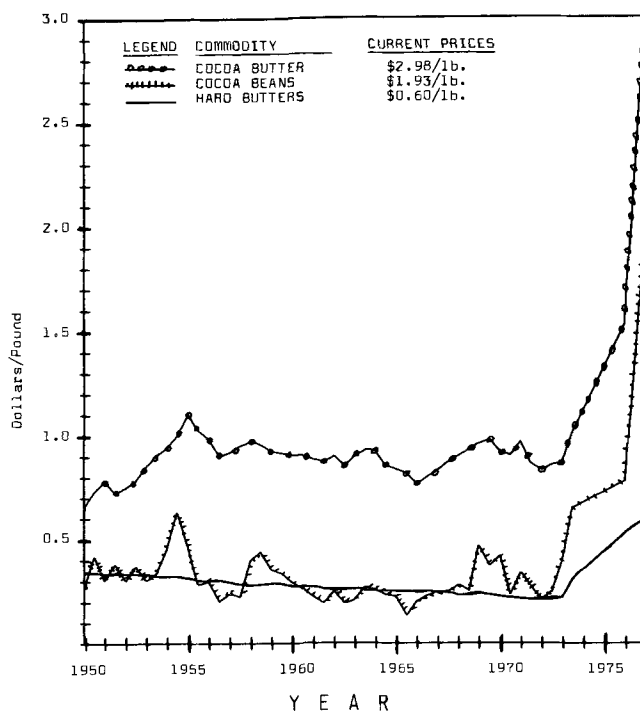


FIG. 1. Commodity price indices for cocoa beans cocoa butter and hard butters.

clusive terminology. The term "confectionery coatings" emerged as a terminology and as a more acceptable compromise than "imitation." The term "candy" could be broadened to include a variety of products and appeared to satisfy most of the people involved. Many of the major chocolate firms which first shunned the confectionery coatings eventually did begin to use them in their line of products. Today it is the exception to the rule when a chocolate or candy manufacturer does not have at least several items in its line which are based on hard butters used in confectionery coatings. As it happened in many other areas, such as with margarine and the nondairy products, so in the confectionery coatings area the industry learned to adapt itself, compromise and live with the situation and, above all else, supply a quality product while making money from the opportunity. As it stands today, the public is better served, and the industry is richer and better equipped to supply good, wholesome, tasty confections to the general public at reasonable prices. Hard butters and confectionery coatings are established lines of products coexisting with chocolate and thriving while doing so.

The versatility of confectionery coatings begins with the versatility that we put into the manufacture of hard butters, the basic fats going into the makings of confectionery coatings. Since these fats are tailor-made fats specifically made to meet certain physical-chemical properties desirable for confectionery use, we have the means and the opportunity to select the proper fat, combine and blend with other specific fats and come up with a composition which has the physical-chemical properties we seek. These things are done by refining, bleaching, deodorizing, fractionating, rearranging, and hydrogenating vegetable oils and by the proper blending of such components to reach the desired melting point, setting point and solid fat indices. When such series of confectionery fats are available ranging from the melting point of cocoa butter up to the melting points of vegetable stearines, we virtually have an entire scale from which we can select and utilize a fat for a specific confectionery need. In areas such as center work, in areas where quick getaway and smooth palatability are desirable, we lean towards the lower melting point fats as the proper selection of the hard butter to be used in the confectionery coating. Where we are trying to get materials that stand up in summer heat or are going to be used in the tropics, we lean towards selecting hard butters which have higher melting points and can withstand the higher elevated temperatures to which they are going to be subjected. Minor variations within a given product are also feasible as a summer-winter formula variation to insure the slight edge for summer use so that the confectionery coating does not smear or turn soupy as chocolate does.

Basically, there are five categories of hard butters available for use in the confectionery industry: a. hydrogenated fats; b. rearranged fats; c. blends and mixtures of the above; d. pressed fats (nonsolvent fractionation); e. solvent-fractionated fats. Synthesis has always been around, and a number of approaches have been advanced through the years, but the economics have always been against them. Perhaps with the present prices prevailing, such processes once again will come into consideration.

In the above categories, industry has also segregated the various types into those prepared from lauric fats and those prepared from nonlauric fats. The lauric fats have generally shown, not only the economic advantage, but also the clean, nongreasy taste and getaway in the mouth. The nonlauric fats range anywhere from grease coatings to chocolate compatible cocoa butter extenders. The fat base and specific structure of the triglyceride are of critical importance.

