“Stuff” (Sometimes Illegal) In Cheese Boosts Volume by About 30%

by John Bunting

Some dairy events cannot be easily explained using the standard dairy science textbooks. One such example: how U.S. cheese yields in recent years appear about 30% greater than one would expect from the volume of farm milk dedicated to cheese vats. In reality, cheese processors’ numbers have been reduced – consolidating into fewer but larger players. But most of those big players march, like programmed robots, towards modern efficiency.

Let me state my conclusions right up front. In previous articles, I have estimated that 28-30% more cheese is being produced in the U.S. than can be accounted for by “normal” cheese yields derived from farm milk of normal component (protein, milk fat) composition and quality.

1) A wide array of technologies, chemicals and ingredients are used to boost cheese yields. Some of these technologies are legal, but knowingly impair cheese quality and/or taste. But, a large array of yeild-boosting chemicals/ingredients are illegal, under rules set by the federal Food and Drug Administration.

2) An extra 28-30% “too much cheese” being produced in the U.S. – relative to the volume of farm milk going into cheese vats – dramatically skews U.S. cheese supply/demand discussions. Without that 28-30% “too much cheese,” U.S. cheese plants would need an additional 40-50 BILLION pounds of farm milk annually. Imagine what prices for farm milk might be, if legal practices were used in our cheese vats that yielded honest cheese for consumers!

Science trumping art in cheese vat

Once, cheese-making was both an art and craft. Most cheese produced in America today, however, is the result of technological “advances.” The modern cheese plant operates as an in-line system – taking milk in one end with the finished cheese coming out the other end. Efficiency results not from artisan craftsmanship, but rather from technological advances that increase the “through-put.”

While the system may have benefits to the owners, both dairy farmers and consumers are cheated.

One of first steps in these modern, closed systems was fortification of the cheese milk by increasing the protein content. Cheese yields directly correlate the protein content of the milk. Initially the “fortification” was accomplished by legally adding either nonfat dry milk (NFDM) or condensed skim milk. Both these inputs used to boost cheese yields have quality shortcomings, primarily due to increased lactose content in the cheese.

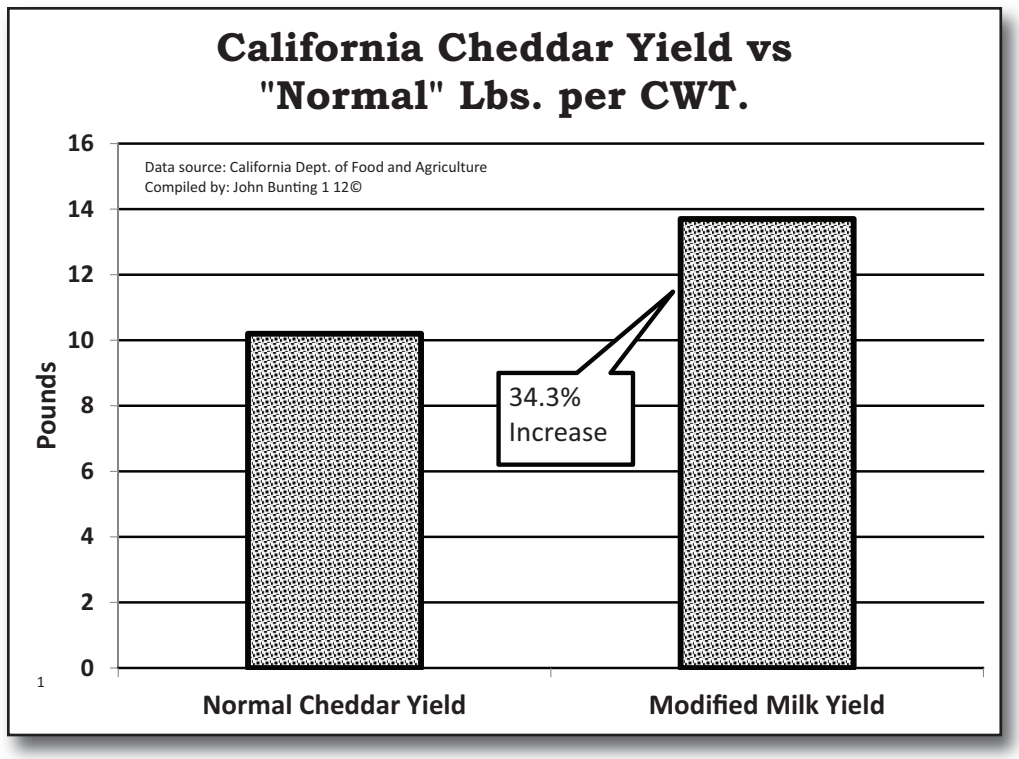
Removing some water through membrane technology – was first seen in the mid-1980s as a means of reducing transportation costs for milk from farms to plants. But those cagey New Zealanders took UF one step further, creating a dry product: milk protein concentrate (MPC). The procedure of ultrafiltration reduces the lactose in the final product. New Zealand took to marketing MPCs to American cheese makers, while the same time avoiding the use of MPCs, for quality reasons, in their own cheese-making procedures.

