

Vanilla Specialists

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INCORPORATED

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Founded 1907

The Story of Vanilla

by
Chat Nielsen, Jr.



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ORIGIN OF VANILLA

Vanilla, the most popular flavor in the world, originated in Mexico. The vanilla bean, actually a pod, was found nowhere else in the world. For hundreds of years the Totonaco Indians, inhabitants of the East Central Coast area of Mexico, were the keepers of this secret flavor. When the Aztecs defeated these peaceful people, one of the most important tributes they demanded was the fruits of the Tlilxochitl vine, vanilla pods. These pods were used with cacao beans to make a drink called "Chocolatl". In 1520 Hernando Cortez, in turn conquered the Aztecs. In his magnificent banquet hall, Montezuma, Emperor of the Aztecs greeted Cortez and offered him this drink in a golden goblet. Cortez astounded by the delicious flavor of "Chocolatl" demanded to know the ingredients. Montezuma, the gracious host, told him it contained ground corn, cacao beans, vanilla pods and honey. Alas, Montezuma not only lost the secret of his favorite beverage, his riches and his empire, but also his life, as Cortez executed him shortly thereafter.

When Cortez returned to Spain, he brought with him a great deal of gold, silver and jewels plundered from the Aztecs. Of even greater importance, he also brought cacao beans and vanilla pods, which the Spaniards call "Vainilla" meaning "Little Scabbard". The drink made from cacao beans and vanilla pods was an instant success and extremely popular throughout Europe. At first it was a luxury only the nobility and very rich could afford as for eighty years, vanilla was used only in the chocolate drink. In 1602, Hugh Morgan, apothecary to Queen Elizabeth I, suggested that vanilla could be used as a flavoring by itself. This was the first step on the path toward the dominate position vanilla now holds in the flavor world.

GROWING VANILLA BEANS

In about 1793, the vanilla vine was smuggled from Mexico to the Island of Reunion, then a French protectorate called Ile de Bourbon. Vanilla beans grown in this area of the world are called Bourbons because of their original home on Reunion. The term Bourbon applies to beans grown on Madagascar, Comoro, Seychelles and Reunion. There is no connection with the American liquor produced in Kentucky.

The important areas of the world now producing vanilla beans are the Bourbon Islands, with Madagascar being the largest producer in the world, Indonesia, Mexico, Tahiti and Tonga. Recent production in Uganda, India, and Papua New Guinea look promising as potential future sources for vanilla beans. Additionally, small production is taking place in various countries such as Costa Rica, Fiji, Jamaica, Hawaii and the Philippines.

Vanilla pods, or beans as they are commonly called, are the fruit of an orchid. Of the thousands of varieties of the orchid, the vanilla plant is the only one known to produce an edible fruit. In most locations such as Madagascar and the rest of the Bourbon Islands, Mexico and Indonesia the species is known as "*Vanilla planifolia Andrews*". The exceptions are Tahiti where the species is "*Vanilla tahitensis Moore*" and in Papua New Guinea where both species are grown.

The vanilla orchid is a rather small, trumpet shaped, celadon colored flower. The center of the flower, the tube-like united stamen and pistil is pale yellow. Because of its shape, the orchid needs assistance to be pollinated in order to produce fruit, the vanilla pods. A tiny bee, the Melipone, found only in Mexico was historically

responsible for the pollination of the orchid. However, natural pollination had very limited success, making the production of any kind of commercial quantities unlikely. For over 300 years, after its discovery by Europeans, vanilla pods were produced only in Mexico because of this bee. Vines were grown successfully in other parts of the world, where they flowered beautifully, but only a small number of pods appeared, inadvertently pollinated by insects. In these other areas there were no tiny bees with the ability and inclination to fertilize the flower. Montezuma had gained his revenge!