Now, in the last twenty years, a variety of types of hard

greasy and slower getaway in the mouth unless their structural configuration is specific and similar to that of cocoa butter. The structural specificity of cocoa butter is unique, and many efforts have been made over the years to duplicate the structure at commercially feasible costs. Fractionation and fractional crystallization, in one solvent system or another, have been utilized in recent years to bring about fractions of fats which conform to or come close to the specific structural configuration of cocoa butter. Greater emphasis has been given this area of research since the debutters have emerged which have become the basis of the confectionery coating. There are the standard hydrogenated vegetable fats which go into such things as biscuits and crackers. There are the hydrogenated vegetable fats rearranged with other vegetable oils to give a broader range of compositions which go into, again, biscuits and crackers and other candy coatings. There are the pressed and specific tailor-made and fractionated products with high solid fat indices at 80 F. for maximum standup in form and yet quite good in palatability. And finally there are the hard butters based upon domestic fats which are more compatible and more acceptable for admixture with chocolate. In these major groups of products, the end products are derived from a variety of approaches, the oldest of which is the pressing operation where specific vegetable oils are subjected to a chilling process and a physical separation to separate the solid component from the liquid oil. It is the oldest form of fractionation.

Such pressed hard butters simulate the properties of cocoa butter and, depending on the source of the fat selected and the process used, they can provide excellent products for the confectionery industry. Where the fat used is a lauric fat, the pressed hard butters must be used with cocoa powder and limited amounts of cocoa butter since the danger of eutectic mixtures may cause consistency problems. Where the fat used is a nonlauric fat, the pressed hard butters must have physical-chemical characteristics not only compatible for cocoa butter, but also which meet the mouth feel and palatability standards we accept for chocolate. In such nonlauric chocolate extenders, waxiness is the primary objection. Limited compatibility with chocolate is probably the next most serious objection. They are, however, very useful products in extending the use of chocolate.

The hydrogenated and rearranged products, the disproportionated products and the blends of such component fats are equally feasible both in the lauric group and the nonlauric group. The lauric group tends to have a nongreasy, clean, quick getaway in the mouth with a cooling sensation. The nonlauric group tends to have a slightly mands for chocolate keep on increasing while the supply does not appear to keep pace. Brazil and other countries are attempting to increase their capacity to produce cocoa beans, but the world demand appears to be increasing at a faster rate than our ability to provide larger quantities of cocoa bean tonnage.

The raw materials which go into the formulation of making confectionery coatings play a very important role in the quality of the finished product. The confectionery industry has to make certain that the raw materials it purchases are free from impurities, contaminants, molds, spores and microbial contaminations. Many of the problems of the industry in the past have been traced to such raw materials. Enzymatic hydrolysis and soapy taste resulting in some lauric fats were common years ago when very little control was maintained over the raw materials coming to the candy factory. Good manufacturing practices and sanitation measures on the premises have also minimized and/or eliminated such problems in recent years. Today it is rare to hear of such situations. Here again, we have learned to cope with a problem and we take advantage of the clean, non-

greasy taste and getaway of the lauric fats to make some very fine confectionery coatings at the lowest cost.

The real versatility of confectionery coatings comes into play when we understand the physical-chemical properties of the specific hard butters we select to use for a specific confection. What one selects to use for a candy or a candy coating is distinct and different from what one selects as a coating for a biscuit, cracker or a moon pie. What one selects as the hard butter for a confectionery coating going into the covering of a soft center peanut butter base is distinct and different from the confectionery coating one selects to put over a graham cracker or a vanilla wafer. The entire key to successful utilization and maximum advantage and versatility of confectionery coatings lies in the understanding of the hard butters that one has to select and use. Most confectionery coatings are not too different from each other as far as the components and ingredients that are used for such coatings are concerned. Usually, we have sugar, fat, cocoa, salt, lecithin, milk solids, emulsifiers and flavorings. For a typical formulation for such confectionery coatings, one can refer to several textbooks and technical papers. The real difference comes when the confectionery coating is made from the specific fat that has the unique physical-chemical properties to give one the unique coating for his use. In some areas high solid fat index at 80 F is desirable and even mandatory. High solid fat index at 80 F is the key for a stable physical form and structure of the product in question and the shelf life of the packaged goods. It also reflects in the form of the finished product as consumed by the public. It must have the stability to hold its form and yet have a clean getaway in the mouth making the palatability an acceptable quality. In other areas where the confectionery coating over a highly flavored center or a biscuit is thin, it is less critical to use such a sophisticated confectionery coating, and some of the more simple confectionery coatings would be more than adequate; therefore, the selection becomes very, very important.

