CAKE-BAKING EXPERIMENT

1. Problem Formulation

In this case study you will be involved in an experiment of baking a peanut butter carrot loaf. We will use the experiment to demonstrate two-way analysis of variance with three levels of temperature and three levels of baking time.

Objective

Baking conditions, such as time and temperature, are important concerns in developing a cake mix that will perform for a wide variety of users. In most recipes, the baking time and temperature are usually provided. Because oven and timer settings vary, the mix must bake satisfactorily at ranges of temperatures and times.

The purpose of the experiment is to assess the impact of different combinations of the levels of temperature and baking time on the taste of the cake. Is the cake better when it is baked in slightly higher temperature or when it is baked a little bit longer than stated in the instructions on the package? Is there any interaction between baking temperature and baking time? We will answer all the questions by conducting an experiment.

You will have to design the experiment, collect the data, enter the data into SPSS, carry out the statistical analysis, and formulate your conclusions. The data collection equipment used in the experiment is very simple and relatively cheap.

The instructions provided in the study will allow you to carry out the experiment, produce and examine your own data. However, if you do not wish to be involved in the data collection process, you can use our data.

Statistical Concepts

Planned experiments, two-factor design, randomization, complete block design, general linear model.

Materials Needed

The experiment can be carried out in normal kitchen conditions, and it does not require any sophisticated and expensive measuring equipment. You should have an oven with properly working temperature indicator and timer. The experiment can be carried out in a team.

Software

The data will be analyzed using SPSS version 8.0.