Finally in 1836, Charles Morren, a respected Belgian botanist of his time, after careful study of the flower, discovered the fact that it could not become fertilized without aid. In 1841, a former slave, Edmond Albious, of the Island of Reunion, devised a practical and speedy method of fertilizing the flower by hand. He devised a bamboo toothpick-like stick to lift the thin membrane separating the male organ (Anther) from the female organ (Stigma) and pressing the pollen against the stigma. This method is still in use today. Pollination by hand is actually an improvement over nature in that the best flowers, properly spaced, may be chosen. Further, healthier vines can be made to bear more, 30 to 150 pods, while weaker vines or older vines may be controlled to produce less. Too many pods weaken a plant, making it susceptible to disease and/or reducing the size and quality of the pods produced.

Vanilla grows best in areas 10 to 20 degrees north or south of the equator. It requires a warm, moist tropical climate with year round temperatures of 75 to 85 degrees Fahrenheit. The area should have relatively little wind and fairly high humidity. The vine grows best in soil rich in organic matter on terrain that is gently sloping to

allow adequate, but not excessive, drainage. Vanilla should have a mixture of sun and shade and grows from sea level to about 2,500 feet. Above this altitude the flowers rarely bloom. The vines are propagated from short lengths, 90 to 120 centimeters, of vine cuttings and are grown against trees or posts. A rapid grower, they must be pruned and trained to keep them within reach of the workers. Left on its own, the vine may grow 50 to 70 feet long and any pods produced will be of low quality. This is due to the vine devoting all of its time into gaining biomass, leaving only a small amount for the development of the pods.

On average, a vanilla vine has a life span of ten to twelve years. It takes three to four years for the vanilla vine to reach bearing stage, with the first crop often being small, and it will produce well for about 7 to 8 years before they have to be replaced. It is the writer's understanding that no pesticides or fertilizers, except natural mulch, are used in growing vanilla beans. Mainly the growers are too poor to afford the products and actually, the vines need little assistance, as they are prolific growers. Most pods are produced by very small, individual growers and sold to curers for processing. A family of four is able to grow and care for about one to one and a half acres of vanilla vines.

The size of the vanilla crop each year is very dependent on the weather. If a bad storm strikes during the growing season the crop may be greatly reduced. Dryness, sunshine and rain are important factors in the production of vanilla. Even more important is the timing of these weather patterns. If too much rain falls, the plant will put its energy into creating more biomass, simply said, expanding its girth size and/or length. Prior to the flowering season, a period of dryness and high temperatures is required to inflict "stress" on the plant.

This stress causes the plant to produce flowers instead of building biomass.

Each vanilla flower opens for only part of one day and if not pollinated on that day, no pod will be produced. Fortunately, the flowers do not open on the same day but over a period of one to two months. For this reason, it is necessary to visit each vine daily to check on the condition of the flowering. Each successfully fertilized blossom produces a pod that grows to a length of five to nine inches in about six weeks.

To prevent pirating of their crops, most growers brand their pods to designate ownership. Branding is normally accomplished by using cork with pins placed in a unique pattern. The green pods are punctured with the pins, in a process called scarification or branding, and the design will remain on the bean even through curing.

HARVESTING & CURING VANILLA BEANS

Six to nine months after pollination, the green pods begin to turn yellow at their tip indicating readiness to harvest. As with the flowering, the pods are not all ready to be picked at the same time. Again, the vines must be checked daily in order to pick each pod at the proper time. After the pods are harvested, the curing process is begun which develops the flavor of the vanilla beans. The characteristic vanilla flavor and aroma are not present in the green beans. It is within the last weeks of growth that precursors to the most important flavoring components develop.

The curing processes of the Bourbon Islands, Mexico, Tahiti and most other growing regions are fairly similar. The initial step, which begins the enzymatic reaction,

does differ however. In Mexico, the vanilla beans are wrapped in blankets, then straw mats, and are placed in ovens for 24 to 48 hours. In the Bourbon Islands, Tonga and Tahiti the beans are immersed for a short period of time in hot water. From this point on, the beans are spread in the sun to absorb heat, becoming so hot they almost burn the worker's hands as they handle the beans, turning them and spreading them out. Late in the afternoon they are gathered and wrapped in blankets and straw mats, placed in large wooden boxes and allowed to sweat overnight. The next day the beans are again spread in the sun. This process is repeated over and over, with occasional periods in the holding room for conditioning, until, in the opinion of the head curer, they are properly cured. The beans are then stored on racks and in conditioning boxes in holding rooms for a length of time to further develop and mellow the flavor. Overall, the curing process takes three to six months during which the beans are handled hundreds of times. Normally, about five pounds of green, uncured beans are required to produce one pound of properly cured beans.

