Investigation into the industrial Potentials of methanol Extract of *Euphorbia heterophlla* by Infrared Spectroscopy

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Introduction

- The use of herbal medicine for the treatment of diseases and infection is as old as mankind.

- The world health organization supports the use of traditional medicine provided they are proven to be efficacious and safe. (WHO, 1995).

- Herbal medicines have received much attention since they are considered as time tested and relatively safe for both human use and environment friendly. They are also cheap, easily available and affordable (Fazly, 2005).

Euphorbia heteterophlla plant

- *Euphorbia heterophlla* is an erect, branched, smooth, half-woody herb or shrubby plant, 0.5 to 1.5 metres high.

- Leaves are alternate and extremely variable in shape, most often oblong ovate, 3 to 10 centimeters long, the lower ones usually entire, the upper ones variously lobed, sinuate, dentate, or subentive, and the uppermost ones blotched with red at the base as shown in Figure 1.

- Common names of *Euphorbia heteterophlla* are; Fiddler's spurge, mole plant, annual poinsettia, wild poinsettia, pintado Japanese poinsettia, fire plant (Garcke, 2010). The Igbo's call it "Ogba'nyu while the Hausa's call it "Madaran somo".

Figure 1: *Euphorbia heteterophlla* plant

Plant material collection and preparation

- The plant sample was identified in the Botany unit of the Department of Biological Science ABU Zaria as *Euphorbia hetrophylla* (Euphorbiaceae).

- Fresh leaves were collected from Gyellesu, Zaria. The samples were washed with water and rewashed with distilled water.

- The leaves were air-dried for two weeks, ground with mortar and pestle in order to obtain find powder.

- The powdered samples were stored in air tight glass bottles at room temperature for further analysis.

Plant extraction and analysis

- 50.00 g portion of powered sample was weighed into 1000.00 ml conical flask and500.00 ml of methanol was added.

- The composition was allowed to stand for 24 hours, filtered with under vacuum pressure and the filtrate concentrated using rotary evaporator.

- The extract was taken for IR analysis. The functional groups in the powered plant sample, the methanolic extract and the residue obtained from the methanolic extract were identified by infrared spectroscopy.

Results and Discussion

- Figures 1, 2 and 3 are the spectra of the powered plant sample, the methanolic extract and the residue obtained from the methanolic extract from infrared spectroscopy

- Table 1, 2 and 3 present the various functional group detected in the powered plant sample, the methanolic extract and the residue obtained from the methanolic extract identified from the infrared spectroscopy.

