

Evaluation of Antibacterial Potency of Ethyl acetate and Ethanolic Extracts of *Murinda Lucida* Leaf, Stem, and Bark on *Mycobacterium* Species, isolated from the chest Hospital, Obafemi Awolowo University, Ile-Ife, Osun State Nigeria.

ABSTRACT

The plant *Morinda Lucida* falls under the family Rubiaceae known to have wide usage in traditional medicine. *Morinda lucida* is a tropical West African tree of medium-size about 18–25 m tall, the bark is grey to brown in colour, flowers are white in colour, the fruit is a drupe, seed is ellipsoid, yellowish and soft. The antibacterial potency of ethyl acetate and ethanolic extracts of *Murinda Lucida* leaf, stem, and bark were tested against mycobacterium species. The mycobacterium species used during the course of this research work are *Mycobacterium fortuitum* (ATCC 6841), *Mycobacterium smegmatis* (ATCC 19420), *Mycobacterium abscessus* (ATCC 19977), *Mycobacterium phlei* (ATCC 19240). It was observed that the medicinal plant, *Murinda Lucida* has antimicrobial potency against the test organisms. It was also observed that, the ethanolic extracts of leaf and bark has better antimicrobial activity compared to the ethyl acetate stem extract. But all the extracts exhibit various degrees of antimicrobial potency. The purpose of this research work is to determine the antimicrobial properties of *Murinda Lucida* against mycobacterium species, a very virulent and infectious organism, isolated from the chest Hospital, Obafemi Awolowo University, Ile-Ife, Osun State Nigeria.

Keywords ; Test organism, *Mycobacterium fortuitum* (ATCC 6841), *Mycobacterium smegmatis* (ATCC 19420), *Mycobacterium abscessus* (ATCC 19977), *Mycobacterium phlei* (ATCC 19240), Antibacterial assay and Extraction,

INTRODUCTION

Medicinal plants have been the mainstay of traditional herbal medicine amongst rural dwellers worldwide since antiquity to date. The therapeutic use of plants certainly goes back to the Sumerian and the Akkadian civilizations in about the third millennium BC. Hippocrates, one of the ancient authors who described medicinal natural products of plant and animal origins, listed approximately 400 different plant species for medicinal purposes. Natural products have been an

integral part of the ancient traditional medicine systems, e.g. Chinese, Ayurvedic and Egyptian (Sarker and Nahar, 2007).

Over the years they have assumed a very central stage in modern civilization as natural source of chemotherapy as well as amongst scientist in search for alternative sources of drugs. About 3.4 billion people in the developing world depend on plant-based traditional medicines, this represents about 88 per cent of the world's inhabitants, who rely mainly on traditional medicine for their primary health care. (Sarker and Nahar, 2007).

According to the World Health Organization, a medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes, or which are precursors for chemo-pharmaceutical semi synthesis. Such a plant will have its parts including leaves, roots, rhizomes, stems, barks, flowers, fruits, grains or seeds, employed in the control or treatment of a disease condition and therefore contains chemical components that are medically active. These non-nutrient plant chemical compounds or bioactive components are often referred to as phytochemicals ('phyto-'from Greek - *phyto* meaning 'plant') or phytoconstituents and are responsible for protecting the plant against microbial infections or infestations by pests (Abo *et al*; 1991, Liu 2004, Nweze *et al* 2004; Doughari *et al.*, 2009). The study of natural products on the other hand is called phytochemistry. (Doughari and Obidah, 2008, Doughari *et al.*, 2009).

The plant *Morindalucida* falls under the family Rubiaceae known to have wide usage in traditional medicine (Osuntokun 2015). *Morindalucida* is a tropical West African tree of medium-size about 18–25 m tall, the bark is grey to brown in colour, flowers are white in colour, the fruit is a drupe, seed is ellipsoid, yellowish and soft (Zimudzi&Cardon, 2005). *Morindalucida* which commonly known as the Brimstone tree, is known in Ghana as Konkroma in Twi (Addo-Fodjoret *al.*, 2008) while in Nigeria it is known as Nfia in Igbo (Nweze, 2011), (Akinyemi, *et al.*, 2008). The leaves are used as "oral teas", which are usually taken orally for the traditional treatment of malaria, and as a general febrifuge, analgesic, laxative and antiinfections (Abbiw, *et al.*, 1990).

