GCMS Phytochemical Profiling and Evaluation of the Effect of Methanol Extract of *Anacardium Occidentale* (cashew) Stem Bark on Antioxidant and Liver Function Markers of Hepatotoxic Rats

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Introduction

In the past few years, there has been a sudden increase in the hunt or search for natural source for antioxidants. This is as a result of the increasing evidence that implicates oxidants in the etiology of many diseases such as diseases of the liver, inflammatory diseases, neurological diseases. Simultaneously, there is an upsurge in the side effects of orthodox drugs used in the past few decades as the therapeutics for managing and treating these diseases.

Medicinal plants with minimal side effect have gained much attention as an alternative medicine useful for treatment, managing and prevention health defects or diseases. They are used to treat a wide variety of diseases and are potential natural hepatoprotectives and antioxidant compounds in the treatment of liver diseases. Most of the therapeutic effects of these plants has been attributed to their phytochemical constituent. *Anacardium occidentale* (Cashew) is one of such plants whose stem bark extract is used traditionally for the treatment of many diseases.

Aim

This study was aimed at phytochemical profiling of methanol extract of *Anarcardium occidentale* (cashew) stem bark (MEAOSB) and evaluation of its effect on antioxidant and liver function markers

Methods

In the experimental design of this study, a total of 25 Wistar albino rats divided into five groups, of five rats each, were used. Hepatotoxicity was induced with 2 ml/kg of carbon tetrachloride (CCl_4) in all the groups except group one (1) which served as normal control. Group 2 was induced but not treated and served as the positive control while group 3-5 were induced and treated with standard (silymarin), 200 and 400 mg/kg of the extract respectively. Treatment lasted a week. Phytochemical profiling was done with GCMS while biochemical analyses of the parameters were determined by standard protocol.

The biochemical parameters analysed include alkaline phosphatase (ALP), aspartate

RESULTS

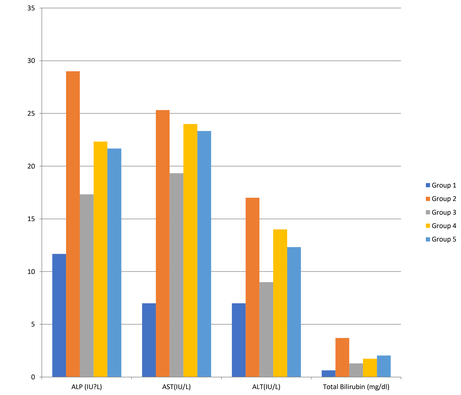

Figure 1: **Effect of methanol extract of cashew stem bark (MEAOSB) on liver markers in CCl_4-Induced hepatotoxic rats**

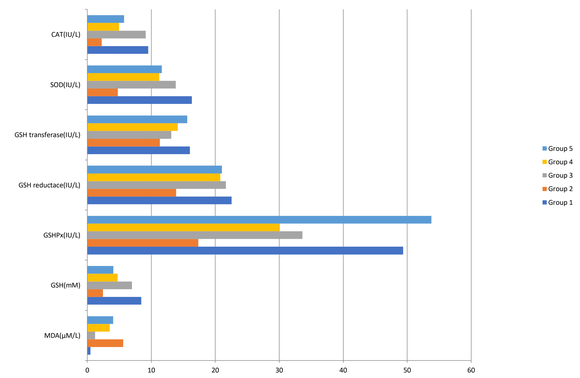

Figure 2: **Effect of methanol extract of cashew stem bark (MEAOSB) on antioxidant markers in CCl_4-Induced hepatotoxic rats**

