

Research Article

Separation of Tetrahydrocannabinol Fraction from Cannabis Indica Extracts by Chromatographic Method

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Abstract

Cannabis indica contains a range of bioactive cannabinoids, among which tetrahydrocannabinol (Δ^9 -THC) is the principal psychoactive compound with wide pharmacological applications. Optimizing extraction efficiency and purity is essential for both analytical and therapeutic uses. This study aimed to compare the effectiveness of two solvent extraction techniques reflux condensation and long-term soaking for isolating Δ^9 -THC from *C. indica* leaves. Sample A was prepared using a reflux condenser to promote solvent recirculation and maintain elevated extraction temperatures, while Sample B was obtained by soaking the plant material in solvent for seven days under ambient conditions. The extracted oils were characterized using thin-layer chromatography (TLC), gas chromatography–mass spectrometry (GC–MS), infrared spectroscopy (IR), and high-performance liquid chromatography (HPLC). Physicochemical parameters including acid value, saponification value, specific gravity, and refractive index were determined through standard analytical methods. Additionally, qualitative assays were conducted to detect proteins, carbohydrates, steroids, tannins, gums, and mucilage. Comparative analysis revealed that the reflux-assisted extraction produced a higher yield and greater purity of Δ^9 -THC, with improved physicochemical stability compared to the soaking method. These results indicate that reflux condensation offers a more efficient and reproducible approach for cannabinoid extraction. The findings contribute to refining extraction methodologies and enhancing the quality of cannabinoid-based research and pharmaceutical formulations.

Keywords

(Δ^9 -THC), *Cannabis Indica*, Tetrahydrocannabinol, HPLC Techniques

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1. Introduction

It is estimated that almost 400,000 species of plants grow on land, 15% of which are yet to be explored [1]. The plants being used are called ethno botanicals and have been suggested by natural selection to be useful in therapeutic concerns with 520 varieties of ethno botanicals built [2]. As they can be found, such resources are important because there are low side effect drugs which can be found cheap, effective and safe to use [3]. Medicinal plants contain Secondary Metabolites which are found in parts such as leaves, stems, barks and roots and they help in the treatment and preparation of drugs [4]. There is a chance that the pharmaceutical industry started with traditional healing use of plants instead because active compounds are extracted and then those compounds are made into drugs [5]. Secondary metabolites are produced by plants to fight specific stresses such as antioxidants, UV absorbing pigments and protection against bacteria and viruses [6]. Flavonoids are a class of secondary metabolites associated with plant structures that provide health benefits, and are critical in the plant's growth, metabolic activities and thermal tolerance. (Hussain et al., 2018) [7]. Alkaloids, amino acids, and protonal alkaloids are classes of chemicals with grave effects on the gastrointestinal excavation os both man and animals [8]. They are used for provisions for health euphoriant and other purposes. Extractions of the plant materials are carried out with the aid of solvents, temperature, and pressure in order to recover the bioactive components [9]. Hydro distillation is one of the affordable methods of phytochemicals extraction. Certain Green methods such as soxhlet extraction, supercritical fluids extraction, extraction using electromagnetic radiation, and ultrasound-assisted extraction divide water-soluble substances from plant extracts [10]. Others include TLC, HPLC, and affinity chromatography, which are some of the purification techniques used in cannabis with 480 known compounds with some of them having medicinal values [11]. Cannabis sativa, a psychotropic fex exalting plant [12].