The use of *Morindalucida* has always been part of human culture and is wide spread in Africa. In some countries, like Ghana, government encourages the use of indigenous forms of medicine rather than expensive imported drugs. Also in Nigeria, a large percentage of the populace depends on herbal medicines because the commercially available orthodox medicines are becoming increasingly expensive and out of reach (Adeshina *et al.*, 2005).

The leaves have also been reported to possess strong trypanocidal and aortic vasorelaxant activities (Asuzu, *et al.*, 1990). Further studies have shown that leaf and stem bark of *M. lucida* possess anticancer (Sowemimo, *et al.*, 2007), hepatoprotective (Oduola, *et al.*, 2010), cytotoxic and genotoxic (Akinyemi, *et al.*, 2005), antispermatogenic (Raji, *et al.*, 2005), hypoglycemia and antidiabetic activity.

The major constituents of *M. lucida* extract are the various types of alkaloids, anthraquinones and anthraquinols. Two compounds (oruwalol and oruwal) and 10 anthraquinones have been isolated and characterized from the stem of the plant (Adeneye, *et al.*, 1984).

In Nigeria, *Morinda lucida* is one of the four most used plants in the preparation of traditional medicines against fever. Decoctions and infusions or plasters of root, bark and leaves are recognized remedies against different types of fever, including yellow fever, malaria, trypanosomiasis and feverish condition during childbirth. In some cases, the plant is employed in the treatment of diabetes, hypertension, cerebral congestion, dysentery, stomach-ache, ulcers, leprosy and gonorrhea (Adesida, *et al.*, 1972).

Morinda lucida is used generally for febrifuge, analgesic and laxative (Bever, 1996) while the decoction of the stem bark is used for the treatment of severe jaundice. As reported by Adjanohoun *et al.*, (1991) *Morinda lucida* is used locally in the treatment of irregular menstruation, insomnia and jaundice though did not state the parts that are useful in this purpose.

Morinda lucida is used in the treatment of wound infections, abscesses and chancre (The primary syphilitic ulcer associated with swelling of local lymph glands and is painless, indurated, solitary and highly infectious) Also amongst the Igbo People in Benue State, Nigeria, it was reported by Oduola *et al.*, (2005) that the decoction of the *Morinda lucida* is used twice or thrice daily as anti-diarrhea, while the leaves are used for treatment of infertility in women.



Fig 1; Leaf section of *Morinda lucida*





Fig 2;Bark section of *Morindalucida*

Morindalucida is used as an astringent and antiseptic for ulcerating abscess, exudate is rubbed on affected area (Adomi and Umukoro, 2010). The crude ethyl acetate extract of the leaves is said to contain alkaloids, cardenolides and saponins (Adomi and Umukoro, 2010). Ogundare and Onifade (2009) worked exclusively and extensively on the effect of the leaves of *Morindalucida* on *Escherichia coli*, and reported that it has potent inhibitory activity both in vitro and in vivo. The purpose of this research work is to elucidate the basic importance of *Morindalucida* as a Medicinal plant to pharmaceutical industry for the development and production of herbal bases drugs in the treatment of tuberculosis infection from the data obtained from the antimicrobial assay of *Morindalucida* activity on *Mycobacterium* species which is the test organism.

MATERIALS AND METHODS

PLANT SAMPLES COLLECTION

The leaves, stem and bark from *Morindalucida* were collected from Chief Omole's compound, AkungbaAkoko, Ondo State at exactly 7:02.am, on the 23rd June 2015. The plant was authenticated by a botanist at the department of Plant science and biotechnology, AdekunleAjasin University AkungbaAkoko, OndoState, Nigeria with latitude (7.21692 North) and longitude (5.21561 East) with the voucher number 17702.

