Lab Report: Report\_1333

Abstract:This report includes a comprehensive analysis of various oil and wax mixtures using sophisticated instruments to assess their temperature, pH, absorption, viscosity, rheological, and chromatographical properties. The aim was to gather detailed data on how different combinations of oils and additives behave under specific conditions.

Introduction:The study of oil mixtures informs cosmetic, culinary, and industrial applications. Understanding how these mixtures react under different conditions is vital for improving product quality and performance. This report examines several mixtures, each consisting of different combinations of essential oils and additives, using various instruments to determine their physical and chemical characteristics. The mixtures tested in this report include Coconut Oil with Gum, Jojoba Oil with Glycerin, Almond Oil with Beeswax, and others.

Materials & Methods:

Instruments Utilized:1. Thermocycler TC-5000  
2. pH Meter PH-700  
3. UV-Vis Spectrophotometer UV-2600  
4. Rheometer R-4500  
5. Gas Chromatograph GC-2010  
6. Titrator T-905  
7. Viscometer VS-300

Tested Mixtures:- Coconut Oil, Gum  
- Jojoba Oil, Glycerin  
- Jojoba Oil, Beeswax  
- Almond Oil, Beeswax  
- Coconut Oil (alone)  
- Almond Oil, Cetyl Alcohol  
- Coconut Oil, Beeswax  
- Almond Oil, Glycerin  
- Jojoba Oil, Gum, Glycerin

Results:

Table 1: Temperature and pH Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** | **Device Used** | **Measurement** | **Unit** |
| Coconut Oil, Gum | Thermocycler TC-5000 | 85.2 | C |
| Jojoba Oil, Glycerin | pH Meter PH-700 | 6.5 | pH |
| Coconut Oil, Beeswax | Thermocycler TC-5000 | 77.3 | C |

Observations:

Irrelevant data collected during thermocycler calibration indicated erratic readings which were disregarded. It is noteworthy that gum presence influences the thermal properties of coconut oil significantly.

Table 2: Spectrophotometric, Rheological, and Chromatographic Data

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** | **Device Used** | **Measurement** | **Unit** |
| Jojoba Oil, Beeswax | UV-Vis Spectrophotometer UV-2600 | 1.8 | Abs |
| Almond Oil, Beeswax | Rheometer R-4500 | 200.0 | Pa-s |
| Coconut Oil | Gas Chromatograph GC-2010 | 150.5 | ppm |

Results Analysis:

UV absorption was recorded at 1.8 Abs indicating significant interaction between Jojoba Oil and Beeswax, which was further confirmed by the standard deviation in readings taken every five minutes. Unrelated equipment vibrations were detected and analyzed separately.

Table 3: Viscosity and Molar Concentration Measurements

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** | **Device Used** | **Measurement** | **Unit** |
| Almond Oil, Cetyl Alcohol | Titrator T-905 | 0.7 | M |
| Almond Oil, Glycerin | Viscometer VS-300 | 7474.14 | cP |
| Jojoba Oil, Gum, Glycerin | Viscometer VS-300 | 1854.77 | cP |

Observations:

Analysis indicated double peak patterns in viscosity curves due to the non-homogeneous processing conditions. Extraneous sound from nearby construction randomly impacted viscometer sensors.

Discussion:The contrasting thermal properties as observed in Coconut Oil samples with different additives may be pivotal for future product formulation. The distinct pH levels were crucial for understanding the emulsion stability of Jojoba Oil and Glycerin mixtures. Viscosity measurement deviations were minimal, though they revealed the high shear stability of Almond Oil-based mixtures, reinforcing its potential for usage in products necessitating thickening attributes.

In some instances, imperfections in procedural execution and environmental disturbances presented challenges; nonetheless, the data obtained provides an insightful foundation for further study.

Conclusion:This intricate investigation of various oil and additive mixtures underscores the variability of physical and chemical responses influenced by instrument types and mixing combinations. Future experiments should focus on standardizing operational environs to minimize noise-induced discrepancies.

Appendices:- Calibration logs, irrelevant equipment checks, and error margins are provided separately in Annex A.

References:Literature used for theoretical frameworks that aren't directly related includes fermentation processes irrelevant to the scope of this study.

End of Report