



**Title**

**Vanilla-aroma queen from Madagascar**

**Author**

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**Table of activities**

<b>School subject</b>	<i>Chemistry</i>
<b>Topic</b>	<i>Aldehydes and ketones</i>
<b>Age</b>	<i>18 years</i>
<b>Required time fo the acitivity</b>	<i>90 minutes</i>
<b>Required materials</b>	<i>Vanilla spice, the Internet</i>
<b>Cultural concept</b>	<i>The biggest vanilla produced is Madagascar. Connecting distant contries and historical facts and its influence to our cuisine</i>



# Education Resilience in Europe

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## Teaching concept

The goal of this activity is to show learn about chemical content related to aldehydes and ketones through the most famous spice-vanilla.

## Cultural concept

Vanilla, considered as the queen of aromas, is one of the most sought-after and expensive spices globally, with a rich history dating back to the ancient Aztecs. This spice originally came from Mexico and was introduced to Europe in the 16th century by the Spanish conquistador Cortez. However, the task of moving vanilla from Mexico to other regions proved to be challenging since only specific Mexican bees known as meliponas could pollinate its flowers. It was not until 1841, on the French island of Reunion, that Edmond Albius developed the technique of artificial insemination of vanilla, which is still used today. The island was later renamed Bourbon, giving rise to the name Bourbon vanilla. Today, Madagascar is the largest producer and exporter of vanilla. Through the study of vanilla, this activity aims to educate participants on the chemical content of aldehydes and ketones.

## Chemical concept

Properties of aldehydes and ketones.

## Aim of the activity

The objective of this activity is to enable students to utilize their knowledge of chemistry in comprehending the properties of aldehydes and ketones.

## Activities

This activity is divided into three segments, each aimed at exploring a different aspect of aldehydes, ketones, and vanilla:

In the first segment of the activity, students will learn about the chemical properties of aldehydes and ketones. Aldehydes and ketones belong to a group of compounds called carbonyl compounds, which are characterized by the carbonyl functional group. An aldehyde is a carbonyl compound that contains a hydrogen atom attached to the carbon atom of the carbonyl group. The functional group of an aldehyde is called the aldehyde group. A ketone, on the other hand, is a carbonyl compound that contains a carbonyl group attached to two other carbon atoms. The functional group of a ketone is called the keto group.

*Aldehydes and ketones are commonly found in nature and are important components of many compounds such as hormones, monosaccharides, and aromatic plants like vanilla and cinnamon. For example, formaldehyde or methanal can be formed during forest fires and is also a component of tobacco and car exhaust gases. Acetaldehyde or ethanal can be found in coffee and flour and is responsible for causing hangovers after consuming alcohol. Acetone or propanone can be detected in the urine of people with diabetes in higher concentrations. Vanillin and cinnamaldehyde are aldehydes that are components of aromatic plants like vanilla and cinnamon.*

*The second segment, students will learn about vanilla spice and its chemical composition. Vanilla is a fermented fruit obtained from special orchid species belonging to the Orchidaceae family. There are three types of orchids that produce vanilla, but the most popular is *Vanilla planifolia*, which is harvested on Bourbon vanilla islands such as Madagascar, Comoros, La Reunion, Seychelles, and Mauritius. Only Bourbon vanilla from these islands can be called "Bourbon vanilla". Another species is *Vanilla tahitensis*, originally grown in Tahiti, and the third is *Vanilla pompona*, which is used to obtain perfumes.*

*The main ingredients of vanilla are phenolic heterosides, which are glucosides of vanillin (vanilloside) and vanillyl alcohol (vanilloside). During the fermentation of the fruit, ALDEHYDE VANILLIN is released from the heteroside and is responsible for the characteristic smell and aroma of vanilla. Vanilla also contains other compounds such as anis-aldehyde, anis-alcohol, and piperonal.*

*The third segment is about the flavor of vanilla, which is widely used in the food, pharmaceutical, perfumery, and cosmetic industries. Vanilla plants require specific growing conditions and produce limited quantities, which cannot meet the high demand, and therefore, synthetic vanillin is often used. The sweet and velvety aroma of vanilla adds a delicate and unforgettable flavor to dishes, promotes joy, relaxation, and creativity, and has a soothing effect that relieves nervous tension and negative thoughts.*

*Vanilla is mainly used in sweet dishes such as cakes, cookies, cakes, syrups, creams, puddings, biscuits, and ice cream, but it can also be used to flavor seafood dishes, chicken, soups, tea, coffee, and milk drinks. It is often combined with chocolate and fruit, and also used to enrich punch, hot chocolate, mulled wine, sangria, and chocolate liqueur.*