SOURCES OF TEST ORGANISM

The pure cultures of 10 typed strains organisms were graciously provided by Prof. B.A. Adeniyi of the department of pharmaceutical microbiology faculty of pharmacy, university of Ibadan, Ibadan, Oyo State, These included *Mycobacterium fortuitum* (ATCC 6841), *Mycobacterium smegmatis* (ATCC 19420), *Mycobacterium abscessus* (ATCC 19977), *Mycobacterium phlei* (ATCC 19240), They were collected in slants in McCartney bottles containing nutrient agar and were then stored in a refrigerator at -4°C.

109 PREPARATION OF EXTRACTS

110 The extracts were prepared from three different plant part; the leaves, stem and bark. The
 111 plant parts were washed with distilled water, sliced and air-dried. After drying, it was then powdered
 112 using a grinder. 400grams of each plant parts was soaked in 1200mL ethyl acetate in an air-tight
 113 container(Akinyemiet *al* 2005,El Astalet *al.*,2005).It was mixed vigorously and left for nine days in
 114 the laboratory. After the ninth day, the solution contained in the bottle was filtered using Whatman
 115 filter paper. Then the extract was separated from the solvent using rotary evaporator at different
 116 temperatures depending on the solvent used to obtain a pure extract. The filtrates were concentrated
 117 and later freeze dried. The samples were stored at -4°C until required for use.(Osuntokun *et*
 118 *al.*,2015)



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 120 **Fig 3;Extracted photo of Murindalucida**

122 STANDARDIZATION OF INOCULUM

123 Points of the various organisms are reconstituted using an aseptic condition. Using a sterile
 124 wire loop, approximately one isolated colony of each pure culture was transferred into 5mL of sterile
 125 nutrient broth and incubated for 24 hours. After incubation, 0.1mL of the isolated colony was
 126 transferred using a sterile needle and syringe into 9.9ml of sterile distilled water contained in each
 127 test tube and then mixed properly. The liquid now serve as a source of inoculum containing
 128 approximately 10^6 cfu/mL of bacterial suspension.(Osuntokun *et al.*,2015).

129 STANDARDIZATION OF EXTRACT

130 Using aseptic condition, the extract is reconstituted by adding 0.0g of each extract with mL
 131 0.01 dimethyl sulphoxide (DMSO) and 7.5mL of sterile distilled water. For each extract that is for
 132 leaf, 3mL of distilled water is measured into three sterile bijou bottle and therefore serial dilution
 133 follows by incorporating 3mL of leaf extract into the first bijou bottle (A) and from A 3mL was
 134 picked into B, from B 3ml is picked into C.. (Osuntokun *et al.*, 2015)

135 ANTIMICROBIAL SCREENING

136 The susceptibility testing was investigated by the agar diffusion method (Adeniyet *al.*,
 137 2006), (Osuntokun 2015). A 0.1 ml of 1:10,000 dilutions (equivalent to 10^6 cfu/mL) of fresh
 138 overnight culture of the nontuberculous mycobacteria species grown in Nutrient broth, was seeded
 139 into 40 mL of molten Mueller-Hinton agar, and properly mixed in universal bottles. The mixture was
 140 aseptically poured into sterile Petri dishes and allowed to set. Using a sterile cork borer of 4 mm
 141 diameter, equidistant wells were made in the agar. Drops of the re-suspended extracts with
 142 concentrations between 60 to 7.5 mg/mL were introduced into the wells till it's filled. Ciprofloxacin
 143 and Metronidazole 2mg/mL were used as the control for bacteria. The plates were allowed to stand on
 144 the bench for an hour, to allow pre-diffusion of the extracts before incubation. The plates were
 145 incubated at 37°C for 24 to 48 hours. The zones of inhibition were measured to the nearest
 146 millimeter (mm) using a standard transparent meter rule. All experiments were performed in
 147 duplicates. (Osuntokun & Olajubu 2014).