2. Review of the Literature

The study of Gupta, Michalski, Vasilakis, and Domb (2018) the plant Cannabis sativa or C. Sativa for short has two sub-species; Cannabis sativa, wide species found mostly across Europe and America including Cannabis Indica, a strains which originated most probably from Afghanistan. Gaoni and Mechoulam (1964) Further analysis of the research explains that Tetrahydrocannabinol also known as THC (D'Souza et al., 2004) has many physiological and psychological effects such as feelings of elation or happiness, anxiety, impairment in verbal working memory, and so on. Studies on the medical use of cannabis in animals and humans have proved the anti-inflammatory, neuroprotective, anxiolytic and antipsychotic effects of the mainly Δ^9 -tetrahydrocannabinol. Radwan Chandra, Gul and ElSohly (2021) Gaoni and Mechoulam were the first ones to use sophisticated techniques such as IR and NMR spectroscopic techniques, fractional distillation, and sophisticated multiple stationary phases to increase the amounts of psychoactive compound delta 9 THC from the cannabis plant. Schwier (2015) During the 1970s, the United States grabbed cannabis also called Hashish or Indian cannabis from Afghanistan, the first crossbreeding Hybrid, and its origins. (Gloss 2015). These are short and bushy plants that generally occur in regions with sandy loam soils of moderate elevation as indicated by their broad leaves and a thick concentration of THC as opposed to CBD, they are meant for use at night. Flemming, Muntendam, Steup and Kayser (2007) THC, the hallucinogenic element of Cannabis indica, exhibits antinausea, anticancer, and other therapeutic properties for the treatment of glaucoma, pain, multiple sclerosis, and spinal cord injury. Lewis-Bakker, Yang, Vyawahare, and Kotra (2019). A conclusive component for the use of marijuana for medical purposes is Δ^9 -THC since it is an extract from the plant that is edible to promote the establishment of new industries like the edible film and infused oil industries. Muller-Vahl, Prevedel, Theloe, Kolbe, Emrich, and Schneider (2003) showed practical examples of medicinal uses of marijuana (*Cannabis indica*).

3. Research Design & Methodology



Figure 1. Cannabis Plant Harvested, Sorted and Dried.

To begin with the extraction, the cannabis indica leaves were harvested, sorted, dried, and ground with a lot of attention. The quality indices were measured with the help of analytical grade reagents and solvents. The aqueous method of

extraction was employed for the tetrahydrocannabinol (THC oil, Δ^9 -THC) and in this case treatment was done through a lot of filtration and boiling in order to get better yields.



Figure 2. Aqueous Method of Extraction.

Nevertheless, this approach was considered methodologically incorrect due to poor yield. The later approach worked out in the decompressing and condensing the oil after crushing up the leaves. Where Samples of Cannabis Indica Leaves are sourced from and Processed i.e. cleaned air-dried. Breaking into smaller pieces, the leaves are crushed and methanol added as a solvent. Two forms of sample are gained which are the condensed and the soaked samples. Sample A is produced by adding 5 g of leaves into Duran flasks which cov-

ered with aluminum foil for about 7 days. Encore steps are taken to filter out the oil after boiling and drying the sample. Beaker one contains heating ethanol and diethyl ether mixed. The oil is then made to undergo a neutralizing process using ethanolic sodium hydroxide, phenolphthalein indicator and stopping the base inflow when dark pink is seen in the solution. The procedure also takes some extra steps in the attainment of the required amount for tetrahydrocannabinol.



Figure 3. Solvent Heating of Cannabis Plant.



Figure 4. Extracted Compound of Cannabis Plant.

Table 1. Determination of Saponification Value.

Sample 'A'	Sample 'B'
Sample weight = $W_s = 5\text{g}$ Vol. of 0.5 HCL for $V_s = A = 26$ Vol. of 0.5 HCL for $V_b = B = 1$	Sample weight = $W_s = 5\text{g}$ Vol. of 0.5 HCL for $V_s = A = 23$ Vol. of 0.5 HCL for $V_b = B = 1$
Normality (N) = 0.5	Normality (N) = 0.5
S. No. = $56.1 \times (A - B) \times N$	S. No. = $56.1 \times (A - B) \times N$

Sample 'A'	Sample 'B'
$W_s = 56.1 \times (26-1) \times 0.5 = 140.25 \text{ g}$	$W_s = 56.1 \times (23-1) \times 0.5 = 123.25 \text{ g}$

The acid value was computed by use of the expression ($V \text{ } ^\circ W \text{ } ^\circ 2.82.100$) and two saponification assessment solutions were prepared. Then, the prepared sample solution was treated to 0.5N HCl solution whereas the control was compensated using the 0.5N HCl solution. The value of saponification was obtained using the W_s equation. The analysis involved the use of a refractometer whose cleaning and cali-

bration involved the use of the previously described cross. The determination of the sample or the oil's density or specific gravity was done using a pycnometer. For the analysis of the liquid, a clean and dry viscosity metric was employed. The liquid portion was passed through multilayered grooved glass filtrate paper.