In Indonesia, many of the vanilla bean growers pick all the beans from a group of vines rather than picking individual beans as they ripen. Thus, the lot has beans of varying maturity. This practice downgrades the overall quality of picked, uncured, green beans. This, combined with a curing process that traditionally used wood fires and now propane heaters, tends to produce a product with lower levels of valuable flavor components compared to Madagascar Bourbon Vanilla Beans. There have been efforts made to improve the quality of the Indonesian crop by leaving the beans on the vines longer and improving their curing process by using a method more like the Bourbon process. However, these have met with limited results and while these beans are a vast

improvement over the wood fire cured beans, they still fall short in flavor to the beans from Mexico and the Bourbon Islands

In most areas, once the vanilla beans have been cured they have a final grading according to moisture content and quality. Beans with diseased or defective areas have these sections cut off and discarded. The remaining sound pieces are called cuts and are normally sold at discounted prices. The vast majority of the cured beans, after grading, are sorted according to length and then bundled with string into bunches of 60 to 100 beans. For export, the bundled beans from the Bourbon Islands, Mexico and Tahiti are packed in wax paper lined square tin containers with loose fitting covers. The higher grades of Indonesian and Tongan beans are bundled and packed in plastic bags with a cardboard box overpack. The lower grades of Indonesian beans, available as whole beans, or the even lower quality cuts, are packed loosely in plastic bags with a cardboard overpack.

WORLDWIDE VANILLA PRODUCTION

While the vanilla bean originated in Mexico, enjoying a 300-year monopoly, they are now considered a secondary supplier with production of approximately 40 to 50 tons per year. Once the dominant source, Mexican vanilla bean production has declined over the years as the same area has oil fields and extensive orange groves, both of which are much more convenient and profitable than the labor intensive vanilla beans.

The largest producer of vanilla beans in the world is the Island of Madagascar, part of the Bourbon Island chain, consisting also of Comoros Islands, L'Ile de la Reunion, and Seychelles. Off the East Coast of Africa, it is the fifth

