



Using Consumer and Laboratory Research for the Development of a Printed and On-line Brochure Promoting Consumption of Safer Fruits and Vegetables

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Introduction

- **Studies have found that the chances of developing certain diseases such as type 2 diabetes, heart disease, and cardiovascular disease are linked to the foods we eat.**
- **Greater consumption of fruits and vegetables reduces risk of some diseases.**
- **According to the 5 A Day program, only 27% of women and 19% of men reported eating the recommended number of servings of fruits and vegetables everyday. This number is frequently even lower in disadvantaged populations.**

Introduction cont.

- **Efforts have been focused on increasing intake of fresh fruits and vegetables.**
- **As consumption increases, protection from food-borne illness becomes of added importance**

Purpose

- **To develop a comprehensive brochure that included information on:**
 - **Nutrition**
 - **Purchasing**
 - **Cleaning**
 - **Storage**
 - **Adapt the brochure for web presentation**
 - **Track usage of the brochure**

Methodology

- **A comprehensive approach to developing a food safety brochure included:**
 - **Determining consumers' fresh fruit and vegetable consumption and cleaning practices,**
 - **Assessing effectiveness of these cleaning methods,**
 - **Developing an educational brochure, and**
 - **Adapting the brochure for web presentation and tracking.**

Results

Most frequently consumed fresh fruits and vegetables were:

apples

lettuce

broccoli

tomatoes

Cleaning methods included:

rubbed and rinsed

rinsed only

brushed and rinsed

or wiped with a wet and/or dry paper towel



Results cont.

Cleaning solutions included:

