PLANEJAMENTO EXPERIMENTAL E OTIMIZAÇÃO DE PROCESSOS

Profa. Dra. Delia Rita Tapia Blácido

OBJETIVOS

- Conhecer as ferramentas estatísticas necessárias para planejar as pesquisas em forma eficiente permitindo o estudo de mais variáveis com menor número de experimentos.
- Conhecer as vantagens e desvantagens dos tipos de planejamento experimental
- Aplicar a análise estatística para avaliar efeitos das variáveis do estudo sobre as respostas.
- Otimizar os parâmetros envolvidos em diferentes processos usando planejamento experimental.

Conteúdo

1. Conceitos básicos de estatística.
2. Tipos de delineamento experimental: Delineamento Inteiramente Casualizado (DIC), Delineamento em Blocos Casualizados (DBC), Quadrado Latino (QL).
3. Testes estatísticos para comparação de médias. Teste de Tukey, Duncan e Fisher
4. Planejamento Fatorial Fracionado
5. Planejamento Plackett-Burman
6. Delineamento composto rotacional (DCCR). Ajuste de modelos.
7. Delineamento Box-Behnken
8. Análise de superfície de resposta.
9. Otimização de processos por análise de multirespostas

Software

- Statistica 7.0
- Statistica 10.0
- Statistica 14.0

Avaliação

- Listas de exercícios
- Seminários ou escrita de artigos científicos (analisar e validar os resultados)

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Using Response Surface Methodology (RSM) to optimize 2G bioethanol production: A review

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ABSTRACT

Environmental concerns arising from the release of greenhouse gases have stimulated the search for more sustainable technologies, including bioethanol production from lignocellulosic biomass. However, the rigid and complex structure of this biomass means that lignocellulosic biomass conversion to bioethanol requires

Optimization of biomass saccharification processes with experimental design tools for 2G ethanol production: A review

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ARTIGO ACEITO

CHAPTER 10

Development of Analytical Methods for Analysis of Drugs of Abuse in Biological Fluids using Design of Experiments and Response Surface Methodology

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Abstract: New Psychoactive Substances (NPS), also known as design drugs, are developed by modification of the chemical structure of the initially prohibited substances. The idea behind this strategy is to create alternatives for consumption and to evade national and international control measures applied to controlled substances, bypassing the legislative prohibition. In this context, the emergence of NPS has raised questions about the analytical methods that can be applied to identify and to characterize these substances in different scenarios, including biological fluids (serum/plasma, whole blood, oral fluid, and urine). Because biological fluids are complex matrixes, a sample preparation step is required to remove undesired endogenous matrix components and to isolate and pre-concentrate the analytes before chromatographic analysis. Different extraction or sample preparation techniques such as liquid-liquid extraction, solid phase extraction, dispersive liquid-liquid

Forensic Chemistry

Use of Statistical Design of Experiments (DoE) in Forensic Analysis: a tailored review

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	Delia Rita Tapia-Blácido, Ph.D.
Abstract:	Forensic Analysis (FA) is strongly linked to Analytical Chemistry. Developing and optimizing methodologies to extract target substances from and to investigate the presence of analytes in bodily fluids is paramount, albeit a challenging task. Consequently, the use of Design of Experiments (DoE) and Response Surface Methodology (RSM) tools in FA has increased over the last years, which makes it relevant to understand how these tools are being employed to identify, to determine, and to quantify toxicants in biological specimens. This review shows two important findings among the forty papers reviewed: almost all the studies have used DoE/RSM in the sample preparation step, but the chromatographic and detection phases of the analytical scheme have been little explored. Additionally, the papers have focused mainly on optimizing the analytical peak signals of the target compounds, suggesting that detectability has been the major concern when applying multivariate techniques to develop the method. We hope this review will encourage future researchers in this area to use more design and optimization tools in a global analytical method development scheme, thus conducting fewer but efficient assays and contributing to shortened analysis time and fewer experimentation requirements such as smaller

ARTIGO SUBMETIDO

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