Table 1: **GCMS phytochemical profile of MEAOSB**

Name of compound	Molecular weight (g/mol)	Molecular formula	Retention Time	Area %
Boric acid	61.83	H_3BO_3	2.341	2.40
Trimethyl ester	270.46	$C_{19}H_{36}O$	2.341	2.40
1-(trimethylsilyl) Oxy)propane 2-ol	148.28	$C_6H_{16}O_2Si$	2.341	2.40
Mercaptopropa-noic acid	106.14	$C_3H_6O_2S$	3.327	1.85
1-propane	58.08	C_3H_6O	3.327	1.85
3-methylthio methylsulfonyl 1phenyldithreitol	122.12	$C_4H_{10}O_4$	3.327	1.85
Methanamine	31.05	$C_8H_{15}N$	3.637	16.53
Cyanogen Chloride	61.470	CClN	3.637	16.53
Silane	32.12	SiH_4	4.116	3.45
Trimethyl silly ethane peroxoate	91.135	$C_5H_{12}O_3Si$	4.116	3.45
Hydrazine carbothioamide	91.135	CH_2N_3S	4.116	3.45
Cyclotrisiloxane	138.30	$H_6O_3Si_3$	4.538	2.58
Cyclopentane 1 carboxylic acid	112.12	$C_6H_8O_2$	4.538	2.58
Methyl Valerate	116.16	$C_6H_{12}O_2$	4.933	1.27
3 cyclopentane 1 acetaldehyde	152.23	$C_{10}H_{16}O$	5.234	0.29
2,5 dimethyl furan	96.13	C_6H_8O	5.243	0.29
3 amino 5-(indolyl)-4 pyrazolecarbonitrile	223.24	$C_{12}H_9N_5$	5.553	0.14
Indeno(2,1)pyridin 9-one	181.194	$C_{12}H_7NO$	5.553	0.14
Hexanoic acid	116.16	$C_6H_{12}O_2$	5.806	0.54
Octamethyl cyclotrisiloxane	296.62	$C_8H_{24}O_4Si_4$	6.116	2.51
Decane	142.29	$C_{10}H_{22}$	6.370	0.48
Tetradecane	198.39	$C_{14}H_{30}$	6.370	0.48
2,6,10 trimethyl decane	184.22	$C_{13}H_{38}$	6.370	0.48
Heptanoic acid	130.18	$C_7H_{14}O_2$	6.679	1.10
Undecane	156.31	$C_{11}H_{24}$	7.243	0.37
Dodecane	170.33	$C_{12}H_{26}$	7.243	0.37
Decamethyl Benzeneethanamine N-(Pentafluorophenyl) methylene)-beta 4 bis (trimethyl silly) Oxy)	475.60	$C_{21}H_{26}F_5NO_2Si_2$	7.412	6.03
1 fluoro dodecane	160.27	$C_{10}H_{25}$	8.060	1.05
1-octanol	130.23	$C_8H_{18}O$	8.060	1.05
Nonanoic acid	158.24	$C_9H_{18}O_2$	8.454	0.88
Dodecamethyl-cyclohexasiloxane	444.92	$C_{12}H_{36}O_6Si_6$	8.989	3.49
Aspermidin-17-ol	414.5	$C_{23}H_{30}N_2O_5$	14.990	0.21
2 Aziridinone	247.38	$C_{16}H_{25}NO$	15.694	1.63
3 Trimethyl silyl-oxy stearic acid	356.70	$C_{21}H_{44}O_2Si$	,16.257	0.71
Undecanoic acid	186.29	$C_{11}H_{22}O_2$	13.468	0.07
9 Tricosene	322.6	$C_{23}H_{46}$	13.947	0.01
Cis-vaccenic acid	282.46	$C_{18}H_{34}O_2$	14.060	0.01
1 pentadecene	210.40	$C_{15}H_3O$	14.483	0.15
Cycloocta siloxane	352.68	O_8Si_8	14.764	0.38
3 amino 2 phenazinol	211.22	$C_{12}H_9N_{30}$	14.764	0.38
11 oxo 9 Undecanoate	214.30	$C_{12}H_{22}O$	14.990	0.21
Decanoic acid	172.26	$C_{10}H_{20}O_2$	9.581	0.52
Pentanoic acid	102.13	$C_5H_{10}O_2$	9.581	0.52
Oxalic acid	90	$H_2C_2O_4$	10.539	0.52
Propyl undecyl ester	362.5	$C_{22}H_{34}O_4$	10.539	0.52
2 chloro propionic acid	108.52	$C_3H_5ClO_2$	12.820	0.03
Cyclohepta siloxane	519.08	$C_{14}H_{42}O_7Si_7$	11.750	1.09
Hexadecanoic acid	256.42	$C_{16}H_{32}O$	11.243	0.21
Hexadecane	226.41	$C_{26}H_{34}$	11.243	0.21
1 Octadecane sulphonyl chloride	353.0	$C_{18}H_{37}ClO_2S$	10.539	0.52

DISCUSSION

As depicted in fig. 1 above, induction with CCl_4 was injurious to the hepatocytes as indicated by the leakage of ASP, ALT and ALP into the peripheral blood. This leakage may be due to generation of free radical, CCl_3• that alkylates cellular proteins and lipids in the presence of oxygen causing lipid peroxidation and consequently causing liver damage. Findings from this research indicate that high doses of CCl_4-induction could result in Oxidative and hepatic damage and MEAOSB has the potential of scavenging radicals and protecting the liver against CCl_4-induced oxidation and h[illegible]. The observed effect of M[illegible]ld be due to the presence of Aspidospermidin-17-ol, hexadecanoic acid methyl ester and Aziridinone in the extract shown by the GCMS analysis.

CONCLUSION

Findings from this research indicate that high doses of CCl_4-induction could result in hepatic damage and methanol extract of *Anacardium occidentale*stem bark has the potential of protecting the liver against CCl_4-induced hepatotoxicity. This hepatoprotective activity could be of great therapeutic potentials to clinicians, and is attributed to the antioxidant activities.