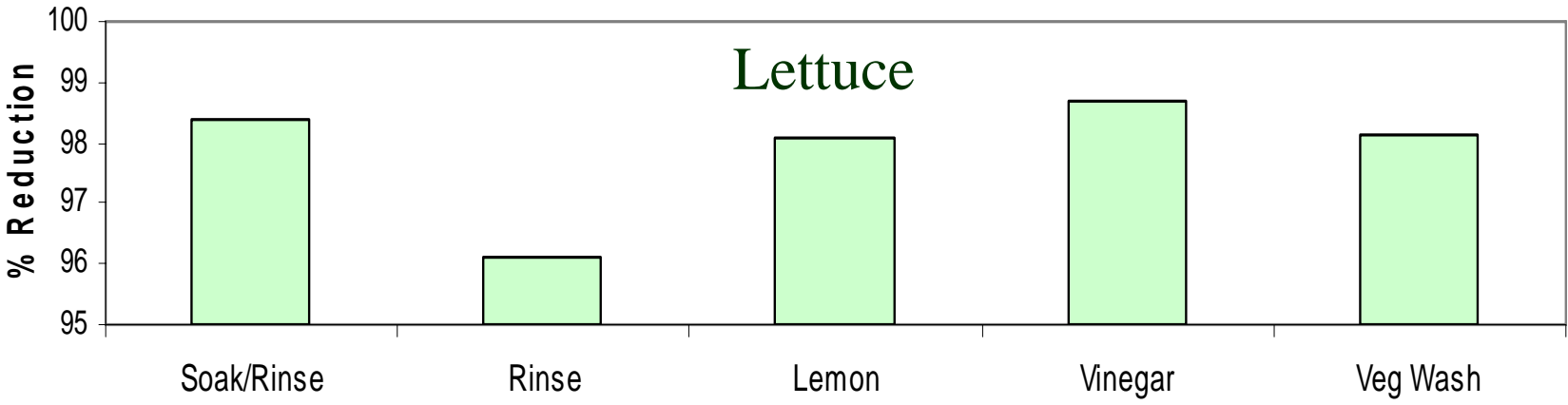
water

lemon juice

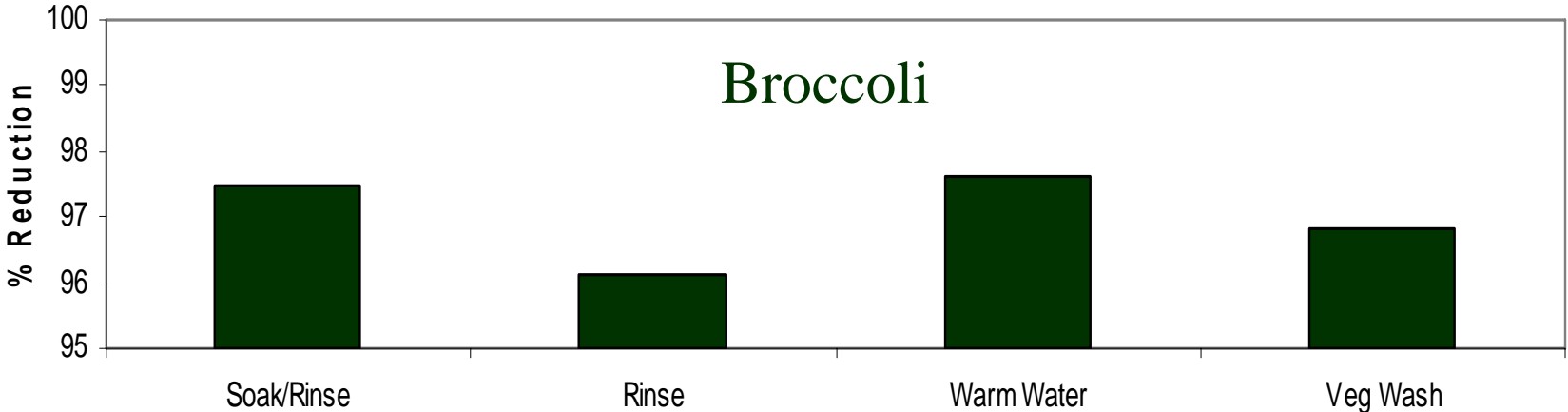