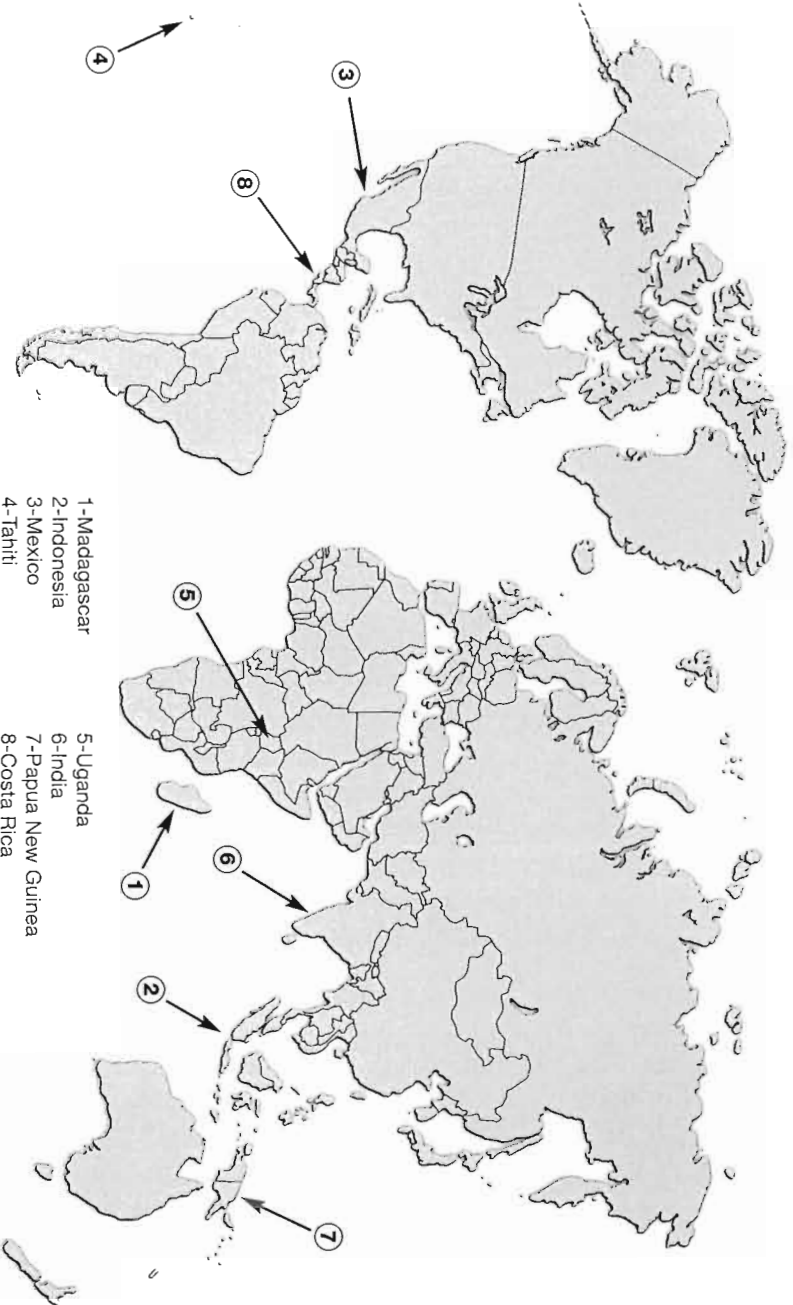


Vines growing against trees.



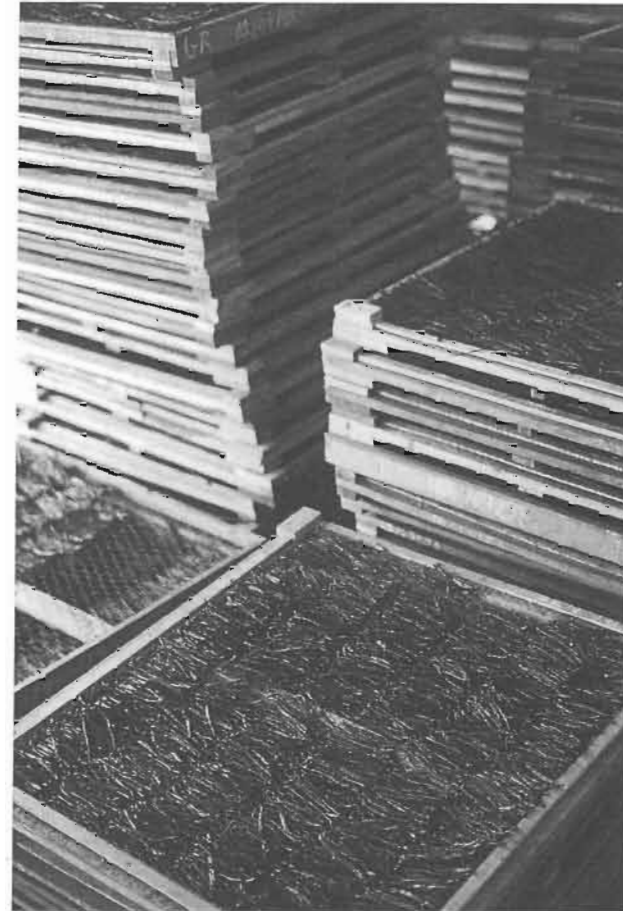
Fertilization of the vanilla flower.

Vanilla Producing Regions





Beans spread on mats to absorb heat from Sun.



