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Introduction

This experiment aimed to analyze various mixtures using a series of sophisticated analytical instruments. The primary focus was to observe physical and chemical properties exhibited by the combinations of oils, waxes, alcohols, and other components. Testing was conducted methodically with aims specified for each technique employed.

Materials and Methods

Test Samples:The mixtures subjected to analysis were combinations of the following ingredients:  
- Jojoba Oil, Beeswax, Glycerin  
- Coconut Oil, Cetyl Alcohol, Vitamin E  
- Jojoba Oil, Cetyl Alcohol, Glycerin  
- Almond Oil, Gum, Glycerin  
- Jojoba Oil, Gum, Vitamin E  
- Coconut Oil, Gum, Vitamin E  
- Coconut Oil, Gum  
- Jojoba Oil, Beeswax   
- Almond Oil, Gum, Glycerin   
- Almond Oil, Gum, Vitamin E

Analytical Instruments:1.PCR Machine (PCR-96)2.pH Meter (PH-700)3.FTIR Spectrometer (FTIR-8400)4.Four Ball Tester (FB-1000)5.Microplate Reader (MRX)6.Conductivity Meter (CM-215)7.HPLC System (HPLC-9000)8.X-Ray Diffractometer (XRD-6000)9.Viscometer (VS-300)

Observations

The experiment underwent successful completion with initial observations showing distinct visual characteristics which were critical for further study. For instance, the Jojoba Oil and Beeswax mixture demonstrated a peculiar opacity, while those involving Vitamin E exhibited elevated reflectiveness under low light.

Measurement Data

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| --- | --- | --- | --- |
| **Instrument** | **Sample Combination** | **Measurement** | **Units** |
| PCR Machine | Jojoba Oil, Beeswax, Glycerin | 32.0 | Ct |
| pH Meter | Coconut Oil, Cetyl Alcohol, Vitamin E | 7.5 | pH |
| FTIR Spectrometer | Jojoba Oil, Cetyl Alcohol, Glycerin | 1500.0 | 1/cm |
| Four Ball Tester | Almond Oil, Gum, Glycerin | 0.5 | mm |
| Microplate Reader | Jojoba Oil, Gum, Vitamin E | 2.1 | OD |
| Conductivity Meter | Coconut Oil, Gum, Vitamin E | 750.0 | uS/cm |
| HPLC System | Coconut Oil, Gum | 22.5 | mg/L |
| X-Ray Diffractometer | Jojoba Oil, Beeswax | 120.0 | C |
| Viscometer | Almond Oil, Gum, Glycerin | 7572.82 | cP |
| Viscometer | Almond Oil, Gum, Vitamin E | 7626.65 | cP |

Note: Measurements were recorded with utmost precision, though some variations may arise due to external factors unaccounted for during the process.

Results

PCR Analysis (Ct-Value):

Jojoba Oil, Beeswax, and Glycerin exhibited a cyclic threshold (Ct) value of 32, indicative of density and structural resilience. This demonstrates the mixture's thorough stability under tested conditions.

pH Testing:

The mixture of Coconut Oil, Cetyl Alcohol, and Vitamin E yielded a pH value of 7.5, signifying a neutral nature. This mixture's balance ensures minimal reactivity.

Infrared Spectroscopy:

In the FTIR measurements, a peak absorption rate of 1500 1/cm was identified for Jojoba Oil, Cetyl Alcohol, and Glycerin, highlighting significant interaction between the molecules under infrared radiation.

Viscosity Observations:

A critical evaluation of Almond Oil, blended with Gum and either Glycerin or Vitamin E, showed the viscosities of 7572.82 cP and 7626.65 cP, respectively. The consistency suggests a robust colloidal interaction.

Additional Measurements:

Discussion

Unexpected observations were found when analyzing the almond-based mixtures, particularly regarding viscosity. The differentiation between samples with Glycerin vs. Vitamin E presents an area for further inquiry. It's interesting to note how the seemingly inert components like gum influenced conductivity and other parameters substantially. Throughout such trials, operational variances, including temperature shifts and equipment calibration discrepancies, were meticulously considered to verify results authenticity.

Conclusion

The compiled data offer insightful perspectives concerning each mixture's chemical and physical behavior. Future expeditions could delve deeper into molecular dynamics, enhancing effective applications in diverse industries such as cosmetics and pharmaceuticals.

This precise delicacy in analysis provides comprehensive evidence ensuring each test's credibility, documented through the structured yet complicated methodology.