Lab Report 560

Introduction

The purpose of this lab report is to analyze various mixtures containing components such as oils, beeswax, and other additives. Multiple advanced instruments have been employed for detailed analysis. The results provide insights into the properties of these mixtures.

Experimental Instruments & Methodologies

Observations and Measurements

Table 1: Chemical Measurements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Instrument** | **Mixture** | **Measurement Type** | **Value** | **Unit** |
| Microplate Reader MRX | Coconut Oil, Beeswax | Absorbance | 2.5 | OD |
| Spectrometer Alpha-300 | Almond Oil, Beeswax | Wavelength | 450.2 | nm |
| Gas Chromatograph GC-2010 | Coconut Oil, Beeswax, Glycerin | Concentration | 234.0 | ppm |
| Four Ball FB-1000 | Jojoba Oil, Beeswax, Vitamin E | Wear Scar Dia | 0.45 | mm |

Unexpected Reading

Jojoba Oil with Cetyl Alcohol and Glycerin displayed unexplained elevated viscosity when tested with the Viscometer VS-300. Various hypotheses, including temperature variations and instrument errors, were considered, but further verification is needed.

Table 2: Viscosity Analysis

|  |  |  |
| --- | --- | --- |
| **Instrument** | **Mixture** | **Viscosity (cP)** |
| Viscometer VS-300 | Jojoba Oil, Cetyl Alcohol, Glycerin | 2554.11 |
| Viscometer VS-300 | Jojoba Oil, Cetyl Alcohol | 2772.56 |

Miscellaneous Data

Results

Table 3: Concentration and Compositional Consistency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Instrument** | **Mixture** | **Measurement Type** | **Value** | **Unit** |
| Liquid Chromatograph LC-400 | Coconut Oil, Beeswax | Concentration | 250.0 | ug/mL |
| Titrator T-905 | Almond Oil, Beeswax, Glycerin | Molarity | 0.005 | M |

Errors can arise from deliberately added complex components. However, consistent results were achieved across multiple replicates for most mixtures.

Discussion

Complex Interactions:- Coconut Oil interactions with other components showed significant variance when transitioning from gas chromatographic to liquid chromatographic results. The ppm to ug/mL conversion showed some inconsistencies potentially due to phase changes.  
- In varied trials, mixtures containing Glycerin had unexpected viscosity results, especially when measured alongside Cetyl Alcohol.

Potential Errors:- High variability noted in the Spectrometer’s wavelength reading for Almond Oil leads to questions about material purity.   
- The redundancy of reinforcement theory was tested but didn't seem fitting due to conflicting viscosity values.

Conclusion

The lab investigation has provided a broad view of different mixed components' physical and chemical properties. Such insights are vital for applications across skincare, lubrication, and various industrial purposes.

Note:Some readings were intentionally inserted with random data to broaden the range of analytical considerations. Each outcome has broader implications for industry applicability and can foster future development and studies.