In earlier presentations we have stressed the point that if we could capture the flavor and aroma of chocolate in confectionery coatings, we would have products of equal palatability, taste and acceptability to chocolate. In recent years we have shown that excellent products can be produced with hard butters using either a chocolate liquor or a formulation using a high percentage of cocoa solids. Depending upon the hard butter selected and its compatibility with cocoa butter, we have the option of formulation to give us the desired rich taste and aroma of chocolate in a confectionery coating. We are coming closer to the time when even the experts will not be able to discern chocolate from the confectionery fat. Individual and geographic tastes vary. The texture, flavor, aroma and the smoothness of the confection on the palate are all controllable by formulation and the mechanical means of processing. The addition of the minor ingredients and the length of grinding of the cocoa solids appear to make major differences in the final product. European chocolates and American chocolates, for example, have distinct differences in grind, in color and in flavoring. One does not like the product of the other, and yet they all fall under the general class of chocolate. So in coatings, one has the opportunity to blend in the various types of flavors, aromas, and colors, and grind to the finest texture as possible, if that is desirable, to get an end product that suits this particular need. Lecithin, for example, is generally used to control the viscosity, and yet lecithin has some definite limitations since a little of it will lower viscosity, but too much lecithin tends to turn that viscosity curve around and actually increase it. Polyglycerol esters have been used as gloss additives for chocolate and confectionery coatings. They, too, lower viscosity, but unlike lecithin the additional use of polygly-

cerol esters does not increase viscosity but tends to decrease viscosity. The greater the usage, the lower the viscosity. Sorbitan esters and polyoxy sorbitan esters have been used to improve gloss and palatability. Handling such products is still a problem since their incompatibility with the fat causes settling and throwout problems.

The history of chocolate has shown that chocolate is looked upon as the most acceptable confection on the market. The public accepts and consumes chocolate in ever increasing quantities. It is also true, however, that the chocolate manufacturer, knowing the characteristics of chocolate, has to use caution and meticulous care in the preparation, handling and storage of chocolate products. While we accept this sensitivity and the need for care in handling chocolate, we have not carried out the same concern and care with respect to the compound coatings. In the past, compound coatings have been abused and some of the results have been reflected in the end product. In recent years we tend to simplify and use confectionery coatings with as little care as possible but adherence to simple basic rules insures the flexibility of compound coatings. Some firms claim nontempered products for their confectionery bases. This is possible within reason, but we know that the best confectionery coatings are still made where reasonable care is given to the tempering and the seeding of such confectionery bases and their subsequent coating and cooling. The most dependable procedure still seems to be to have a formulation made in a gently agitated scraped wall vessel. Cooling the confectionery coating down to a very heavy mush consistency, maintaining it at that mush consistency, preferably overnight but several hours if at all possible, and then gradually bringing the mush consistency up to about the melting point of hard butter and then coating the product is the preferred procedure to follow. Generally, such an operation will insure stable seed and give a highly desirable, glossy coating which maintains its gloss over long storage and shelf life. One of the precautions one must take to insure that the coated product maintains the high gloss characteristics is to cool sufficiently, and for sufficient time to dissipate the latent heat of crystallization that is in the product. This heat must be dissipated over the next 24 or 48 hr to insure that the crystals have time to lose their latent heat of crystallization. The finished coating will maintain its crystal form on storage for long periods of time if the heat of crystallization is eliminated. In this area what we have learned about chocolate applied equally well to confectionery coatings. We must take this initial precaution in the cooling and handling of the coating material to insure the future stability and gloss characteristics of the confectionery products.

Another aspect of the confectionery coatings and fats is their versatility and other applications and uses. Where initially we thought about only candy in confectionery coatings, over the last twenty years we have seen applications of such products in allied food uses such as desserts, toppings and many other food products where the confectionery coating or the hard butter fat has become the basis of the new foods. These products utilize the same properties and characteristics as the hard butter in a somewhat different form than a coating application, but nevertheless produce food products which are delicious and excellent products to eat. The success of these dessert products and other food products is based upon the same characteristics of the hard butter, which were mandatory in selecting their use in a confectionery coating.

Since this field is becoming more specialized and more sophisticated, it is difficult for the average baker or the confectioner to understand or keep attuned with the ever changing developments that came about. The best suggestion that we have is that you work closely with your

supplier; if you trust him and tell him your needs, describe your problem, he has an answer for you to resolve your problem and give you the type of fat or the type of confectionery coating which is best suited for your needs.

There is no guarantee in this world, but there are a number of assurances one can give you. The availability of confectionery coatings and hard butters will remain good. Prices may fluctuate more than they have in the past, but nowhere near the type of prices and fluctuations you have witnessed in cocoa butter and cocoa beans. We feel that your best interests can be served by becoming a regular user of confectionery coatings because this is where the trend is going, this is where the products of the future must be — in the proper blending of chocolate liquor and/or cocoa solids

with hard butters to give the lowest price and highest quality confectionery fats for your confections and candy uses.

REFERENCES

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3. U.S. Patent 2,309,949.
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