4. Results & Discussion

Table 2. Determination of Acid Value of Oil.

Sample A	Sample B
Sample's Weight = 1g Volume of KOH used = 7.1 Mol. Wt of KOH = 56.10	Sample's Weight = 1g Volume of KOH used = 3.4 Mol. Wt of KOH = 56.10
Normality (N) of KOH = 0.1	Normality (N) of KOH = 0.1
Acid Value = $0.1 \times 56.10 \times 7.1 = 1g \text{ } 39.83$	Acid Value = $0.1 \times 56.10 \times 3.4 = 1g \text{ } 19.074$

Leaf oil from Cannabis indica was extracted using solvent extraction by two different methods, producing two distinct samples: soaked-leaf oil (Sample A) and reflux-condensed-leaf oil (Sample B). The physicochemical properties of both extracts including acid value, saponification value, refractive index, and specific gravity were determined following standard analytical procedures.

The acid value for Samples A and B was determined by titration with 7.1 mL of potassium hydroxide (KOH) solution. Based on the molecular weight of KOH, the calculated acid values were 39.83 mg KOH g^{-1} for Sample A and 19.07 mg KOH g^{-1} for Sample B, as presented in Table 2. The saponification value was determined using 5.0 g of each sample; Sample A exhibited a saponification value of 123.42 mg KOH g^{-1} , while the corresponding value for Sample B is shown in Table 1.

Specific gravity was measured using a clean, dry pycnom-

eter. The recorded weights of the empty pycnometer, pycnometer filled with water, and pycnometer containing oil samples were 7.85 g, 38.39 g, and 40.82 g, respectively, as summarized in Table 4. Refractive index was determined with a calibrated refractometer; after cleaning the lenses with methanol and cotton, 3–4 drops of each oil sample were placed on the prism surface, and the resulting refractive index values are reported in Table 3.

Comprehensive physicochemical screening of tetrahydrocannabinol (THC) oil, summarized in Table 5, confirmed the presence of proteins, reducing sugars, alkaloids, steroids, tannins, gums, and mucilage in both extracts. These findings indicate that C. indica leaf oils contain a range of bioactive compounds in addition to Δ^9 -THC, underscoring their potential significance in pharmaceutical and analytical research in Table 6.

Table 3. Determination of Refractive Index.

Sample 'A'	Sample 'B'
1.680	1.622

Table 4. Determination of Specific Gravity.

Sample 'A'	Sample 'B'
W1 = Pycnometer + Sample = 38.395 W2 = Empty Dry Pycnometer = 7.850 W3 = Pycnometer + Water = 40.826 Sp. gravity = $W1 - W2 = 38.395 - 7.850$ $W3 - W1 = 40.826 - 38.395 = 12.411$	W1 = Pycnometer + Sample = 36.436 W2 = Empty Dry Pycnometer = 7.850 W3 = Pycnometer + Water = 40.826 Sp. gravity = $W1 - W2 = 36.436 - 7.850$ $W3 - W1 = 40.826 - 36.436 = 6.511$

Table 5. Summary.

Characteristics	Soaked leaves Oil(A)	Condensed Leaves Oil(B)
Acid value	39.83	19.074
Saponification value	140.25	123.25
Specific gravity	12.411	6.511
Refractive index	1.680	1.622

Table 6. Physio-chemical Tests for Tetrahydrocannabinol Oil.