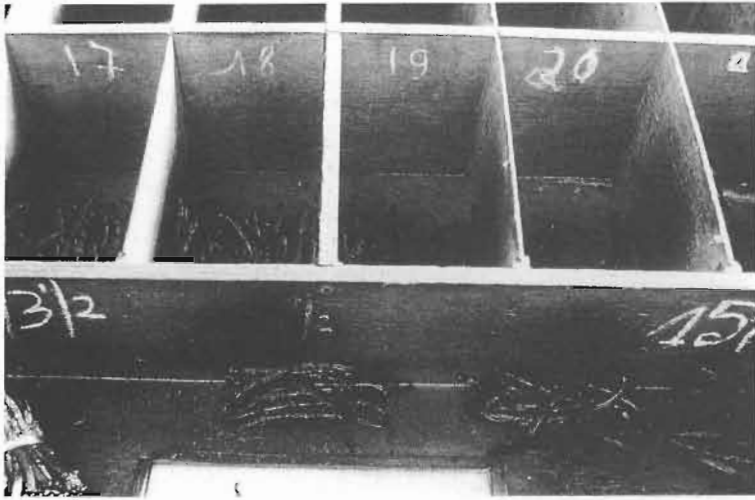
Conditioning of vanilla beans on storage racks.



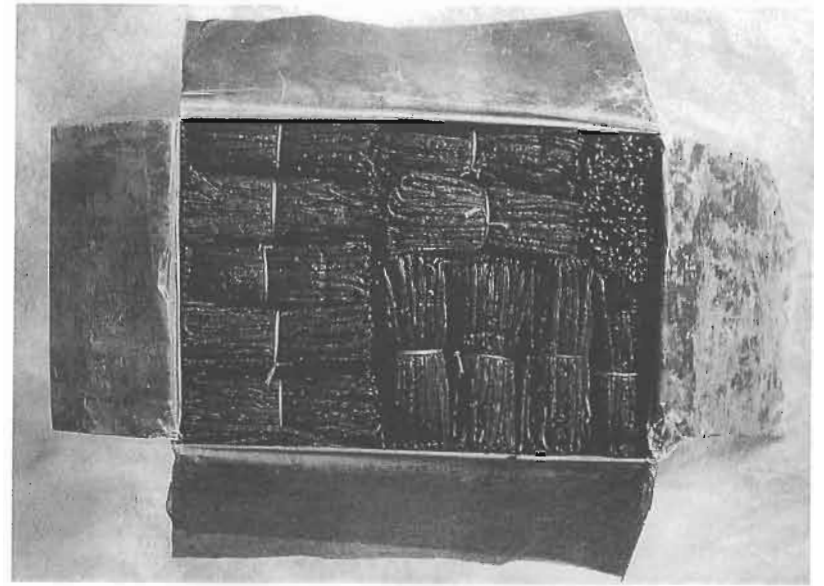
Curing vanilla pods wrapped in blankets at the end of the day.



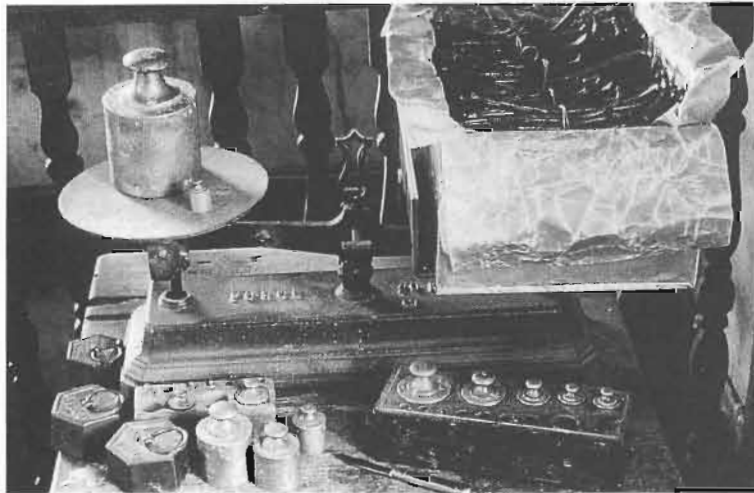
Five pounds of green, uncured beans produce one pound of cured beans.



Grading of vanilla beans by length.



Vanilla beans packed for shipment.



Weighing of packaged vanilla beans.

*Part of the production facilities
at Nielsen-Massey Vanillas.*



*Filling gallons of Pure
Vanilla Extract.*



United States Facility.