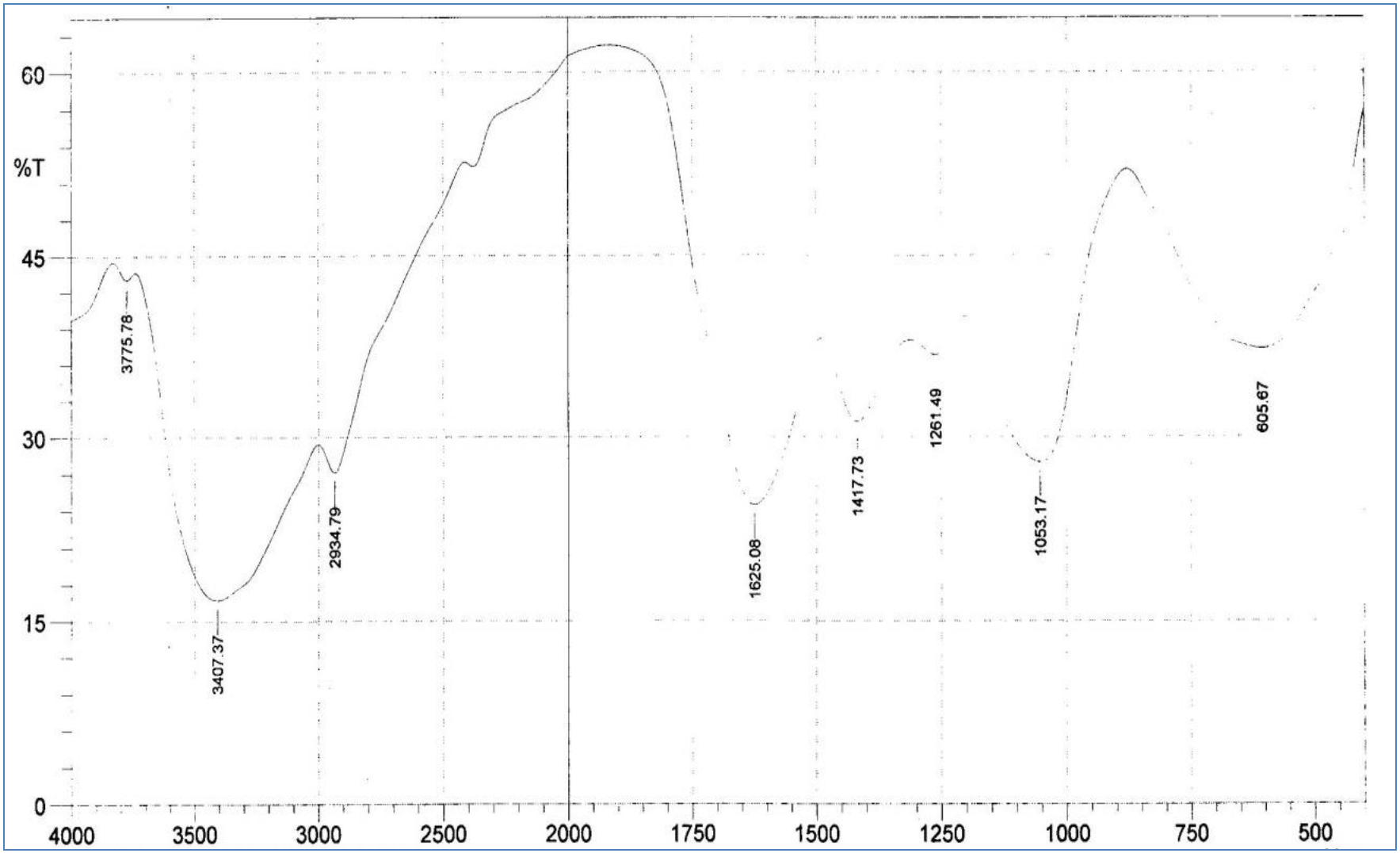


Figure 1: FTIR spectra of dry leave of *euphorbial heterophylla*

Table 1: Characterization of peaks obtained from FTIR spectrum of dry leaves of *euphorbial heterophylla*

S/No.	Absorptions peaks (cm^{-1})	Appearance	Bond	Compound
1. 2.	605.67 1053.17	very broad medium broad	C – Cl vibrate C = S stretching vibration	C – Cl (Hologen compound sulfur compound
3.	1261.47	Weak	O-H, C – O C – O – C Bending Vibration	Primary alcohol ethers
4. 5.	1417.73 1625.08	Weak and sharp medium and strong	C – H bending N – H bending Vibration	Alkene Primary amines
6.	2934.79	Sharp and weak	C – H Stretching	Alkanes
7.	3407.37	Broad and strong	N – H/O – H Stretching Vibration	Carboxylic acid amines (secoundary)