Of course, MPCs are not legal for use in standardized cheese manufacturing. But certain cheese manufacturers and processors have learned by simple observation that FDA really doesn’t seem to care about the legality of what goes into the cheese vat.

With the use of MPCs, cheese yields increased. One by one, many large cheese plants have adopted both ultrafiltration and the use of MPCs and fortifying the cheese vat. Ultrafiltration increases cheese yield primarily by locking a significant amount of whey proteins. Normally, those whey proteins are drained off, in the finished cheese.

High-speed starters beget sodium gluconate

Ultrafiltration and MPCs are the prime factors increasing cheese yields. However, even more cheese yield-enhancing technologies have been created. One such technology is the use of high-speed starter cultures. Bacterial starter cultures are added early in the cheese-making process because the bacteria increase the acidity of the milk. A slight amount of acidity in the milk allows the rennet, which coagulates the curd, to work properly. Naturally, cheese yield is pumped up slightly by the use of high-speed cultures.



High-speed cultures also come with their own problematic baggage. Primarily these cultures work so rapidly developing acid that not all of the lactose in the milk can be converted. Lactate crystals – a cheese defect – can readily form as a result of the high-speed cultures.

Undesired crystal formation? No problem! We can thank some white-coated food technologists at the University of Minnesota for devising solution to the lactate crystal problem: adding a chemical known as sodium gluconate to cheese vats in which high-speed starter cultures have been used. But sodium gluconate is not a “legal” additive, approved by the federal Food and Drug Administration, for making standardized cheese varieties (like Cheddar, Muenster, Colby, etc).

Pea starch & highly refined sawdust

Our list of questionable substances used to boost cheese yields grows longer, and even more curious. Other items added to some cheeses also increase the yield. Some manufacturers are adding starch, which contains the miraculous ability to absorb nearly tentimes its own weight in water. (Pea starch is a favorite.) Some other cheese manufacturers use microcrystalline cellulose (wood fiber). Perhaps a better descriptor microcrystalline cellulose is “highly refined sawdust.”

Ultrafiltering? MPCs? High-speed cheese starters? Sodium gluconate? Pea starch? Sawdust in the guise of a 25-cent descriptor – microcrystalline cellulose? What, if any benefit, does the American consumer derive from this array ot cheese-making technologies which may boost total cheese yields, but leave questions about quality and … indeed, INTEGRITY … of cheese products? Numerous scientific papers have been published regarding quality and taste defects in cheese, when ultrafiltered milk and MPCs are used. Flavor problems, for example, include a bitter aftertaste. Also, problems with cheese melting characteristics have been documented. Example: for a consumer wishing to home-prepare top-quality macaroni and cheese, ordinary, off-the-shelf cheese may not work ideally, because of melting problems.