148 RESULTS

149 This result shows the effects of Murid lucida on selected species of *Mycobacterium*. The observation and
 150 reading were recorded in table 1-6 and some plates were used to show the evidence of antimicrobial potency
 151 of the extracts on the test organisms.

152 Table I shows the effect of ethyl acetate leaf extract of Murida Lucida on the test organisms, it was
 153 observed at 60mg/mL, 30mg/mL concentration *Mycobacterium fortuitum* (ATCC 6841) has the
 154 highest zones of inhibition which is between 18mm and 12mm respectively. *Mycobacterium*
 155 *plei* (ATCC 19240) has the lowest zones of inhibition, between 10mm and 7mm. The control shows
 156 the zones of inhibition between 11mm and 17mm of Ciprofloxacin and Metronidazole which are

both broad spectrum of antibiotics. Plate 1 shows the plate of *Mycobacterium fortuitum* seeded with *Morinda lucida* leaf extract and the effect of the *Morinda lucida* on the test organism.

Table 2. It was observed that *Mycobacterium fortuitum* (ATCC 6841) at 60mg/mL and 30mg/mL concentration has the highest zone of inhibition between 12mm and 18mm. 9mm and 6mm were observed as the lowest zones of inhibition for *Mycobacterium smegmatis* (ATCC 19420). The control experiment recording were between the range of 17mm and 22mm at 20mg/mL concentration. Plate 2 shows the effect of *Mycobacterium abscessus* seeded with *Morinda lucida* stem extracts.

Table 3 shows the effect of ethyl acetate bark extracts of *Morinda lucida* on the test organism.. it also shows the plates which demonstrate the growth inhibition of *Morinda lucida* on one of the test organism, *Mycobacterium phlei*. it was observed that *Mycobacterium smegmatis* (ATCC 19420) and *Mycobacterium fortuitum* (ATCC 9841) has the highest zones of inhibition at 60mg/mL and 30mg/mL at 14mm and 18mm respectively and 12mm and 9mm zones of inhibition value were recorded for *Mycobacterium abscessus* (ATCC 19977) at the same value of concentration. 4mm and 8mm zones of inhibition were observed at 15 and 7.5mg/mL concentration of *Mycobacterium fortuitum* (ATCC 9841) and *Mycobacterium phlei* (ATCC 19240) but a sharp value were recorded at 15mg/mL concentration.

In table 4. Plates 4 showing zone of inhibition of *Mycobacterium phlei* seeded with *Morinda lucida* leaf extract. it was observed that the *Mycobacterium abscessus* (ATCC 19977) has the highest zones of inhibition of 9mm and 8mm at 60mg/mL and 30mg/mL and *Mycobacterium smegmatis* (ATCC 19420) has the lowest zones of inhibition of 3mm and 5mm at the same concentration of 60 and 30mg/mL concentration. *Mycobacterium abscessus* (ATCC 19977) has the highest zones of inhibition of 6mm at 15mg/mL and lowest zones of inhibition of 3mm at the same concentration. The control antibiotics zones of inhibition are between 12mm and 14mm at 20mg/mL of Ciprofloxacin and Metronidazole.

In table 5, It was observed that *Mycobacterium smegmatis* (ATCC 19420) and *Mycobacterium phlei* (ATCC 19240) has the highest zones of inhibition of 5mm and 8mm at the same concentration of 60mg/mL and 30mg/mL concentration. *Mycobacterium phlei* has the highest concentration of between 3mm and 5mm at 15mg/mL and 7.5mg/mL concentration and *Mycobacterium smegmatis* has the lowest concentration of 1mm and 2mm at the same concentration. The control of Ciprofloxacin and Metronidazole at 20mg/mL are between 10 and 20mm.