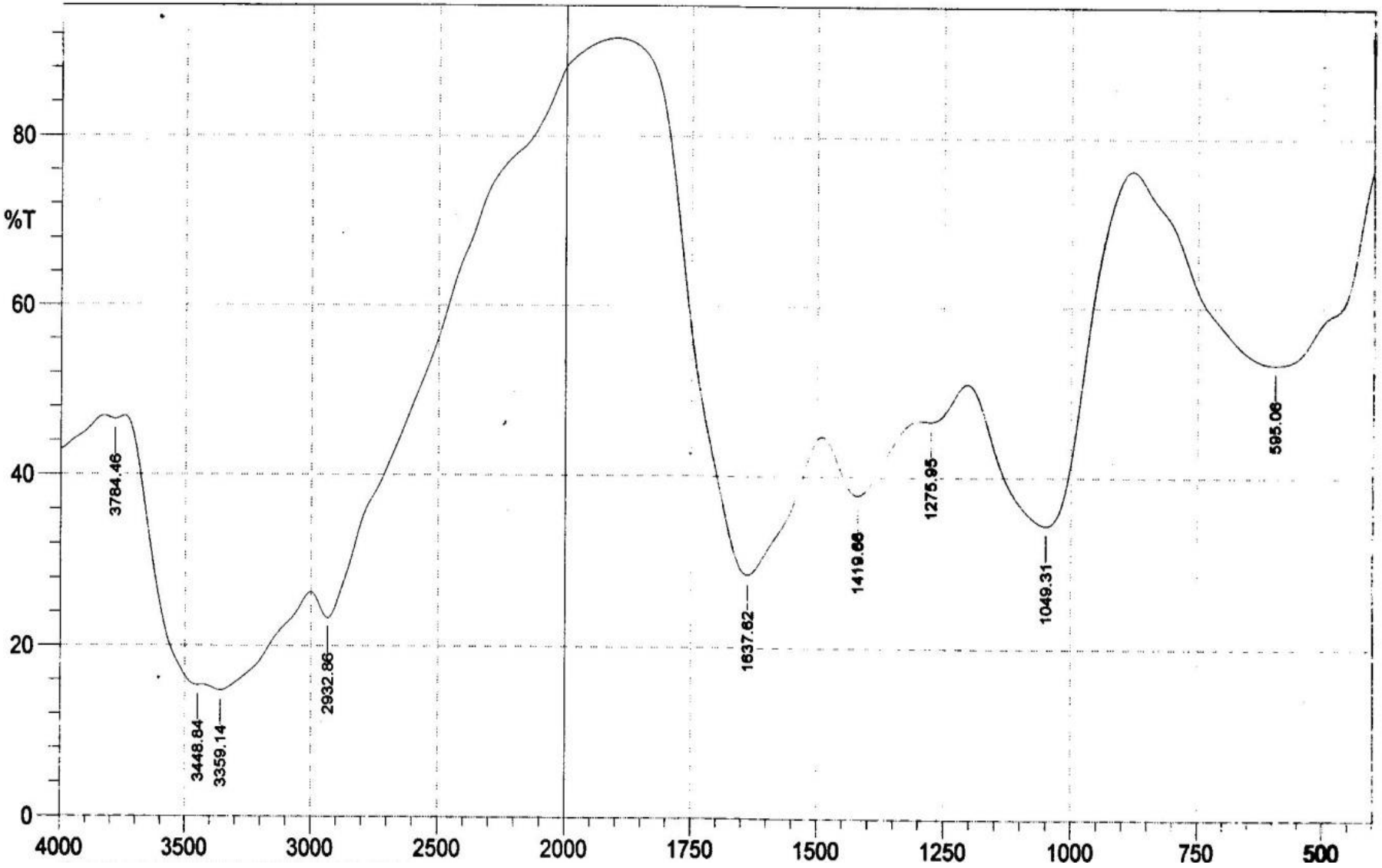


Figure 1: FTIR spectra of aqueous extract of *Euphorbial heterophylla*

Table 2: Characterization of peaks obtained from FTIR spectrum of residue from ethanol extract of *euphorbial heterophylla*				
S/No.	**Absorptions peaks (cm^{-1})**	**Appearance**	**Bond**	**Compound**
1.	595.06	Broad and weak	C – Cl stretching vibration	Halogen compound
2.	1049.31	Broad and medium	S-H stretching vibration	Sulfoxides
3.	1275.95	Weak	O-H, Bending	Primary alcohol
4.	1419.66	Weak	C-H bending	Alkene
5.	1637.62	Medium and sharp	N-H bending vibration >C=C<, >CO	Amines, alkenes
6.	2932.86	Sharp	C – H stretching vibration	Carboxylic oacid amines (sec).
7.	3359.14	Broad	N – H, O – H stretching vibration	amines carboxylic acid

