Laboratory Report 2176

Analysis of Various Oil-Based Mixtures

This report details the analysis of various oil-based test samples using multiple analytical techniques. The samples comprised different oil types in combination with various additives. Below are the methods, observations, and results obtained during the tests.

Instruments and Samples Examined

Each sample mixture was subjected to a specific analytical technique using the designated instrument for the study. The instruments employed are listed in Table 1.

Table 1: Instruments Used

Instrument	Sample Mixture	Additives
FTIR Spectrometer FTIR-8400	Almond Oil	-
HPLC System HPLC-9000	Jojoba Oil, Gum	Vitamin E
pH Meter PH-700	Coconut Oil, Cetyl Alcohol	Vitamin E
UV-Vis Spectrophotometer UV-2600	Almond Oil, Gum	Glycerin
Gas Chromatograph GC-2010	Jojoba Oil, Gum	Glycerin
Ion Chromatograph IC-2100	Coconut Oil, Glycerin	-
FTIR Spectrometer FTIR-8400	Coconut Oil, Cetyl Alcohol	-
Viscometer VS-300	Almond Oil	-

Observations and Measurements

The properties of each tested mixture were observed using advanced analytical tools designed to measure specific parameters. Observations were conducted meticulously to ensure the accuracy of the findings.

Table 2: Observations and Results

Analytical Technique	Sample & Additives	Measurement & Unit	Descriptor
FTIR Spectroscopy	Almond Oil	1425 1/cm	Unique absorption identified
HPLC Analysis	Jojoba Oil, Gum, Vitamin E	45.3 mg/L	High Vitamin E stability
pH Measurement	Coconut Oil, Cetyl Alcohol	6.8 pH	Moderate acidity detected
UV-Visible Spectroscopy	Almond Oil, Gum, Glycerin	1.75 Abs	Moderate absorbance level
Gas Chromatography	Jojoba Oil, Gum, Glycerin	323.1 ppm	Enhanced ester presence
Ion Chromatography	Coconut Oil, Glycerin	12.75 mM	High ionic concentration
FTIR Spectroscopy (Coconut Oil)	Coconut Oil, Cetyl Alcohol	1548 1/cm	Strong ester band detected
Viscosity Measurement	Almond Oil	7411.95 cP	High viscosity observed

Detailed Descriptions of Experimental Results

The following describes the results and in-depth analysis of the findings:

Spectroscopic Analysis (FTIR):The almond oil spectrum revealed a unique absorption at 1425 1/cm, indicative of specific functional groups present. Coconut oil exhibited a significant ester band at 1548 1/cm attributable to Cetyl Alcohol, correlating with a higher molecular weight derivative.

HPLC Analysis:The combination of Jojoba Oil and Vitamin E demonstrated a substantial concentration of vitamin E at 45.3 mg/L, suggesting the retention and stability of the nutrient in the presence of the gum additive.

pH Evaluation:A measurement of 6.8 pH was recorded for the coconut oil mixture, indicating a balanced level of acidity, which can affect long-term stability.

UV-Vis Spectrophotometric Results:The almond oil combination with gum and glycerin demonstrated moderate absorbance at 1.75 Abs, suggesting reasonable light penetration and compound interactions.

Gas Chromatography Evaluation:Detectable glycerin and esters within the Jojoba oil mixture at 323.1 ppm indicate a transformation of compounds when chemically interacting with gum.

Chromatographic Analysis (Ion Chromatography):The measurable ionic content of 12.75 mM signifies an elevated

presence of ionic species, which plays a key role in the solubility and mixing properties of the sample.

Viscosity Measurements:A viscosity of 7411.95 cP for almond oil alone indicates significant internal resistance, which may affect its utility in various formulations.

Conclusion

The complex interactions and properties observed have provided invaluable insights into the behavior and stability of these oil-based mixtures. Multiple interactions were identified which aid in optimizing formulations for commercial and industrial applications.

Note:Irrelevant details were omitted to maintain focus on accuracy and relevance.