186 In table 6,It was observed that at 60mg/mL and 30mg/mL concentration, *Mycobacterium fortuitum*
 187 (ATCC6841) and *Mycobacterium phlei* (ATCC19240)has the highest zones of inhibition of 8mm to
 188 10mm compare with the concentration at 15mg/mL and 15mg/mL which recorded the lowest zones
 189 of inhibition of 2mm and 5mm respectively.plate 6 and 7 shows the plate where *Mycobacterium*
 190 *smegmatis* and *Mycobacterium abscessus* seeded with *Morindalucida* bark extract.

191 **TABLE 1: Effect of ethyl acetate leaf extract of *Morindalucida* on the test**
 192 **organisms**

TEST ORGANISM	ZONES OF INHIBITION (MM)					Metronidazole 20mg/mL
	60 mg/mL	30mg/mL	15mg/mL	7.5mg/mL	Ciprofloxacin 20mg/mL	
<i>Mycobacterium abscessus</i> (ATCC 19977)	11.0	6.0	4.0	4.0	11.0	12.0
<i>Mycobacterium phlei</i> (ATCC 19240)	10.0	7.0	0.0	0.0	12.0	14.0
<i>Mycobacterium smegmatis</i> (ATCC 194212)	14.0	8.0	5.0	4.0	12.0	13.0
<i>Mycobacterium fortuitum</i> (ATCC 6841)	18.0	12.0	8.0	4.0	11.0	17.0

Unit of zones of inhibition-mm

194 **PLATES SHOWING ZONES OF INHIBITION**

195 **PLATE 1 :*Mycobacteriumfortuitum* seeded with *Morinda lucida* leaf extract**

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212 **TABLE 2 : EFFECT OF ETHYL ACETATE STEM EXTRACT OF**
 213 ***Morindalucida* ON THE TEST ORGANISMS**

TEST ORGANISM	ZONES OF INHIBITION (MM)					
	60 mg/mL	30mg/mL	15mg/mL	7.5mg/mL	Ciprofloxacin 20mg/mL	Metronidazole 20mg/mL
<i>Mycobacterium fortuitum</i> (ATCC 6841)	18.0	12.0	8.0	4.0	11.0	17.0
<i>Mycobacterium abscessus</i> (ATCC 19977)	16.0	14.0	9.0	5.0	22.0	12.0
<i>Mycobacterium plei</i> (ATCC 19240)	13.0	11.0	5.0	5.0	14.0	11.0
<i>Mycobacterium smegmatis</i> (ATCC 19420)	9.0	6.0	0.0	0.0	22.0	16.0