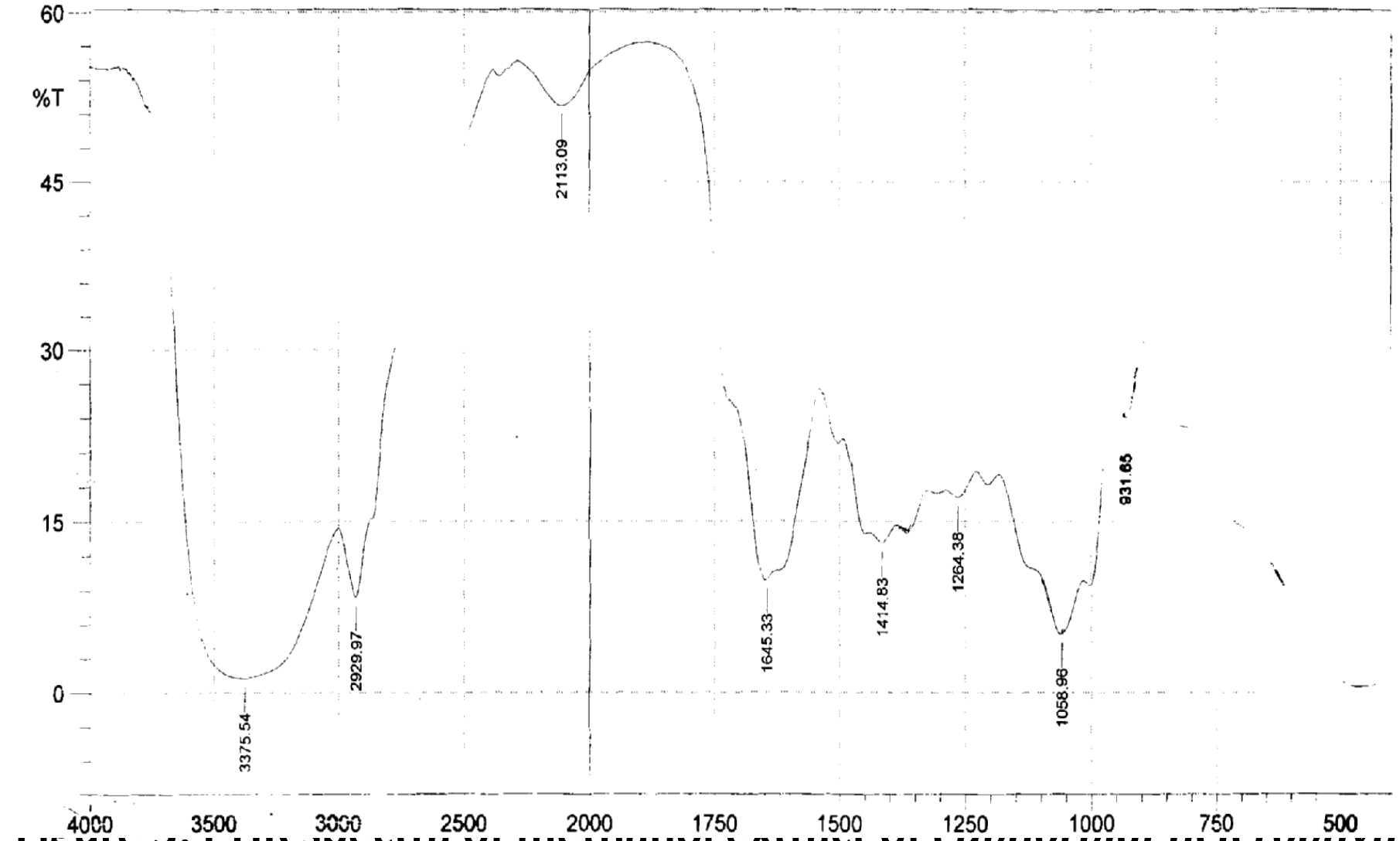
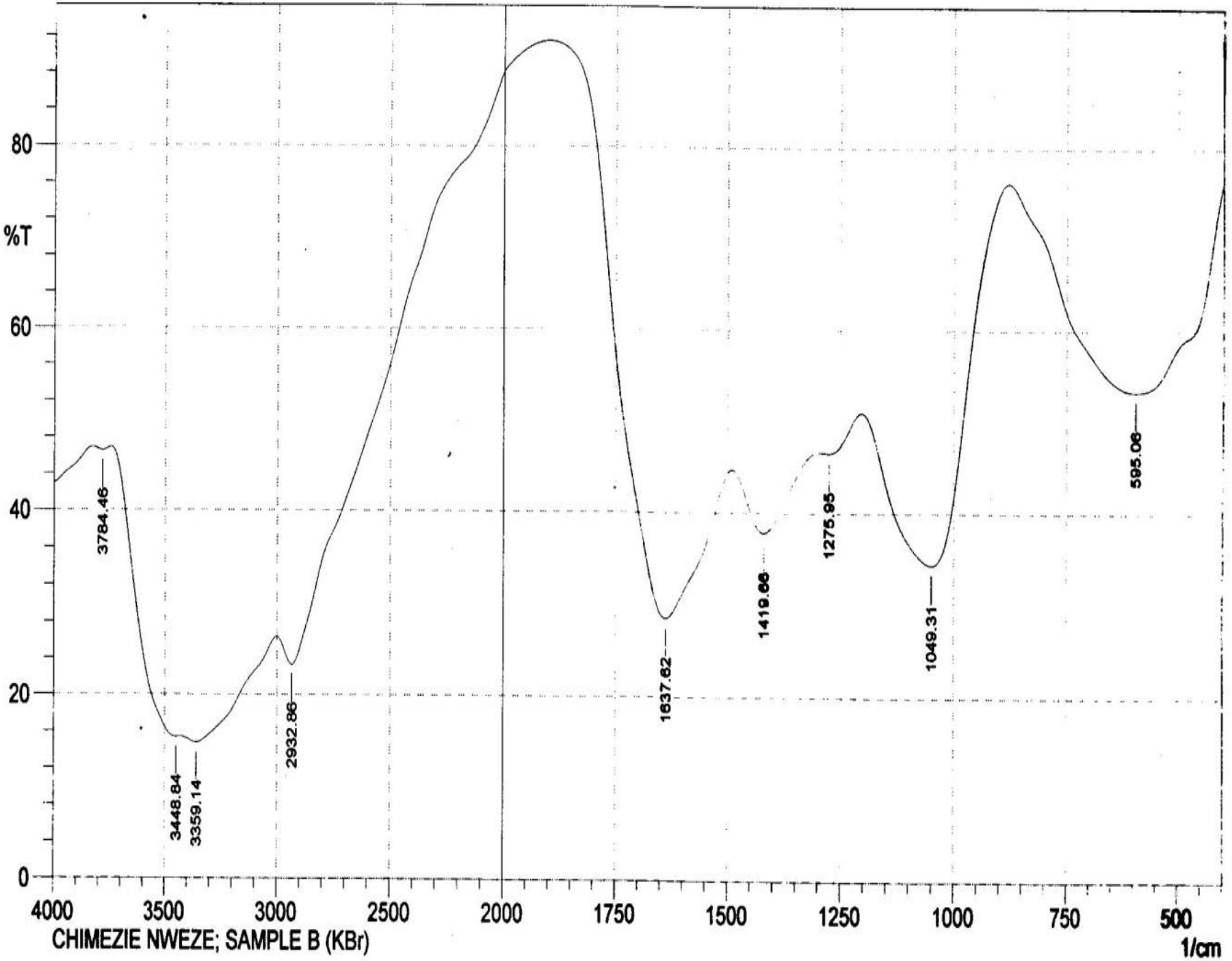