vegetable wash

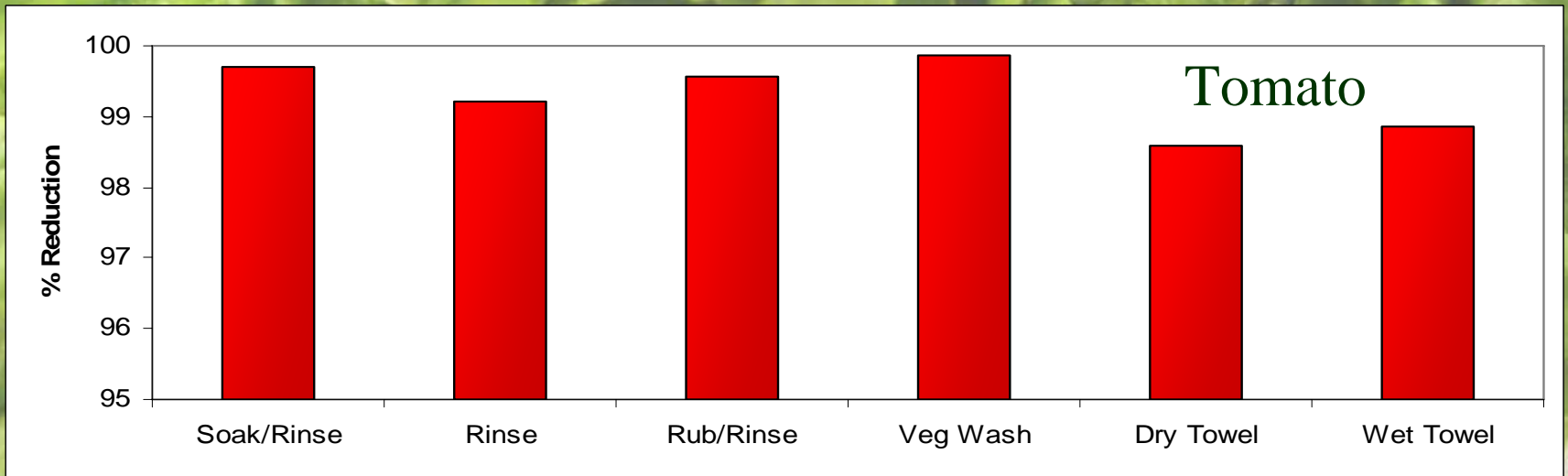
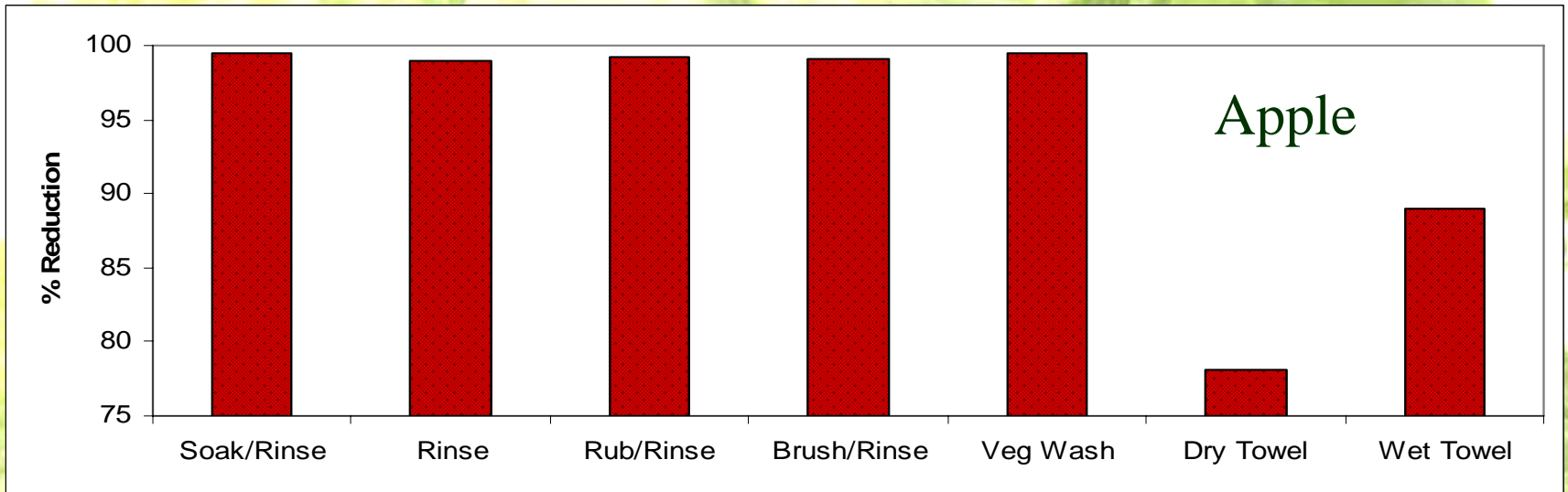
vinegar