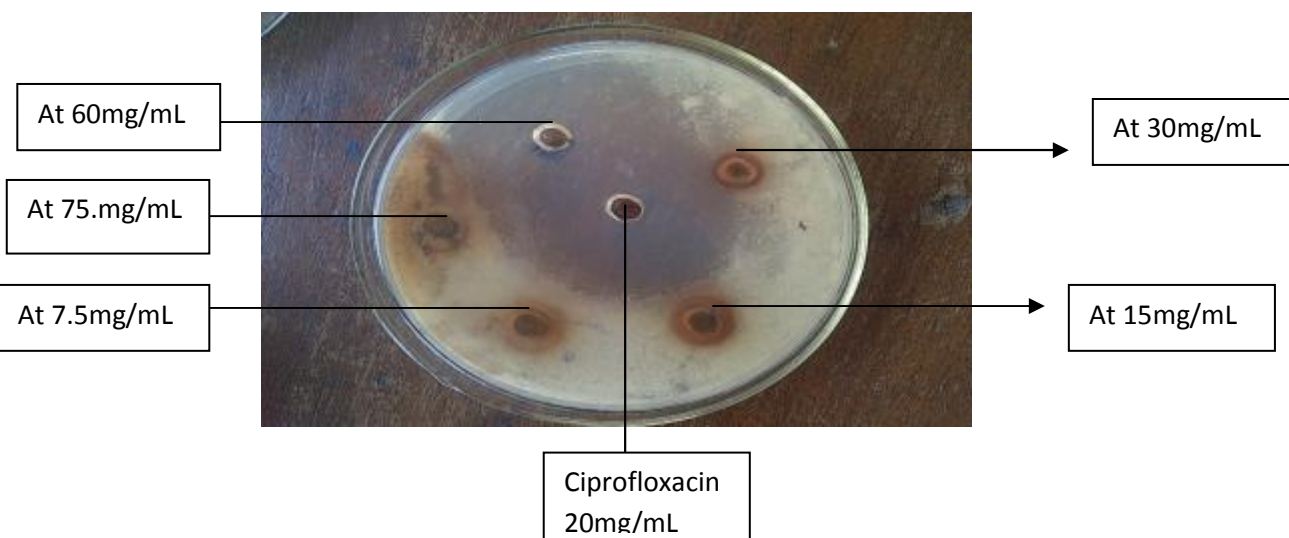
214 Unit of zones of inhibition-mm

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217 **PLATES SHOWING ZONES OF INHIBITION**