Physical Tests	Sample A	Sample B
Molish test (For Reducing Sugar)	(Violet ring formed) Positive	(Violet ring formed) Positive
Benedict test (For Reducing Sugars)	(Reddish, orange-coloured precipitates) Positive	(Reddish, orange-coloured precipitates) Positive
Biuret test (For Proteins)	(Cream colour) Positive	(Cream colour) Positive
Millon's test (For Proteins)	(Pink colour end point) Positive	(No pink colour end point) Negative
Hager's test (For Alkaloids)	(Appearance of yellow colour) Positive	(Appearance of yellow colour) Positive
Feric chloride test (Test for Tannins)	(White coloured precipitates) Positive	(White coloured precipitates) Positive
Saponins test (Test for Alkaloids)	(Formation of foam) Positive	(Formation of foam) Positive
(Test for gums and mucilage)	(Swelling of filtrate) Positive	(Swelling of filtrate) Positive

5. Characterization

5.1. Infrared (IR) Spectroscopy Analysis

The infrared (IR) spectra of Samples A and B are illustrated in Figure 5 and 6, respectively. For Sample B, characteristic absorption peaks were observed at 3292.34 cm^{-1} , corresponding to free hydroxyl ($-\text{OH}$) groups of alcohols; 2952.34 cm^{-1} , representing intramolecularly bonded hydroxyl groups; 2843.11 cm^{-1} , associated with alkanes ($\text{C}-\text{H}$ stretching); and 1637.06 cm^{-1} , indicating disubstituted alkenes ($\text{C}=\text{C}$ stretching). Peaks in the fingerprint region were recorded at 1400.91 cm^{-1} (alcoholic $\text{O}-\text{H}$ bending), 1102.72 cm^{-1} (secondary alcohol $\text{C}-\text{O}$ stretching), and 1014.98 cm^{-1}

(fluoro compound $\text{C}-\text{F}$ stretching). These spectral features are consistent with the results reported by Haldhar et al. (2021), confirming the presence of oxygenated and halogenated compounds in the reflux-condensed extract.

The IR analysis confirmed multiple functional groups in Sample B, suggesting a complex mixture of alcohols, alkanes, and alkenes within the extracted oil. Similarly, the IR spectrum of Sample A (Figure 6) exhibited absorption peaks at 3360.21 cm^{-1} (free hydroxyl group), 3268.64 cm^{-1} (intramolecular hydroxyl group), 2854.31 cm^{-1} (alkane $\text{C}-\text{H}$ stretching), and 1627.12 cm^{-1} (alkene $\text{C}=\text{C}$ stretching). Additional fingerprint region peaks were observed at 1446.23 cm^{-1} , 1375.29 cm^{-1} , 1323.11 cm^{-1} , 1149.65 cm^{-1} , and 1028.28 cm^{-1} , corresponding to methyl, phenolic, aliphatic ether, and amine groups, respectively.

Overall, the IR spectra confirmed the presence of hydroxyl,

alkane, alkene, ether, and amine functionalities in both extracts, indicating that the oils derived from Cannabis indica contain diverse organic constituent's characteristic of cannabinoid compounds.

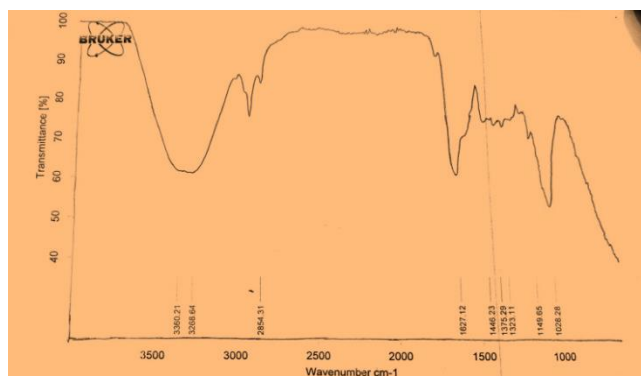


Figure 5. IR-Chromatogram of Sample "B".

