THE DETERMINATION OF THE AMOUNT OF VANILLIN IN COMMERCIALLY AVAILABLE PRODUCTS

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ABSTRACT

The purpose of this study was to determine whether there is a correlation between the amounts of vanillin and the taste of the commercially available products. Extraction of vanillin from such products obtained from the local restaurants was achieved by using a combination of organic solvents and the amounts of vanillin determined using the gas chromatographic (GC) technique. We anticipate that this study may be able to inform the consumer (us) whether the taste we enjoy from our favorite vanillin containing products is due to the amount of vanillin present or not.

BACKGROUND

Structure of Vanillin

Vanillin Crystals

Vanillin is the main component found in vanilla beans. It is also known as 4-hydroxy-3-methoxybenzaldehyde. The first person to isolate vanillin from vanilla beans was Nicholas-Theodore Gobley in 1858. Vanilla plants (Vanilla planifolia) were originally found in Central America and Mexico. The Mayan and Aztec civilizations were among the first groups of people to use vanilla as a flavoring agent. Vanillin is found as β-D-glucoside inside the vanilla pods. It is released from the glucoside by enzymes after the vanilla pods are cured. Vanillin is a yellowish solid that melts at 81°C and boils at 286°C. It can be found in many consumer products: foods, beverages, perfumes, pharmaceuticals, etc. Besides extracting vanillin from vanilla beans, it can be synthesized in labs via bioconversions of ferulic acid, eugenol, etc. and microorganisms.1

OBJECTIVE

Purpose of this project was:

a) To determine the amount of vanillin present in milkshakes from different fast food restaurants,

b) To find if there is a price correlation with the amount of vanillin present.

PROCEDURE

The vanilla milkshake was extracted in a separatory funnel. Ethyl acetate was used to extract the vanillin. The ratio of ethyl acetate to milkshake was 1:1. Each extraction consisted of 25mL of milkshake and 25mL of ethyl acetate. Each portion of milkshake (25mL) was extracted twice. The ethyl acetate extracts were dried using anhydrous sodium sulfate and concentrated using a rotary evaporator. The gas chromatography (GC) technique was used to determine the amount of vanillin present in each milkshake.

RESULTS

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of milkshake</td>
<td>335mL</td>
<td>300mL</td>
</tr>
<tr>
<td>Total extraction (g)</td>
<td>1.817g</td>
<td>2.019g</td>
</tr>
<tr>
<td>% vanillin present</td>
<td>0.33%</td>
<td>0.45%</td>
</tr>
<tr>
<td>% unknown compound present</td>
<td>0.13%</td>
<td>0.02%</td>
</tr>
<tr>
<td>Amount of vanillin present</td>
<td>1.303g</td>
<td>1.926g</td>
</tr>
<tr>
<td>g vanillin/mL milkshake</td>
<td>0.0042g/mL</td>
<td>0.0057g/mL</td>
</tr>
<tr>
<td>Price per unit ($/mL)</td>
<td>$0.0059/mL</td>
<td>$0.0063/mL</td>
</tr>
<tr>
<td>Price (g)</td>
<td>$1.37/g</td>
<td>$0.72/g</td>
</tr>
</tbody>
</table>

SUMMARY

It was found that there were more vanillin and a higher level of vanillin per mL of milkshake in B's milkshake. The amount of vanillin present in B was twice the amount found in A. When comparing the price between the two, it was found that even though the price per unit was higher for B, this might be due to the higher level of vanillin. A close examination showed that the price per gram of vanillin present in milkshake was cheaper for B's milkshake.

FUTURE WORK

For future work, more samples would be tested for the percentage composition of vanillin. Also, to determine if people's preference for certain vanilla milkshake is correlated with the amount of vanillin.

REFERENCES