For dairy farmers, the real problems relating to all this bogus “stuff” used to produce some of our cheeses all comes down to one painful factor: “surplus” cheese inventories held up as excuses for depressing cash prices for commodity Cheddar at the Chicago Mercantile Exchange. Dairy farmers’ milk prices correlate very closely with cash Cheddar prices derived from CME cash markets. Although most dairy economists constantly sing about supply and demand, not a single one is willing to look at the impact on milk price of additional cheese production, caused by widespread use of questionable, and sometimes illegal, technologies.

CDFA cheese data: contradictory story

No one needs to guess about the numbers. California Department of Food and Agriculture (CDFA) regularly tracks “manufacturing cost” in detail which includes important data regarding the manufacturing of Cheddar cheese.

The most recent CDFA data are for 2010. CDFA states, “For all cheese: the weighted average yield was 13.70 lbs. of cheese per hundredweight of milk. The weighted average moisture was 37.78% and the weighted average vat tests were 4.67% fat and 9.60% SNF.”

Another CDFA publication, “California Dairy Statistics Annual 2010,” states at the bottom of page 29, ten pounds of milk make one pound of cheese … NOT 13.70 pounds. Normal cows milk will make one pound of cheese from ten pounds of milk. But, you will notice above, the SNF (solids-not-fat) number of 9.60. Normal cows milk should be 8.7% SNF.

The difference between normal cheese yield and those from the CDFA survey is a 34.3% increase.

However, when it comes calculating state producers’ milk checks, CDFA conveniently forgets the damning reality of CDFA’s own current cheese-yield data.

Explaining how milk used in cheese-making (Class 4b) is priced, CDFA begins by taking “The average market price per pound of Cheddar cheese at Chicago Mercantile Exchange.” The next step subtracts a location differential. Then CDFA multiplies the result by a cheese yield of 10.2 stating, “Cheese yield; can produce 10.2 lbs. of cheese from 100 pounds of milk.” True enough, nevertheless the facts of the matter indicate that 100 pounds of milk will produce 13.7 pounds of Cheddar cheese in California’s biggest Cheddar plant – according to CDFA’s own data.

Ultimately, a moral issue

The problem really isn’t a technical problem. In USDA’s 1940 “Yearbook of Agriculture” *Farmers in a Changing World*, the introduction to an essay by M.L. Wilson titled “Beyond Economics” states, “the more scientific a man is the more clearly he will see that our economic problems are really moral problems.”

From a consumer’s perspective, there is a genuine dishonesty relative to labeling today’s mass-produced “cheese” as the same product which was labeled “cheese” 20 or more years ago.

There are numerous proposals which have and are being advanced regarding farm milk pricing. Many have included the concept of supply management. The truth is, what is happening in the cheese-making process in California is happening throughout America. In other words, without all the “stuff” used in cheese-making there would be a milk shortfall of approximately 30%. No proposed “supply management program” suggest reducing the farm milk supply by 30% … or whatever volume would be needed to offset all the extra cheese resulting from cheese vat alchemy.

As the U.S. enters another round of contemplating what shall be the federal government’s role in regulating dairy (as part of the larger farm legislation process), the need for new federal dairy legislation is questionable, when agencies such as FDA and USDA are ignoring, existing laws that oversee allowable ingredients in our foods. If government took the “standards of identity” for cheese seriously, there would be an immediate need for more milk going into the cheese vats. Let me be more specific: an additional 30% more milk needed for “HONEST” U.S. cheese production would equal roughly 40-50 BILLION pounds more U.S. milk. Right now, almost half of all U.S. farm milk is directed into the cheese vat.

Additionally, if federal agencies enforced existing laws regarding ingredients and additives going into our cheese vats, the quality of cheese would improve and consumers might want to eat more cheese. There is an ancient Chinese expression, “The beginning of wisdom is to call things by their real names.”