Lettuce



Broccoli





Conclusions from lab study

- Wiping apples and tomatoes with paper towels showed little bacterial reduction.
- Generally, water, vinegar, lemon juice, and vegetable wash solutions reduced bacteria population approximately the same amounts
- It is cost effective for consumers to use cold running tap water instead of other washing solutions to reduce microbial contamination on fresh produce

**Educational
Brochure
Prepared and
Evaluated:
Discussion
Groups,
Nutritionists**

**EATING FRUITS
AND VEGETABLES
FRESH AND CLEAN**



C. Agyemang, S. Godwin, F. Chen and
A. Kilonzo-Nthenge.
Institute of Agricultural and
Environmental Research,
Tennessee State University, 2004

EAT THEM

Consumption of enough fruits and vegetables has become a great concern in the US during recent years. The rich vitamins and minerals found in fresh fruits and vegetables make them very special as the cornerstone of a healthy lifestyle. Unfortunately, only 20% of all Americans eat five or more servings of fruits and vegetables a day (not including french fries and potato chips), the minimum amount recommended by nutritionists. Scientists, researchers and the media give reports supporting the fact that fruits and vegetables are essential for good health. Eating 5-9 fruits and vegetables can help prevent serious diseases such as cancer and heart disease. Have you ever considered looking at the 5 a Day for Better Health Program? It recommends making your meal time colorful and healthy. Think about the different colors of fruits and vegetables that are available to add to your meal each time you eat and it will become a habit. And guess what? A habit is hard to change.

RED: Strawberries, Watermelon & Tomatoes



Orange & Yellow: Oranges, Carrots & Papaya



Green: Spinach, Broccoli & Green Beans



White: Pears, Bananas & Cauliflower



Blue & Purple: Blackberries, Purple Cabbage & Eggplant





Eating Fruits and Vegetables ↓ Fresh and Clean*

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Tennessee State University*

The Food Safety, Nutrition, and Family Well-Being Team is working to increase the consumption of fruits and vegetables prepared in a safe manner. This brochure was developed as part of this effort *

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A combination of fruits and vegetables can keep your heart healthy, strengthen your immune system, give you good memory, good vision health, give you strong bones and teeth, give you a healthy weight, lower your risk of high blood pressure, stroke and as previously mentioned lower your risk of cancer. There may be even more health benefits.