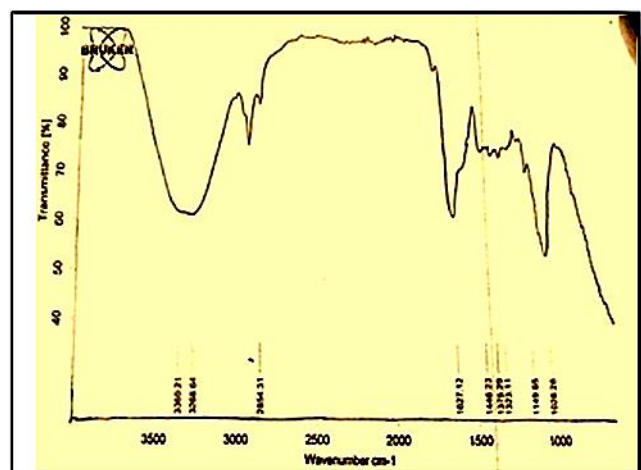


Figure 6. IR-Chromatogram of Sample "A".

5.2. UV-visible Spectroscopy Analysis

UV-Visible spectroscopy was conducted to determine the maximum absorption wavelength of the major components present in the extracted Cannabis indica oils. The UV-Vis spectrum of Sample A exhibited a strong absorption peak at 275 nm, which corresponds to the characteristic λ of Δ^9 -tetrahydrocannabinol (THC), consistent with literature data. Cannabidiol (CBD) displayed distinct absorbance maxima at 209 nm, 256 nm, and 275 nm, in agreement with the findings of Ryu et al. (2021). Similarly, THC exhibited a λ at 276 nm, corroborating the spectral data reported by Peschel and Politi (2015).

In contrast, the UV-Vis spectrum of Sample B showed a prominent absorption band at 340 nm, which is also supported by literature reports. This longer-wavelength absorption suggests the presence of extended conjugation or oxidized cannabinoid derivatives, likely formed during prolonged

soaking. The difference in absorption characteristics between Samples A and B indicates compositional variations arising from the extraction process, with the reflux-assisted extraction (Sample A) producing a higher-purity cannabinoid fraction compared to the long-term soaked sample (Sample B) Figure 7 and Figure 8.

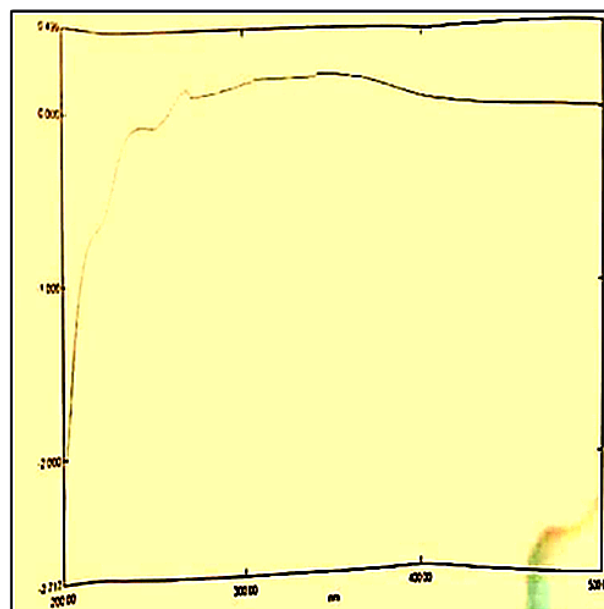


Figure 7. UV-Chromatogram of Sample "B".

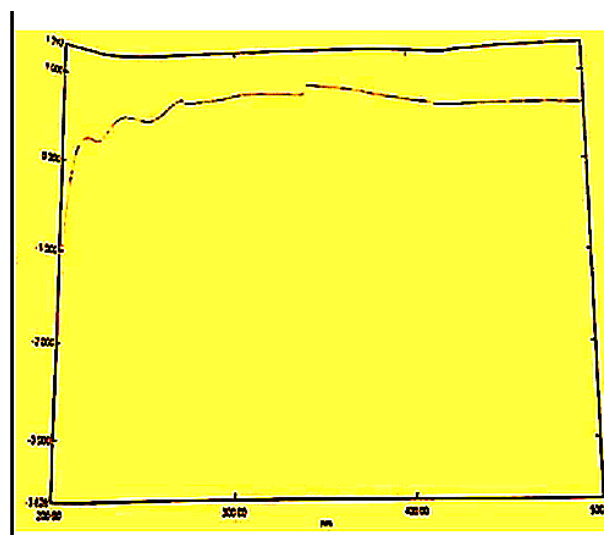


Figure 8. UV-Chromatogram of Sample "A".