Netherlands Facility

India are similar to the Madagascar Bourbon but are not as full and creamy in flavor. Tonga beans have a little lower quality flavor with a slight acidic note.

As mentioned, Indonesian beans, the least expensive, have different flavors. Even those left on the vine longer and cured with improved methods have a flavor that is not as full and round as compared to those from Mexico and the Bourbon Islands. They have a sharper, woodier note to them. Those picked too early and cured over wood fires also have a thinner flavor with a definite smoky tone.

One would expect "*Vanilla Tahitensis*" to be different than the previously described "*Vanilla Planifolia*", and it is. It has a fruity, flowery flavor with hints of heliotropes.

Pure Vanilla is an extremely complex flavor. The major flavor component of the vanilla bean is natural vanillin, which may appear as a white crystalline material on well-aged beans. In addition, however, there are about 300 other flavor components, most of which are present only in minute, trace amounts. These include aromatic aldehydes, esters, oils, organic acids and resins most of which are easily volatilized and lost or changed by the presence of heat and/or pressure during processing. Vanilla is anything but "plain". Flavor scientists with all of their sophisticated equipment have never been able to exactly duplicate the flavor of Pure Vanilla.

VANILLA EXTRACTION

It takes a great deal of experience for the vanilla manufacturer to judge the quality of vanilla beans. Not only do they vary from the various areas of the world grown but also they will vary within a crop. Judgement

has to be based on appearance and odor in addition to the normal analytical results.

At Nielsen-Massey Vanillas, extreme care is taken with regard to the quality of the vanilla beans used. Each shipment is checked bundle by bundle as they are chopped to make sure they meet the highest standards. Because the importers from which Nielsen-Massey purchases know the quality they demand, they select these beans by going over their vast stocks for each shipment. They know any beans not meeting Nielsen-Massey standards will be returned.

Once the vanilla beans arrive in this country and are delivered to the vanilla extract manufacturer, the flavoring matter must be extracted from the beans. Alcohol is necessary to remove the flavoring matter from the vanilla beans. Most manufacturers recirculate alcohol and water over the beans under varying degrees of heat and/or pressure, depending on the manufacturer. This method is a very quick method lasting only 3-5 days. Nielsen-Massey, on the other hand, believes heat and/or pressure is detrimental and uses none in their extraction process. Under precise temperature control, 365 days a year, Nielsen-Massey extracts the delicate flavoring matter from the vanilla beans at 72 degrees Fahrenheit using specially constructed stainless steel extractors. After the beans are loaded into an extractor, a series of menstruums, solutions of alcohol and water are continually recirculated over and through the beans by use of pumps. The finished vanilla is then filtered into one of the holding tanks to await bottling.

Direct extraction can only be done to a Four-Fold strength. Above that, the vanilla is placed in a vessel and under heat and/or pressure, the liquid is driven off to

concentrate the vanilla. For example, if you place ten gallons of a One-Fold vanilla in a container and concentrate it down to one gallon, you would have one gallon of a Ten-Fold vanilla. However, if you taste this ten-fold vanilla versus a retained sample of the original one-fold you would notice a distinct difference in flavor.

Nielsen-Massey's extraction process takes a matter of weeks, rather than days. This slow gentle extraction requires three weeks to five weeks to complete depending on the batch type being produced.

VANILLA STANDARDS

Vanilla, and its' various associated products, is one of the only flavors which has its own Standard of Identity listed under the Code of Federal Regulations Title 21 Part 169. It states what ingredients are allowable in order for it to be called and labeled as pure vanilla.

There are various strengths of Pure Vanillas, designated as folds. As established by the Federal Food and Drug Administration, a fold of vanilla is the extractive matter of 13.35 ounces of vanilla beans, containing less than 25% moisture, to a gallon of liquid. A Two-Fold Pure should contain 26.7 ounces, a Three-Fold 40.5 ounces and a Four-Fold 53.4 ounces. As described earlier, vanillas can be even further concentrated but still must follow the above guidelines. Normally, the vanilla sold in retail outlets is a Single-Fold Extract. The stronger vanillas are normally used in manufacturing when large batches of products are being flavored.