An average of four strangers handled your apple before you chose it and up to 20 may have handled your tomato - Ann Zander

Be Alert

Raw and minimally processed produce can occasionally become contaminated with disease-causing organisms such as *Escherichia coli* O157: H7, *Salmonella*, or *Listeria monocytogenes*. Since the number of illnesses associated with eating fruits and vegetables has increased, scientists and public health agencies want to be sure consumers know how best to keep their foods safe to eat. In addition to bacteria, produce can pick up dust and soil during harvesting, packaging, handling and shipping. Fresh fruits and vegetables may also have traces of chemicals on the surface. As much as fresh fruits and vegetables are healthy so do they present food safety challenges.



Consider This:

How would you feel to learn that excess bacteria ended up in your body, and you could have prevented it? It may have been an unused minute or two of your time or perhaps just not paying close attention to information at your reach. Bacteria can cause nausea, stomach upset, diarrhea, or even death once they enter the human body. Since it is hard to recognize bacteria with the naked eye, you need to be aware that it is not only present in rotten, damaged or bruised fruits and vegetables, but may also be present in nice looking ones.



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Basic Facts:

- ◆ Some produce such as strawberries should not be washed before storage. Washing before storage will cause some fruits and vegetables to spoil faster.
- ◆ All fruits and vegetables should be washed with cold, running tap water before eating. And if washed twice or more, better becomes best.
- ◆ Fruits and vegetables are not to be washed with detergent or bleach.
- ◆ Special cleaning agents are not needed. Plain water works best and is the safest for washing produce.
- ◆ Blowing on an apple and rubbing it on your clothes does not make it clean to eat. The good news is that you know you are safe after washing your produce thoroughly.
- ◆ Some produce such as bananas and mangoes which are sometimes stored at room temperature to speed ripening are to be kept dry and clean.



What Can Help?

- ◆ Look for fresh looking fruits and vegetables without bruises or mold. Avoid produce that is shriveled that shows signs of insect bites or anything that smells rotten.
- ◆ Buy only what is needed for a few days.
- ◆ Do not put other grocery items on top of fruits and vegetables in the shopping cart. They can easily be damaged.
- ◆ Exercise the habit of keeping your kitchen environment clean. This includes your refrigerator.
- ◆ Wash your hands often and teach your family and people around you to do the same. If individual families exercise this habit there will be a society with healthy families and a world full of healthy people.
- ◆ All fruits and vegetables should be washed even if the rind or skin is not going to be eaten. Washing prevents bacteria on the surface from being transferred to the inside when cut or peeled.
- ◆ Remember to refrigerate produce that needs to be refrigerated as soon as you bring it home if it is not going to be eaten immediately.



The Washing Process

Wash firm fruits and vegetables such as apples, pears, cucumbers and carrots more briskly than soft ones such as tomatoes, strawberries, peaches and grapes. Certain produce such as potatoes are to be cleaned with a vegetable brush.

Apples, Cucumbers, Peaches & Such:

- ◆ Make sure sink is clean.
- ◆ Hold produce under running water in both palms and rub turning continuously.
- ◆ Wipe dry with clean paper towel and enjoy.

Strawberries, Grapes & Such:

- ◆ Make sure sink is clean.
- ◆ Place fruits in a colander. Run cold water over the produce while rubbing each fruit gently with the fingertips.
- ◆ Drain in the colander and enjoy.

Lettuce, Spinach, Cabbage & Such:

- ◆ Make sure sink is clean
- ◆ Remove and discard outer layers
- ◆ Separate and hold individual leaves under cold running water while rubbing with tip of fingers. You can also soak for a few seconds before you rinse if desired.
- ◆ Repeat this process until water is clean of particles.
- ◆ Shake produce to drain. If you wish to dry it, be sure to use clean paper towel.



Oranges, Melons, Cantaloupes & Such:

Some consumers do not consider it necessary to wash such produce because the rind or skin is not eaten. Have you ever considered who may have handled your produce before you did and what they had on their hands? They may have used the bathroom and not washed their hands and handled your melons, bananas and oranges. Therefore, all produce should be washed before cutting or peeling. As mentioned earlier, this prevents germs from being transferred from the outside to the inside of the produce.

- ◆ Hold produce under cold running water if possible. Scrub lightly with a vegetable brush while turning continuously.
- ◆ Cut with a clean knife or peel with clean hands.



Potatoes, Zucchini, Carrots & Such:

- ◆ Make sure sink is clean.
- ◆ Scrub produce with a vegetable brush, being sure to turn while brushing, while holding it under cold running water.
- ◆ Wipe with a clean paper towel and peel or cut as desired with a clean knife.