Figure 3.4 FTIR spectra of methanol extract of *Euphorbia heterophylla*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80
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40
20
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3784.46
3448.84
3359.14
2932.86
1637.62
1419.66
1275.95
1049.31
595.06
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3500
3000
2500
2000
1750
1500
1250
1000
750
500
1/cm
CHIMEZIE NWEZE; SAMPLE B (KBr)

Table 3: Characterization of peaks obtained from FTIR spectrum of methanol extract of *euphorbial heterophylla*

S/No.	Absorptions peaks (cm^{-1})	Appearance	Bond	Compound
1.	931.65	Sharp and weak	O – H bending	Carboxylic acid
2.	1058.96	strong and sharp	C = S stretching vibration C – O	Sulfoxides alcohol ethers
3.	1264.38	Weak and variable	C – O – C	Ethers
4.	1414.83	Weak	C – H bending vibration –C – NO_2	Alkene
5.	1645.33	Medium and strong	C-C multiple bond, stretching O – NO_2 , N – H	Aromatic nitro
6.	2113.09	Weak	C – L multiple bond stretching	Akene monosubstituted (vinyl) nitrate Amines
7.	2929.79	Strong and sharp	C – H stretching	Alkyne
8.	3375.54	Very broad	O – H, N-H	Carboxylic acid amines

Conclusion

- The study reveals clearly the presence of some functional groups such as alcohol, carboxylic acid, phenol, alkyl groups, alkenes and amines.

- Some of these functional groups are the major constituents of antibiotics like penicillin's, chloramphenicol, tetracycline etc.

- *Euphorbia heterophlla* could be referred to as a medicinal plant because according to World Health Organisation (WHO) a medicinal plant is any plant in which one or more of its organs contains substances that can be used for therapeutic purpose or which are precursors for the synthesis of useful drugs.

Recommendation for further work

Authors recommend phytochemical screenig of Euphorbia heterophlla

Thank you for listening!