

3-Results and Discussion

3.1-Phytochemical screening

Phytochemical screening of *Citrullus Colocynthis* fruit pulp gave positive reactions for: steroids, flavonoids, tannins, terpenes and glycosides.

Table 3.1: Phytochemical screening of *Adansonia digitata* fruit pulp

Species	Flavonoids	Tannins	Steroids	Terpenes	Glycosides
<i>Adansonia digitata</i>	+ve	+ve	+ve	+ve	+ve

3.2-The GC-MS analysis of *Citrullus Colocynthis* oil

GC-MS analysis of *Citrullus Colocynthis* fixed oil was conducted and the identification of the constituents was initially accomplished by comparison with the MS library (NIST) and further confirmed by interpreting the observed fragmentation pattern. Comparison of the mass spectra with the database on MS library revealed about 90-95% match.

3.2.1- Constituents of oil

The GC-MS analysis of the studied oil revealed the presence of 41 components (Table:3.2). The typical total ion chromatogram (TIC) of hexane extract is shown in Fig.3.1.

Table:3.2: Constituents of *Citrullus Colocynthis* oil

Peak#	R.Time	Area	Peak Report TIC	
			Area%	Name
1	3.354	75263	0.02	Hexanoic acid, methyl ester
2	5.935	259934	0.08	Octanoic acid, methyl ester
3	7.144	86403	0.03	Acetic acid, octyl ester
4	8.299	226442	0.07	Anethole
5	10.193	278808	0.09	Nonanoic acid, 9-oxo-, methyl ester
6	11.255	22164	0.01	Dodecanoic acid, methyl ester
7	11.579	37571	0.01	Nonanedioic acid, dimethyl ester
8	13.570	595623	0.19	Methyl tetradecanoate
9	14.377	40580	0.01	5-Octadecenoic acid, methyl ester
10	14.482	71933	0.02	4-Octadecenoic acid, methyl ester
11	14.644	352523	0.11	Pentadecanoic acid, methyl ester
12	15.375	47127	0.01	7,10-Hexadecadienoic acid, methyl ester
13	15.478	420823	0.13	9-Hexadecenoic acid, methyl ester, (Z)-
14	15.688	50320634	15.82	Hexadecanoic acid, methyl ester
15	16.436	303977	0.10	9,12-Octadecadienoic acid, methyl ester
16	16.648	1197837	0.38	Heptadecanoic acid, methyl ester
17	17.389	125012736	39.30	9,12-Octadecadienoic acid (Z,Z)-, methyl
18	17.411	39777863	12.51	9-Octadecenoic acid (Z)-, methyl ester
19	17.603	44267149	13.92	Methyl stearate
20	18.627	707030	0.22	Methyl 9.cis.,11.trans.t,13.trans.-octadeca
21	18.738	908557	0.29	9,12,15-Octadecatrienoic acid, methyl est
22	18.794	276017	0.09	7,10-Octadecadienoic acid, methyl ester
23	18.857	507529	0.16	8,11,14-Docosatrienoic acid, methyl ester
24	18.942	10340235	3.25	Tricyclo[20.8.0.0(7,16)]triacontane, 1(22),
25	18.979	3113740	0.98	9,12-Octadecadienoyl chloride, (Z,Z)-
26	19.092	2733519	0.86	9-Octadecenoic acid, 12-hydroxy-, methy
27	19.140	1175455	0.37	cis-11-Eicosenoic acid, methyl ester
28	19.340	4466111	1.40	Eicosanoic acid, methyl ester
29	19.394	6793704	2.14	PGH1, methyl ester
30	19.504	3215444	1.01	7-Tetradecenal, (Z)-
31	19.656	556463	0.17	Methyl (11R,12R,13S)-(Z)-12,13-epoxy-1
32	19.741	3149706	0.99	9-(3,3-Dimethyloxiran-2-yl)-2,7-dimethyl
33	19.842	5095416	1.60	1-Naphthalenol, decahydro-4a-methyl-
34	20.957	1508408	0.47	Docosanoic acid, methyl ester
35	21.723	361373	0.11	Tricosanoic acid, methyl ester
36	22.460	1540013	0.48	Tetracosanoic acid, methyl ester
37	22.959	3237649	1.02	Dotriacontane
38	23.200	986867	0.31	Squalene
39	23.556	1580305	0.50	17-Androstanone, 3-(3,4-dimethylphenyl
40	23.704	1996383	0.63	.beta.-Amyrin
41	23.863	441985	0.14	Hexacosanoic acid, methyl ester
		318087299	100.00	