218 **PLATE 2: *Mycobacterium abscessus* seeded with *Morindalucida* stem extract**



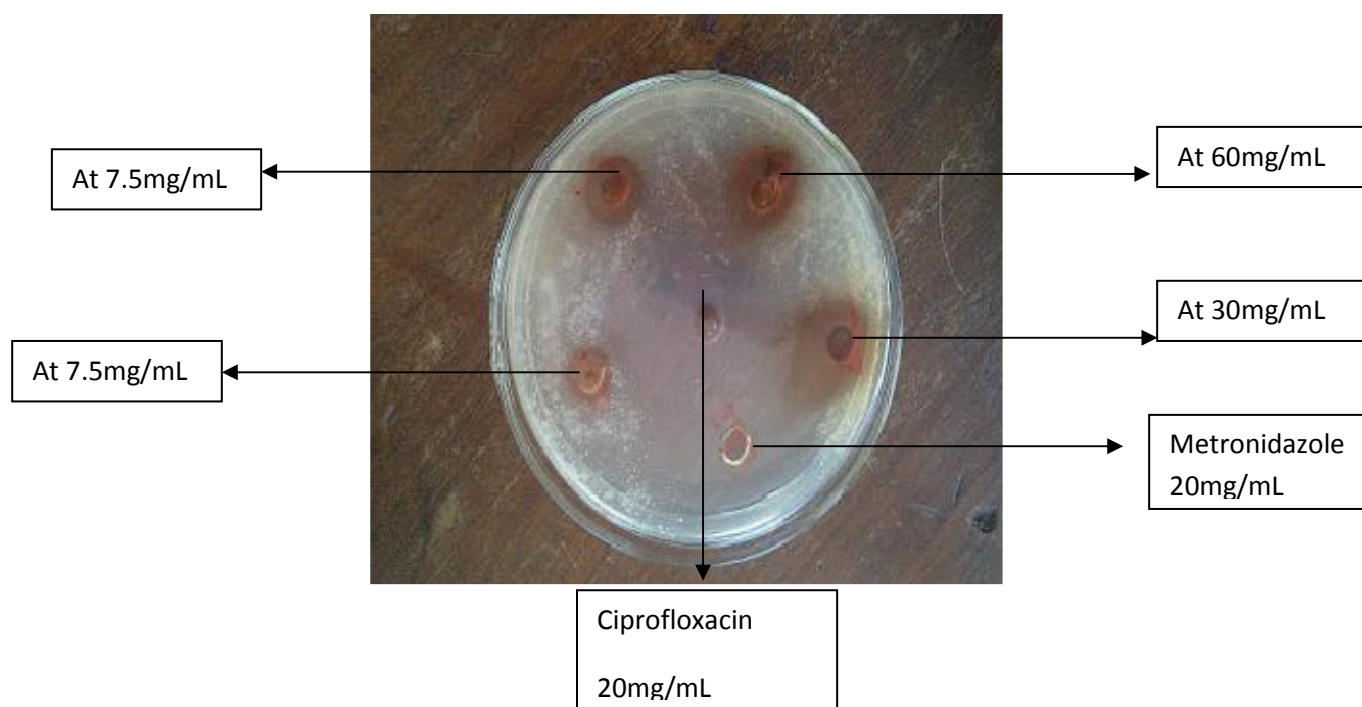
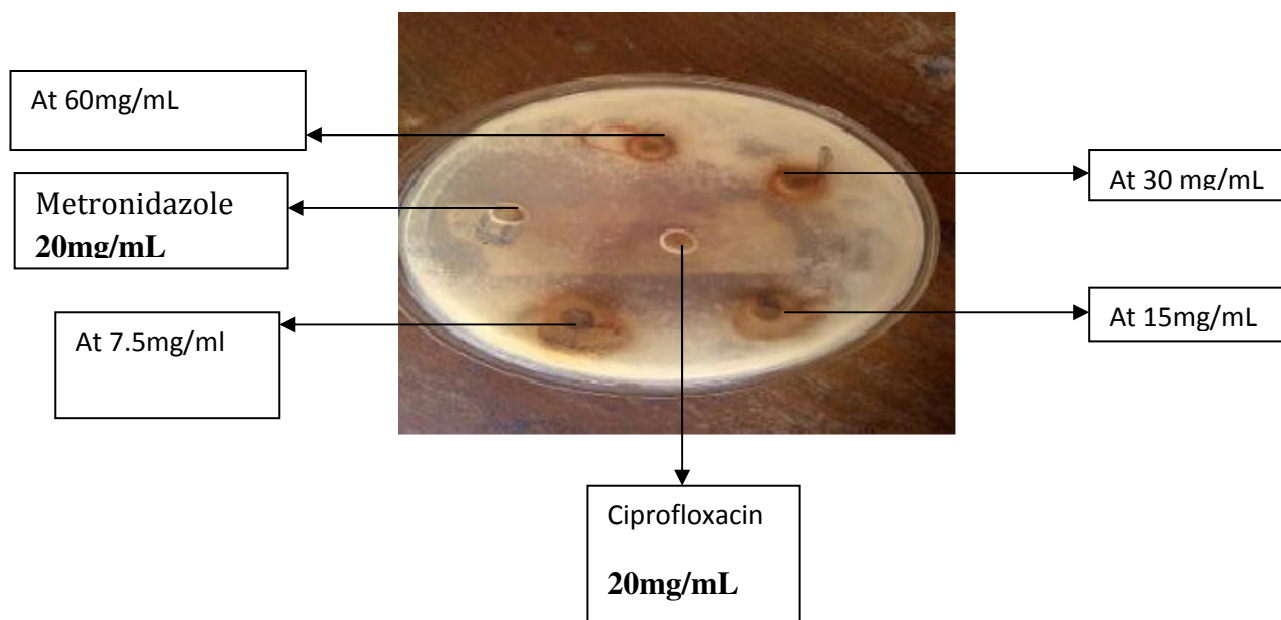


