Initial Considerations

Topics of Elementary Statistics

Introductory Notions

General Ideas

Variables

Populations and Samples

Importance of the Form of the Population

First Ideas of Interference on a Normal Population

Parameters and Estimates

Notions on Testing Hypotheses

Inference of the Mean of a Normal Population

Inference of the Variance of a Normal Population

Inference of the Means of Two Normal Populations

Independent Samples

Paired Samples

Linear Relationship between Two Quantitative Variables

Quantification of a Simple Linear Relationship

Functional Relationship amongst Two Variables

Understanding Factorial Designs

Introductory Concepts

Completely Randomized Experimental Designs with a 2k Factorial Scheme

Factorial 22 with Non-Significant Interaction

The 22 Factorial without Repetitions

Factorial Fractions with Two Level

General Concepts

Half Factorials: ½ Fraction

Quarter Factorials: ¼ Fraction

Comparison of the Methodologies: Study of One Variable at a Time versus Factorial Design

Introduction

Case Study - Evaluation of the Effects of pH and Temperature on the Activity of an Enzyme

Experimental Strategy for Fractional Factorials and the Central Composite Rotational Design (CeRD)

Introduction

Case Study - Experimental Design for 2 Independent Variables

Case Study - Experimental Design for 3 Independent Variables

Case Study - Experimental Design for 4 Independent Variables

Case Study - Experimental Design for 5 Independent Variables

Case Study - Experimental Design for 6 Independent Variables

Case Study - Experimental Design for 7 Independent Variables

Case Study - Experimental Design for 8 Independent Variables

Selection of Variables

Fundamental Theory of the Plackett and Burman (PB) Designs

Locating the Problem

Hadamard Matrices

Some Properties of the Designs

PB Matrix Design

Final Considerations

Matrices of the PB Design

Recommendations

Matrices of the PB Design

Determination of the Main Effects and Calculation of the Deviations for PB Designs

Case Study using PB Design

Case Studies - Applications in Product Processes and Formulations

Case Study - Synthesis of Dextran - Analysis of the Model as from the Coded and Real Values

Case Study - Development of Bread with Substituted Ingredients

Case Study - Alkalization Process of Cocoa Nibs (Theobroma Cacao L.) and Evaluation of Quality

Case Study - Batch Distillation of the Natural Aroma of Cashew Fruit

Case Study - Evaluation of Curvature in Fractionated and/or Plackett and Burman (PB) Designs where the Central Point Responses are Lower or Higher than the Other Treatments