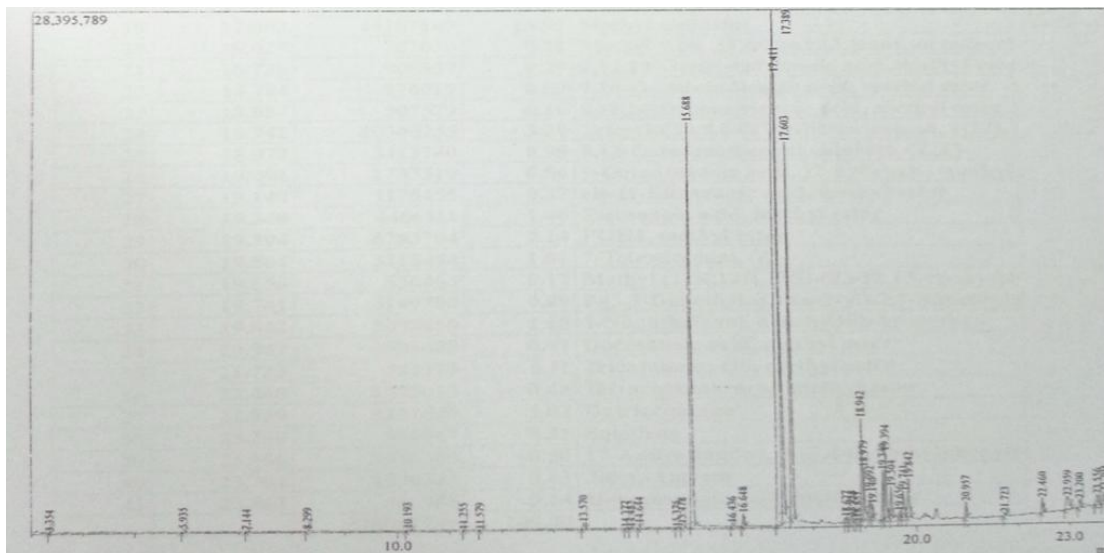


Fig.3.1:Cromatograms of *Citrullus Colocynthis* seed oil

The following constituents were detected in the chromatogram as major constituents:

9,12-Octadecanoic acid methyl ester(39.30%)

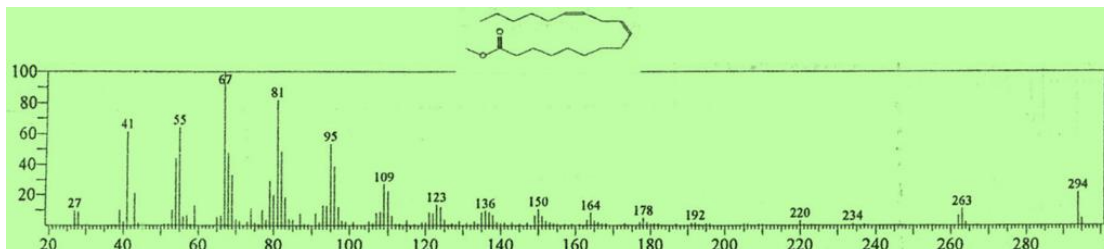


Fig. 3.2: Mass spectrum of 9,12-octadecanoic acid methyl ester

The EI mass spectrum of 9,12-octadecanoic acid methyl ester is shown in Fig. 3.2. The peak at m/z 294, which appeared at R.T. 15.432 in total ion chromatogram, corresponds to $M^+[C_{19}H_{34}O_2]^+$. The peak at m/z 263 corresponds to loss of a methoxyl function.

Hexadecanoic acid methyl ester(15.82%)

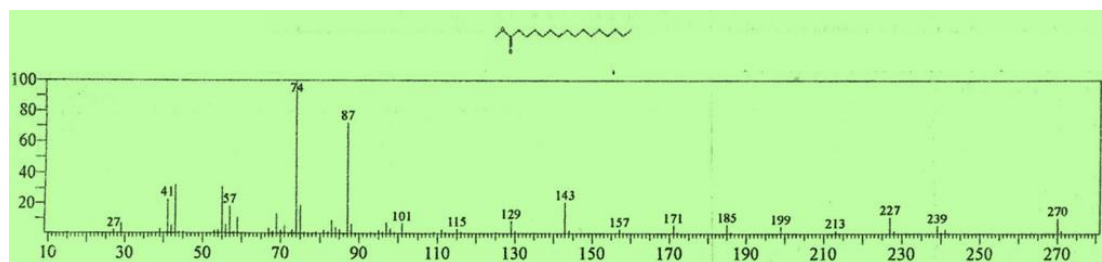


Fig. 3.3: Mass spectrum of hexadecanoic methyl ester

The EI mass spectrum of hexadecanoic acid methyl ester is shown in Fig. 3.3. The peak at m/z 270, which appeared at R.T. 13.308 in total ion chromatogram, corresponds to $M^+[C_{17}H_{34}O_2]^+$. The peak at m/z 239 corresponds to loss of a methoxyl function.