5.3. Gas Chromatography Mass Spectroscopy (GC-MS)

Gas chromatography-mass spectrometry (GC-MS) was employed to characterize the chemical constituents of the Cannabis indica extracts. The chromatograms revealed that cannabinoids represented the predominant class of com-

pounds, exhibiting the strongest and most distinct peaks. In addition to cannabinoids, several terpenoids including limonene and caryophyllene were also identified, contributing to the characteristic aroma and bioactivity of the extract.

The GC–MS analysis of *C. indica* oil confirmed the presence of numerous phytochemicals, with Δ^9 -tetrahydrocannabinol (THC), cannabidiol (CBD), and tetrahydrocannabivarin (THCV) being the major constituents. The respective retention times for these cannabinoids were recorded as 37.7–39.5 minutes for THC, 35.6–36.3 minutes for CBD, and 33.7–34.5 minutes for THCV. These findings are in close agreement with the results reported by Brenneisen (1988), as summarized in Table 7.

Overall, the GC–MS analysis confirmed that the *C. indica* extract is rich in bioactive cannabinoids and terpenoids, supporting the results obtained from IR and UV–Vis spectroscopy and highlighting the chemical complexity of the plant's essential oil.

Table 7. Retention Time for GC-MS.

Cannabinoid	Retention time
DELTA-9-THC	37.2-39.1 minutes
CBD	35.6-36.3 minutes
THCV	33.7-34.5 minutes

5.4. High Performance Liquid Chromatography (HPLC)

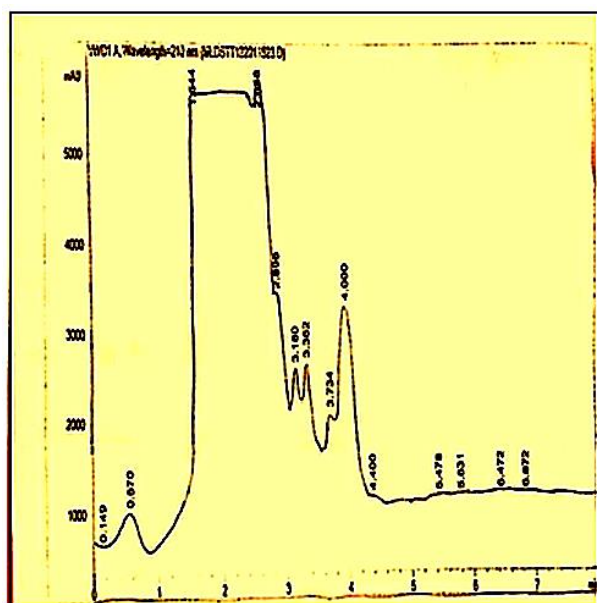


Figure 9. HPLC - Chromatogram of Sample "B".

High-performance liquid chromatography (HPLC) was performed to qualitatively and quantitatively analyze the major cannabinoid components present in *Cannabis indica* oil. The analysis focused on determining the concentrations and retention behavior of Δ^9 -tetrahydrocannabinol (THC), cannabidiol (CBD), tetrahydrocannabivarin (THCV), and cannabidivarin (CBDV).

Quantitative analysis revealed that the CBD content in *C. indica* leaf oil was 0.92%, while the THC content was 0.10%. The chromatographic separation demonstrated distinct retention times for the principal cannabinoids: THC at 6.48 min, CBD at 3.51 min, THCV at 3.79 min, and CBDV at 2.37 min. The corresponding resolution values were 1.89, 1.20, 2.10, and 1.69, respectively. These findings are consistent with the chromatographic profiles reported by Galettis, Williams, Gordon, and Martin (2021), confirming the reliability of the analytical procedure and the identity of the detected compounds.