By government standard, any product labeled as an extract must contain at least 35% alcohol by volume. Anything less than 35% alcohol should be labeled as a

flavor. This does not necessarily mean the product is an imitation but only that it contains lower alcohol. Although many imitation products are labeled as flavors because they contain lower alcohol percentages. As the alcohol is used to extract and to hold the flavoring matter of the vanilla beans in suspension, vanilla flavors such as some Single-Folds do not require the use of 35% alcohol because of the lower amount of flavoring matter per gallon. On the other hand, with their higher flavoring matter content, Two-Folds require a minimum of 35% alcohol while Three and Four Folds require higher. Our Single Fold Pure Vanilla Flavors and Pure Vanilla Extracts have identical flavor profiles except differ in alcohol percentage. This is because the alcohol does not add to the flavor of vanilla.

Pure Vanilla should be stored at room temperature, tightly closed. It should not be subjected to freezing temperature and should be kept away from direct sunlight and heat. After the vanilla has been sitting for awhile, some sedimentation may occur. This is simply the flavoring material settling out and the bottle may be agitated to put the flavoring material back in suspension. Vanilla beans should be kept in an airtight container also at room temperature. Vanilla beans should never be refrigerated, as mold may develop due to condensation. Properly stored vanilla extract may be held for at least four or five years and vanilla beans for at least two years with no adverse effects.

VANILLA PRODUCTS

The discussion, up to this point, has been concentrated on Vanilla Beans and Pure Vanillas. Other natural vanilla products available are Pure Vanilla Powders, Pure Vanilla Paste and Exhausted Vanilla Bean Specks.

Pure Vanilla Powders are usually produced by spray drying pure vanilla extract onto a carrier, usually dextrose based. During the spray drying process however, some flavor components of the vanilla extract may be lost due to the heat used. The Vanilla Powder offered by Nielsen-Massey is based on a maltodextrin carrier and produced by a proprietary process developed exclusively for Nielsen-Massey.

Exhausted Vanilla Bean Specks, or Seeds, are produced from previously extracted vanilla beans using a drying, chopping and sifting process. They are commonly found in ice cream and other desserts and act strictly in a cosmetic manner, as they are flavorless.

Pure Vanilla Paste typically consists of pure vanilla extract and exhausted vanilla bean seeds in simple syrup with a natural thickener. It can be used interchangeably with vanilla extract in any product where the presence of the seeds or specks is desirable without having the problem of splitting and scraping the vanilla bean.

Another type of vanilla sold in both retail and commercial markets is an Imitation. The basic flavor ingredients of most Imitation vanillas are USP Vanillin and/or Ethyl Vanillin. Most vanillin is an artificial product derived as a by-product of the paper or petrochemical industry. The pulp from coniferous trees is treated to clean it for use as paper. The resulting sulfite waste solution goes through a series of cooking and chemical extractions, which removes the lignin from the ligneous sulfonate solution. The lignin is further purified to produce USP Lignin Vanillin normally called USP Vanillin. Ethyl vanillin, also artificial, is three times as strong as USP Vanillin. It is

made from Guaiacol, a coal tar derivative, by a chemical process.

In Imitation Vanillas, the USP Vanillin and/or Ethyl Vanillin are dissolved in alcohol, propylene glycol and/or glycerin. Numerous other ingredients may be used such as essential oils, esters, aldehydes, artificial and natural flavors. Carmel color may be added for appearance. Some even contain small amounts of Pure Vanilla.

Another category of vanillas is Vanilla-Vanillin blends, which is normally available on the commercial market. USP Vanillin may be added to Pure Vanilla at a rate of up to one ounce to the fold of Pure Vanilla. To determine the strength of this combination, the folds of Pure Vanilla and the ounces of USP Vanillin are added together. A One-Fold Pure Vanilla with one ounce of USP Vanillin added is a Two-Fold Vanilla Extract or Flavor. Other folds of vanilla and ounces of vanillin are similarly added together to give the total fold strength of the combination. Ethyl Vanillin is not allowed to be added to a Vanilla-Vanillin blend. The addition of the USP Vanillin to Pure Vanilla at the rate of one ounce to the fold of vanilla reduces the usage of the combination by 25%. Vanillin is extremely inexpensive in comparison to Pure Vanilla. However, if more than one ounce of Vanillin is added to the fold of Pure Vanilla, the resulting vanilla should, by law, be labeled as Imitation. At least 50% of the flavor has to be derived from Pure Vanilla.