Methyl stearate(13.93%)

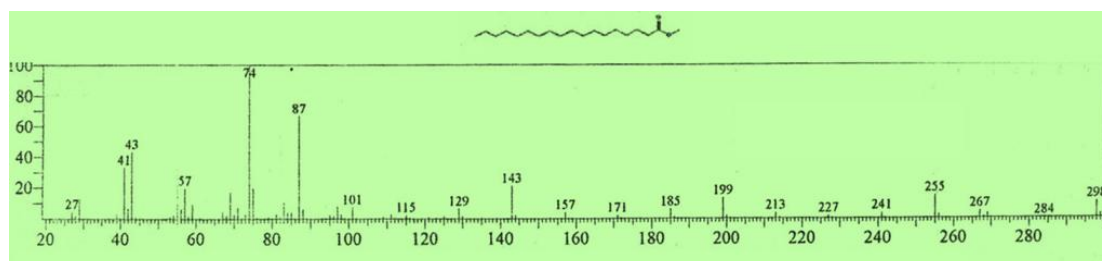


Fig. 3.4: Mass spectrum of methyl stearate

The EI mass spectrum of methyl stearate is shown in Fig. 3.4. The peak at m/z 298, which appeared at R.T. 15.783 in total ion chromatogram, corresponds to $M^+[C_{19}H_{38}O_2]^+$. The peak at m/z 267 corresponds to loss of a methoxyl function.

9-Octadecanoic acid methyl ester(12.51%)

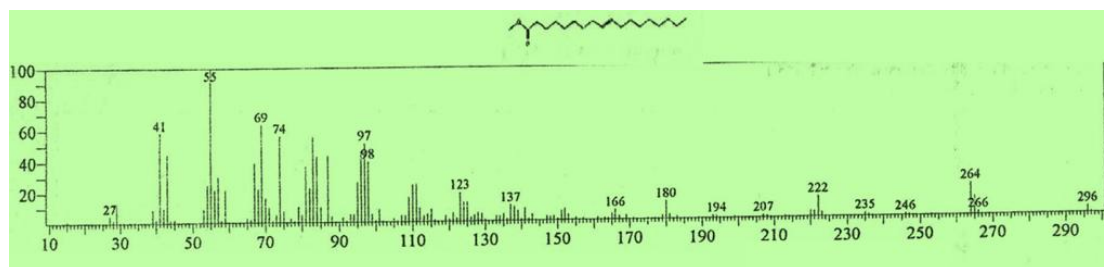


Fig. 3.5: Mass spectrum of 9-octadecanoic acid methyl ester

The EI mass spectrum of 9-octadecanoic acid methyl ester is shown in Fig. 3.5. The peak at m/z 296, which appeared at R.T. 15.496 in total ion chromatogram, corresponds to $M^+[C_{19}H_{36}O_2]^+$. The peak at m/z 265 corresponds to loss of a methoxyl function.

3.3-Antimicrobial activity

The oil was screened for antimicrobial activity against standard organisms. The average of the diameters of the growth inhibition zones are shown in Table (3.3). The results were interpreted in terms of the commonly used terms (<9mm: inactive; 9-12mm: partially active; 13-18mm: active; >18mm: very active). Tables (3.4) and (3.5) represent the antimicrobial activity of standard antibacterial and antifungal chemotherapeutic agents against standard bacteria and fungi respectively.

Table (3.3) : Antibacterial activity of *Citrullus Colocynthis* oil :M.D.I.Z (mm)

Drug	Conc.(mg/ml)	Ec	Ps	Sa	Bs	Ca
<i>Citrullus Colocynthis</i> oil	100	12	8	10	12	-

Table (3.4) : Antibacterial activity of standard chemotherapeutic agents :M.D.I.Z (mm)

Drug	Conc. mg/ml	Bs.	Sa.	Ec.	Ps.
Ampicillin	40	15	30	-	-
	20	14	25	-	-
	10	11	15	-	-
Gentamycin	40	25	19	22	21
	20	22	18	18	15
	10	17	14	15	12

Table (3.5) : Antifungal activity of standard chemotherapeutic agents against standard fungi

Drug	Conc. mg/ml	An.	Ca.
Clotrimazole	30	22	38
	15	17	31
	7.5	16	29

- Sa.: *Staphylococcus aureus*
- Ec.: *Escherichia coli*
- Pa.: *Pseudomonas aeruginosa*
- An.: *Aspergillus niger*
- Ca.: *Candida albicans*
- Bs.: *Bacillus subtilis*

The oil showed activity against *Escherichia coli* and *Bacillus subtilis* ,but it was partially active against *Staphylococcus aureus* .

