

Introduction

This report encompasses detailed analyses conducted to evaluate the characteristics of various oil-based mixtures. We utilized advanced measurement instruments, including pH Meter PH-700, X-Ray Diffractometer XRD-6000, Thermocycler TC-5000, NMR Spectrometer NMR-500, Gas Chromatograph GC-2010, Mass Spectrometer MS-20, and Viscometer VS-300. These tests were critical in determining properties such as pH, crystallinity, thermal behavior, molecular structure, viscosity, and more.

Table 1: pH Measurements for Almond Oil Mixtures

| Instrument | Sample | Measurement | Units |
|------------|------------|-------------|-------|
| PH-700 | Almond Oil | 8.0 | pH |
| PH-700 | Almond Oil | 7.5 | pH |

Measurement of Chemical Composition

Table 2: NMR and Mass Spectrometry Observations

| Instrument | Mixture | Measurement | Units |
|------------|----------------------------|-------------|-------|
| NMR-500 | Joboba Oil, Beeswax | 10 | ppm |
| NMR-500 | Coconut Oil, Gum | 17 | ppm |
| MS-20 | Coconut Oil, Gum | 950 | m/z |
| MS-20 | Coconut Oil, Cetyl Alcohol | 1100 | m/z |

In-depth Observations

The use of theThermocycler TC-5000onCoconut Oil, Beeswaxgenerated a reading of60°C, indicating potential alterations in waxy structures upon heating. This may help tailor the melting point of the finished products significantly.

Moreover, high precisionGC-2010was utilized to determine the volatile compounds within different mixtures. TheCoconut Oil, Cetyl Alcoholmixture was measured at550 ppm, which is intriguing and might suggest the presence of

specific ester components that react distinctively.

Table 3: Viscosity Measurements

| Instrument | Primary Oil | Additive(s) | Viscosity | Units |
|------------|-------------|--------------------|-----------|-------|
| VS-300 | Almond Oil | Beeswax, Vitamin E | 7177.89 | cP |
| VS-300 | Almond Oil | Gum, Vitamin E | 7771.78 | cP |

Irrelevant Information

Interestingly, the team discovered that when left unattended, a mixture ofJojoba Oil, Vitamin Eemits a subtly sweet aroma, which can prove distracting yet delightful for lab personnel.

Also noteworthy, during the procedure, theCoconut Oil, Gummixture separated into distinct phases when exposed to a room temp deviating quest from the required 22°C, thus altering the emulsification properties.

Conclusion

In conclusion, the tests conducted reveal key insights into the behavior and characteristics of oil-based compound mixtures. Data collected from pH, XRD, NMR, GC, MS, and viscosity testing offer valuable information that impacts the formulation and stability of products utilizing these mixtures.

This analytical approach provides a comprehensive understanding of how various components interact, thereby offering avenues for enhanced applications in cosmetics, pharmaceuticals, and food industries.