There are also products on the commercial market called Vanilla or Pure Vanilla, with other natural flavors (or WONF). At the present time the federal Standards for vanilla, which specifically allows Vanilla-Vanillin blends, make no mention of natural flavors as allowable ingredients to Pure Vanillas. It is the writer's opinion,

therefore, that unless the Federal Standards are amended to allow the addition of natural flavors to Pure Vanillas, vanillas that contain any added natural flavor should be labeled Imitation.

As mentioned previously, the Mexican vanilla beans and the resulting extract, when properly produced, are high in quality. Unfortunately, with an ineffective Food and Drug Administration, many vanilla manufacturers in Mexico improperly manufacture and untruthfully label their products. Many vanillas labeled as "Pure" are, in fact, imitation or adulterated vanillas. Some contain a product, Coumarin, a carcinogenic, that was banned from food products made in the United States over 50 years ago. Coumarin is used as a flavor booster thus reducing the amount of vanilla beans, if any, that is used to produce the vanilla. The price charged for these types of vanilla is normally extremely low, making it seem like a bargain.

The various types of vanillas are reflected in the labeling of ice cream, custard, gelato, yogurt and other dairy product cartons. When the product is simply labeled "Vanilla" it is flavored only with Pure Vanilla. "Vanilla Flavored" products are flavored with a combination of Vanilla and Vanillin. "Artificially Flavored" means it is flavored with an imitation Vanilla, or a WONF Vanilla. The ingredient declaration for all food products should be carefully checked.

VANILLA APPLICATIONS

Vanilla is the number one flavor in the ice cream industry. However, its usage is not limited to the dairy industry. It is also used extensively in the confectionery, baking, beverage, foodservice and a variety of other

industries. Vanilla and its imitators have hundreds of uses. It is found in tobacco and perfumes as well as in glue for stamps and envelopes. In the household the uses are many and varied. The vast majority of dessert recipes the home and professional chef prepares contain vanilla as do many beverages and sauces. To eliminate the unpleasant odor of fresh paint, a few drops of vanilla can be added to the paint before use. Placing a vanilla bean under the seat of an automobile every few months will freshen the interior aroma. In addition, adding a small portion of a bean to the ground coffee can enhance a pot of coffee.

Industrially, the type and amount of vanilla used depends greatly on the application in which it is going to be used. The composition as well as the processing conditions of the product has a great affect on the type and usage level of the vanilla. Various ingredients can mask or otherwise affect the flavor delivery of the vanilla extract. Certain vanillas will perform better than others at high heat applications while others will work better in other harsh environments. Thus, it is important to define the variety of vanilla best suited to deliver the proper flavor profile for each product.

As specialists in Pure Vanilla Products, Nielsen-Massey Vanillas manufactures only Pure Vanillas, no Vanilla-Vanillin Blends, no Vanilla WONF and no Imitation Vanillas. In business since 1907, Nielsen-Massey has built an enviable reputation for the quality and consistency of its Pure Vanillas. As one of the largest Pure Vanilla suppliers worldwide, they manufacture a majority of their vanillas from vanilla beans grown in Madagascar, Mexico, Indonesia and Tahiti, although they are constantly reviewing potential sources from other growing regions.

Our experts, with years of vanilla experience, are ready to work in conjunction with your team to develop the vanilla best suited for your application. Whether, it is the popular Madagascar Bourbon, the lower costing Indonesian beans, or a blend of different varieties of vanilla beans, Nielsen-Massey will provide the optimal pure vanilla for each application. A large portion of their work involves the custom blending of different pure vanillas in order to achieve their customers' satisfaction.

We hope the reader has enjoyed this brief "Story of Vanilla", and found the contents interesting and informative. Please feel free to contact Nielsen-Massey Vanillas with any additional questions.