Healthy Recipes

Fresh Fruit Salad

You Need:

- 1 medium cantaloupe
- 1 medium honeydew
- 1 medium pear
- 1 cup red seedless grapes
- 2 medium kiwi
- 2 teaspoons of lemon juice

Method:

- ◆ Clean fruits thoroughly as described in previous pages.
 - ◆ Peel and dice cantaloupe, honeydew, kiwi and pear.
- In a large bowl combine diced fruits with grapes and toss with lemon juice.
- ◆ Serve and enjoy.

Tip: You can add diced watermelon for added color if desired.



Garden Fresh Salad

You need:

- 2 cups leaf lettuce, cut
- 1 cup broccoli florets, cut
- ½ cup carrots, shredded
- 1 cup baby spinach
- ½ cup purple cabbage, shredded
- ½ cup diced tomatoes

Method:

- ◆ Clean all vegetables as described in this booklet.
- ◆ Combine all ingredients together in bowl and serve with your favorite dressing



Tips to Go

- ◆ Keep your refrigerator clean.
- ◆ Wrap or cover any unused cut produce in the refrigerator to keep it fresh and nutrients intact. This also helps prevent cross contamination by contact with other foods.
- ◆ Fresh fruits and vegetables are low in calories. Eat a wide variety of them often.
- ◆ If you happen to be given an apple when there is no water to wash it, rubbing it on your clothes or with a cloth is not enough. Wait and eat it after you have washed it.
- ◆ There is no method which can completely eliminate bacteria from fresh produce without interfering with the taste, quality, texture and color of the produce.
- ◆ The elderly, infants and young children, pregnant women, persons with HIV/AIDS, and other immune compromised persons are more susceptible to foodborne illness than other groups of people. Cleaning produce thoroughly before eating it is especially important for these people.