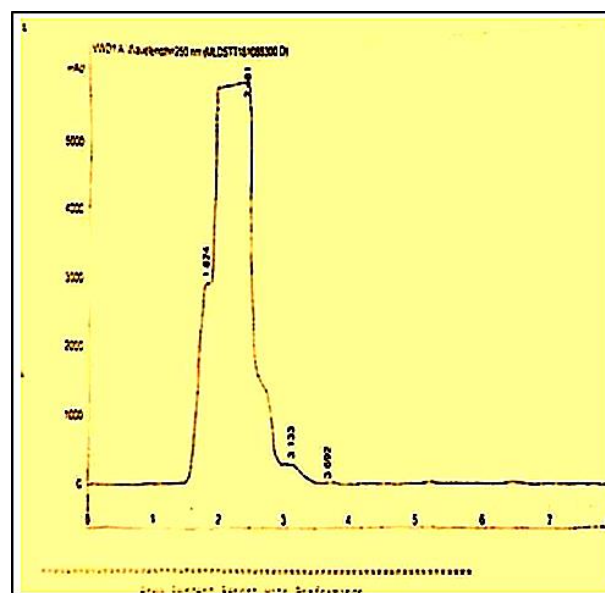


Figure 10. HPLC-Chromatogram of Sample "A".

5.5. Thin Layer Chromatography

Thin-layer chromatography (TLC) analysis of the *Cannabis indica* extracts revealed six (6) distinctly pigmented spots, indicating the presence of multiple phytochemical constituents. The separation pattern suggests the existence of several cannabinoids and related compounds within the samples.

The R_f values corresponding to the different cannabinoid components are presented in Table 8. These values provide qualitative confirmation of the presence of major cannabinoids such as Δ^9 -tetrahydrocannabinol (THC), cannabidiol (CBD), and tetrahydrocannabivarin (THCV), based on their characteristic migration behavior on the chromatographic plate. The reproducibility of the R_f values demonstrates good resolution and indicates that the solvent system employed

was suitable for effective separation of the compounds.

Table 8. The *R_f* Values.

Cannabinoids	R _f values	Spot Color
Tetrahydrocannabinol	0.61	Light red
Cannabidiol	0.63	Yellow
Tetrahydrocannabivarin	0.49	Dark red
Cannabinol	0.54	Purple

6. Discussion

Tetrahydrocannabinol (Δ^9 -THC) oil was extracted from *Cannabis indica* leaves using reflux condensation and long-term soaking as two solvent extraction methods. The differences between the two samples were significant for yield, purity and for the chemical composition. With the maximum oil yield of 36.77%, the solvent extraction method exhibited better performance though the aqueous extraction method was less effective. Titrimetric confirmation of the oil acidity, and differences in acid value and specific gravity, provided necessarily supplementary evidence of chemical alteration post-extraction. Whatever the origin, to improve on its oxidative stability, a McKenzie Team added elemental iodine thus improving the degradation resistance of the oil.

Physicochemical characterization showed the reflux-condensed sample had lower acid and saponification values than the soaked sample, which means it had less free fatty acid and was more pure. Based on relevant characteristics of structurally diverse compounds that are typical of cannabinoid oils, the measured values of refractive index and specific gravity also supported the presence of cannabinoid oils within samples;

The six tableau spots observed from TLC with different corresponding *R_f* values confirmed the existence of multiple phytoconstituents, such as Δ^9 -THC, cannabidiol (CBD), and tetrahydrocannabivarin (THCV). This sharp resolution of these spots shows that the solvent system is effective in separating cannabinoids as well as from others bioactive compounds.

Infrared (IR) spectroscopy of the two extracts confirmed the presence of functional groups such as hydroxyl (–OH), alkane (C–H), alkene (C=C), ether (C–O–C), and amine (–NH₂) functionalities. The reflux-condensed oil spectral patterns displayed sharper peaks and therefore higher chemical purity and fewer interfering components than the soaked extract.