Sources

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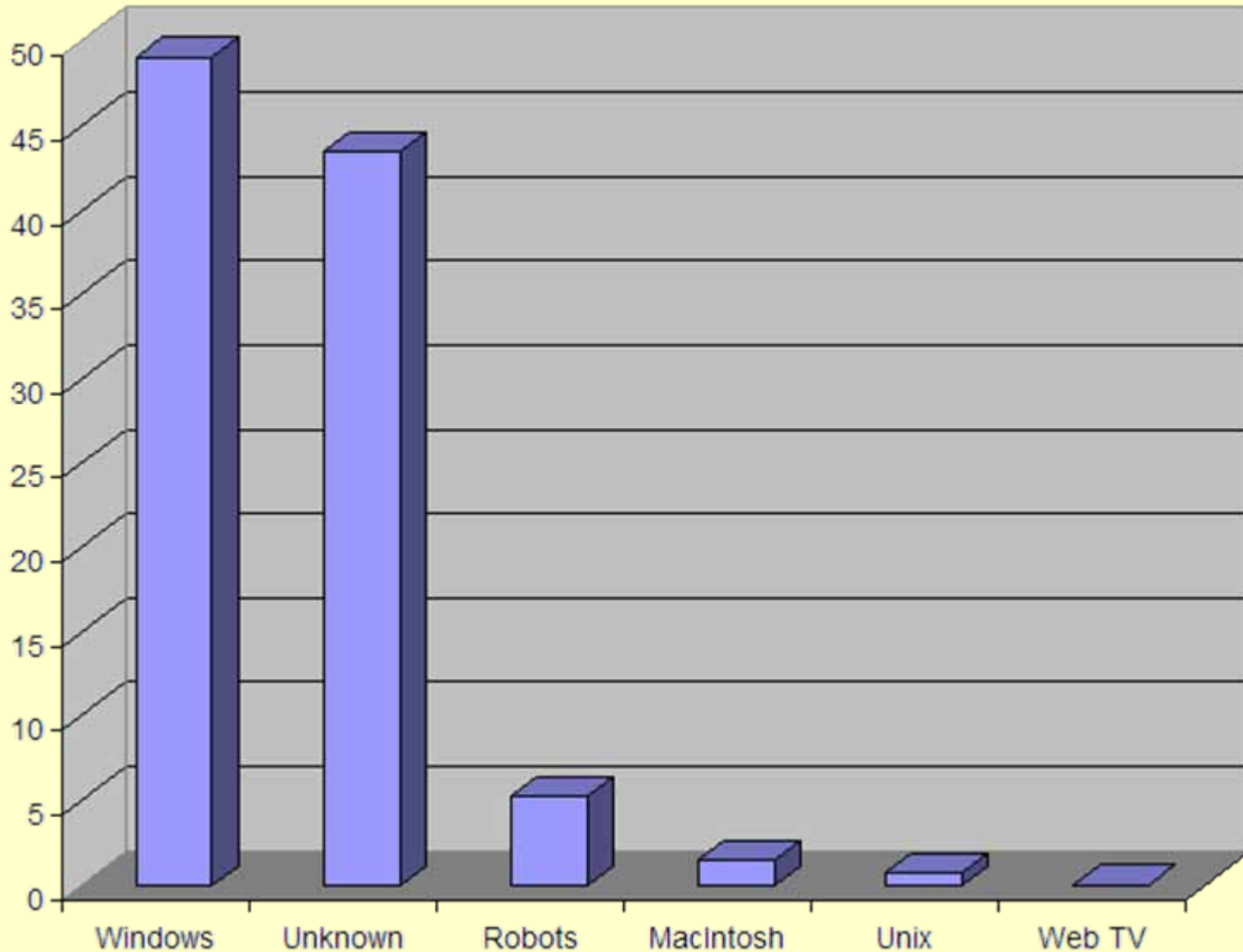
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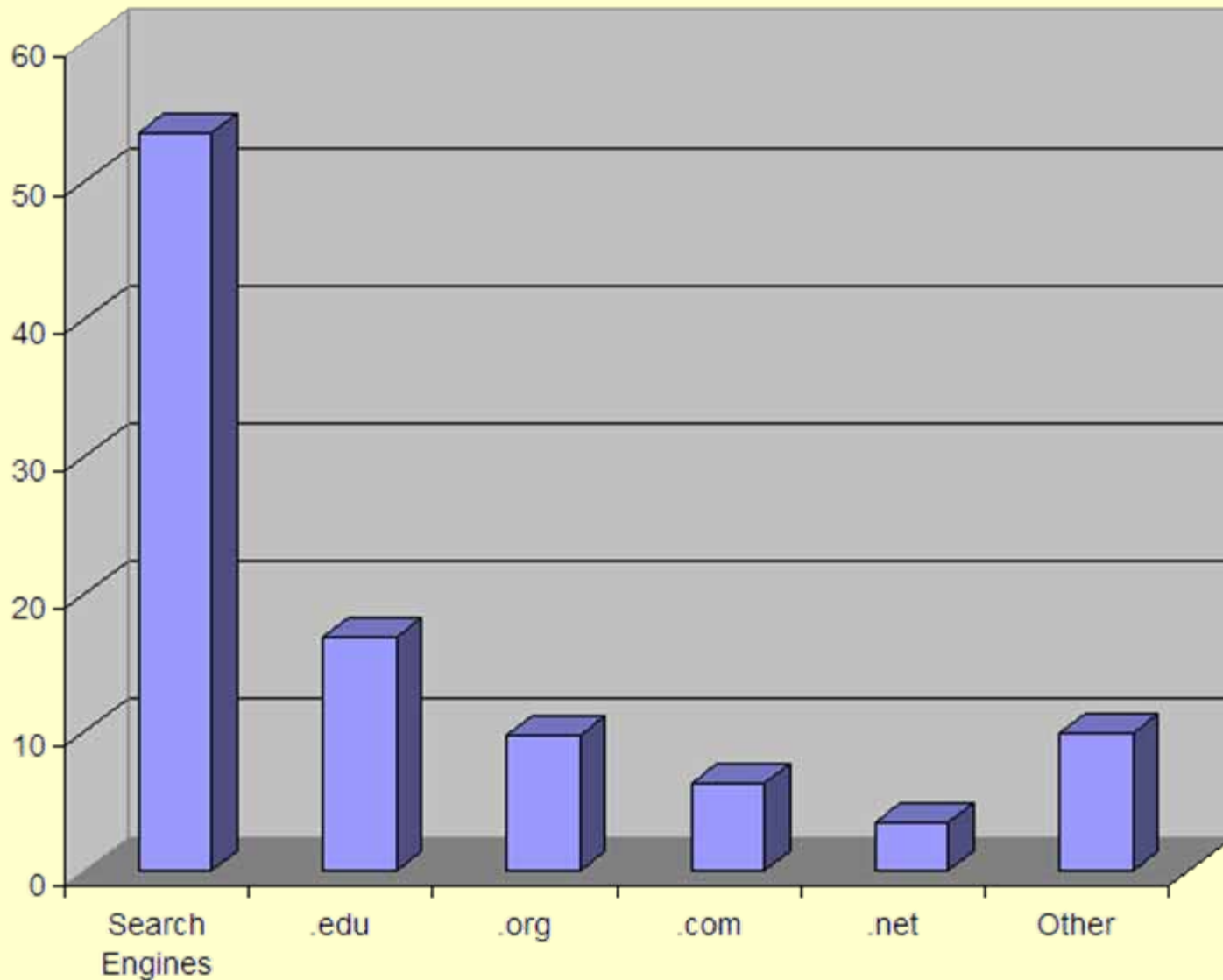


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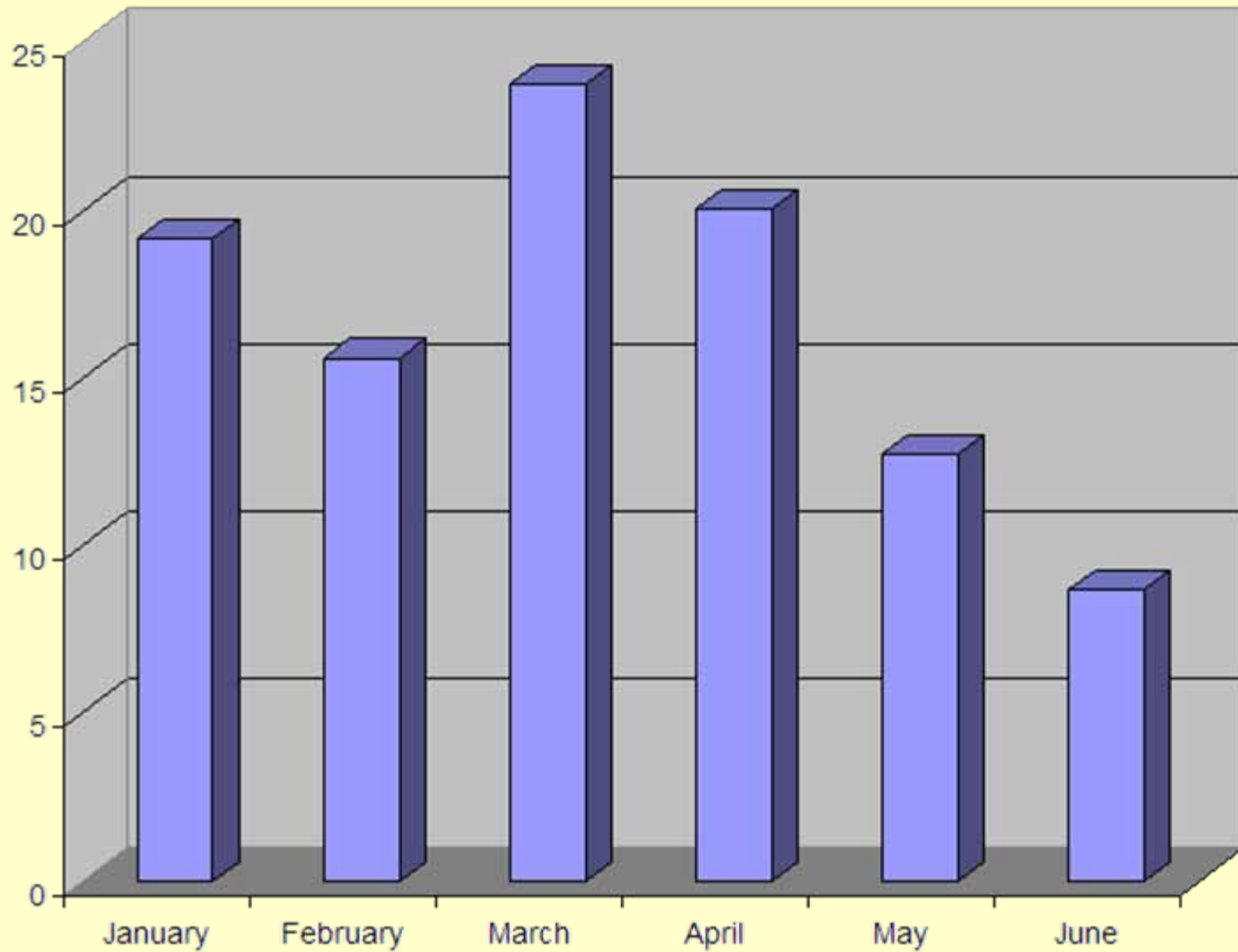
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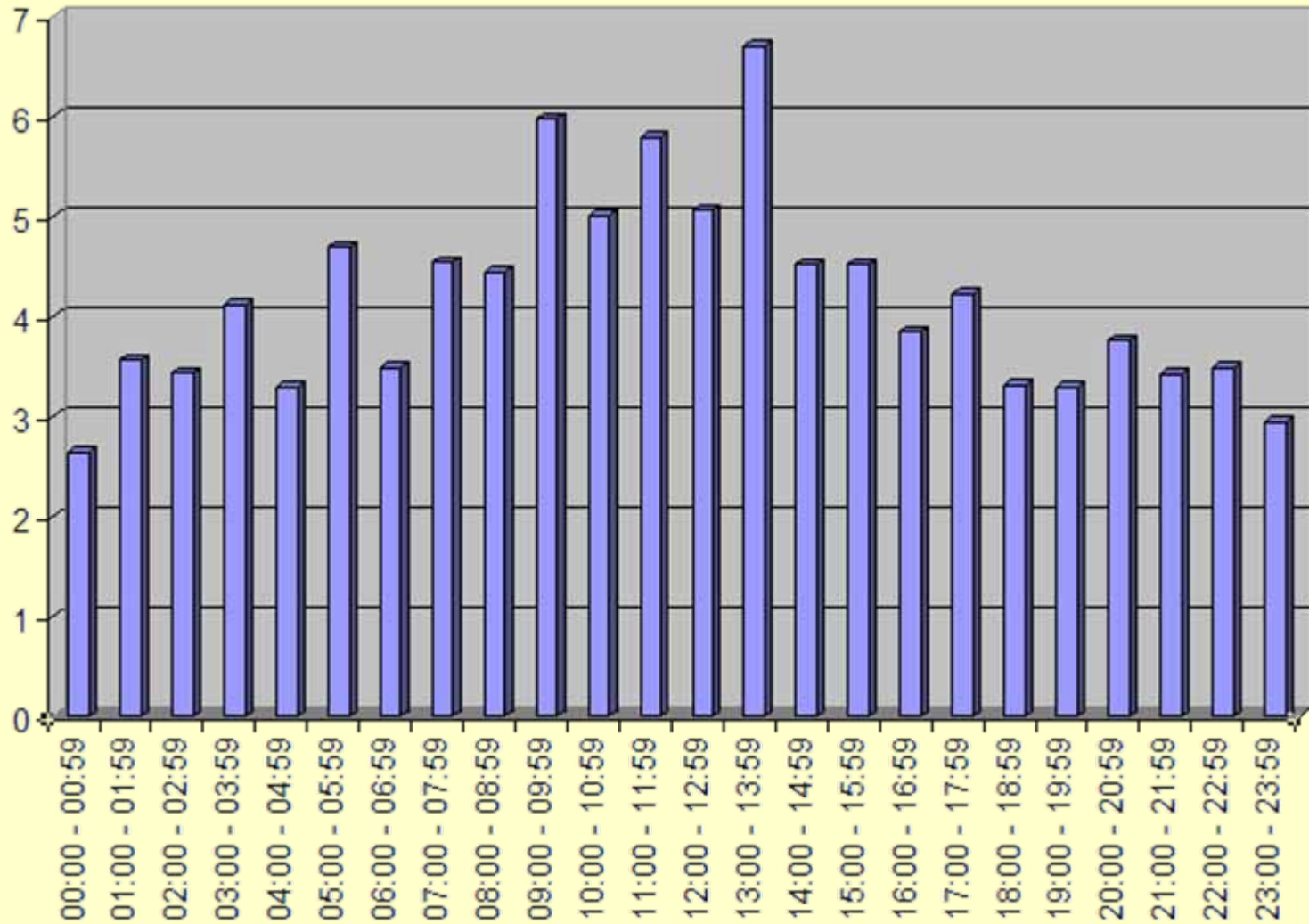
Many operating systems were used to access the Web brochure. It is important to ensure compatibility across multiple platforms, including those generally considered obsolete.



Referring websites revealed the source of visitors to the brochure page. The majority of visitors were referred to the page by search engines. This data also revealed worldwide access to the page.



The month of the year can often be used to identify trends in user profiles. Over extended periods of time, correlations often become visible within user profile data.



Time of day of visits is useful for developing profiles of visitors. It is interesting to note that the highest percentages of visits surrounded the noon hour.

http://www.tnstate.edu/iager/impacts/eating_fruits.htm



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