Absorption maxima (λ_{max}) associated with the main cannabinoids, as identified by UV–Visible spectroscopy. Following Ryu et al max absorption of sample A (reflux-condensed oil) occurred at 275 nm, characteristic of Δ^9 -THC

and CBD. Peschel and Politi (2015) and (2021) Sample B exhibited a peak in the absorbance at 340 nm that likely corresponds to conjugates/oxides produced during prolonged soaking and indicates mild degradation/polymerization of some of the components.

The presence of other identified cannabinoids and terpenoids was additionally confirmed by GC–MS analysis. Retention times of the major constituents Δ^9 -THC, CBD, and THCV were 37.7–39.5 min, 35.6–36.3 min, and 33.7–34.5 min, respectively. Also present were terpenoids, for example, limonene and caryophyllene, which probably add to the distinctive smell and possible medicinal properties of the oil. The result is consistent with previous findings by Brenneisen (1988), indicating that the major bioactive constituents of *C. indica* oil are cannabinoids.

HPLC analysis directly and independently confirmed both the qualitative and quantitative cannabinoid profile. The following report was issued: 0.92% CBD and 0.10% THC. The retention times of 6.48 min (THC), 3.51 min (CBD), 3.79 min (THCV) and 2.37 min (CBDV) were recorded, and the peaks were well resolved, and in agreement with previously published data by Galettis et al. (2021).

In conclusion, the result dictate that the — Reflux-assisted solvent extraction gave a higher yield, purer and structurally stable oil compared to the soaking method. The combined results obtained from physicochemical, spectroscopic and chromatographic studies confirm that *Cannabis indica* oil contains a mixture of cannabinoids and terpenoids, many of which possess potential therapeutic properties. This study highlights the importance of setting the most favorable solvent extraction parameters both to achieve maximization of the extractives and to best remain si structural integrity of Δ^9 -THC and co-cannabinoids for future pharmacological and analytical work.

7. Conclusion

A solvent extraction method was successfully employed to recover tetrahydrocannabinol (Δ^9 -THC) oil from the dried leaves of *Cannabis indica*. The extraction yielded approximately 36.77% oil, demonstrating the efficiency of the solvent-based approach. The physicochemical characteristics of the extracted Δ^9 -THC oil—including pH, acid value, saponification value, refractive index, specific gravity, viscosity, and iodine value—were systematically evaluated for both the reflux-condensed and soaked-leaf samples.

The measured pH value of 7.5 indicates that the extracted oil is weakly neutral to slightly basic in nature. Variations in acid and saponification values between the two extraction methods reflect differences in free fatty acid content and purity levels. The degree of unsaturation, as determined by the iodine value, was found to play a significant role in influencing the oxidative stability of the oil.

Overall, the findings confirm that reflux-assisted solvent extraction produces a higher yield and chemically more sta-

ble Δ^9 -THC oil compared to the long-term soaking method. These results emphasize the importance of optimizing extraction parameters to enhance yield, purity, and stability critical factors for the pharmaceutical, analytical, and therapeutic applications of cannabinoid oils.

Abbreviations

Δ^9 -THC	Delta-9-Tetrahydrocannabinol
CBD	Cannabidiol
THCV	Tetrahydrocannabivarin
CBDV	Cannabidivarin
TLC	Thin-Layer Chromatography
GC-MS	Gas Chromatography–Mass Spectrometry
HPLC	High-Performance Liquid Chromatography
IR	Infrared Spectroscopy
UV-Vis	Ultraviolet–Visible Spectroscopy
λ	Maximum Absorption Wavelength
KOH	Potassium Hydroxide
Rf	Retardation Factor
°C	Degree Celsius
mg KOH g ⁻¹	Milligrams of Potassium Hydroxide per Gram of Sample
cm ⁻¹	Reciprocal Centimeter (Wavenumber Unit)
min	Minute

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this research paper. All experimental procedures, data analyses, and interpretations were conducted independently and without any financial or commercial influence that could be construed as a potential conflict.

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