TABLE 3 : Effect of ethyl acetate bark extract of *Morindalucida* on the test organisms

TEST ORGANISM	ZONES OF INHIBITION (MM)					
	60 mg/mL	30mg/mL	15mg/mL	7.5mg/mL	Ciprofloxacin 20mg/mL	Metronidazole 20mg/mL
<i>Mycobacterium fortuitum</i> (ATCC 9841)	17.0	14.0	8.0	4.0	15.0	15.0
<i>Mycobacterium abscessus</i> (ATCC 19977)	12.0	9.0	5.0	3.0	12.0	12.0
<i>Mycobacterium plei</i> (ATCC 19240)	17.0	12.0	8.0	4.0	18.0	12.0
<i>Mycobacterium smegmatis</i> (ATCC 19420)	18.0	14.0	14.0	0.0	17.0	16.0

234 **PLATES SHOWING ZONES OF INHIBITION**

235 **PLATE 3: *Mycobacterium phlei* seeded with *Morindalucida* bark extract**



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239 **Table 4;Effect of ETHANOLIC STEM EXTRACT of *Morindalucida* on the test**
 240 **organisms.**

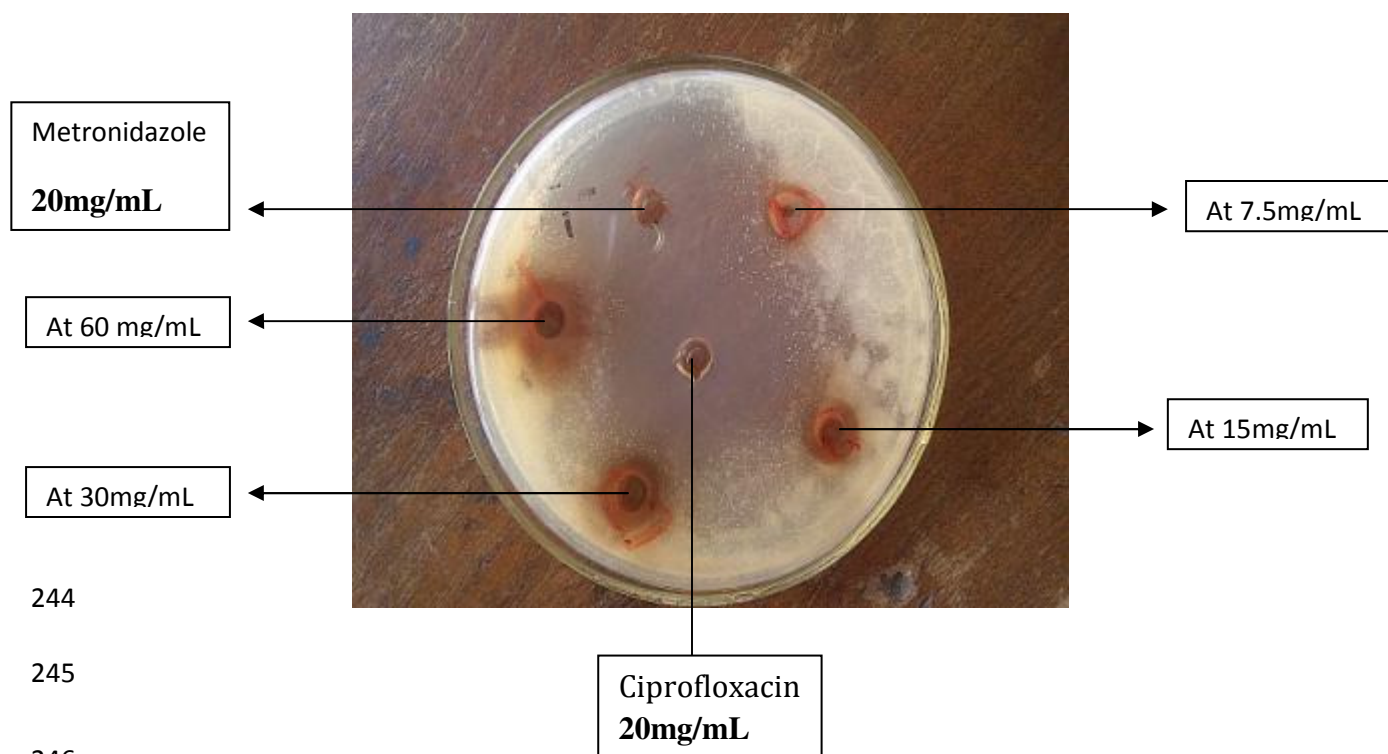
TEST ORGANISMS	ZONES OF INHIBITON					
	60mg/mL	30mg/mL	15mg/mL	7.5mg/mL	Ciprofloxacin 20mg/mL	Metronidazole 20mg/mL
<i>Mycobacterium fortuitum</i> (ATCC6841)	8.0	7.0	3.0	0.0	13.0	12.0
<i>Mycobacterium smegmatis</i> (ATCC19420)	5.0	3.0	3.0	1.0	8.0	10.0
<i>Mycobacterium abscessus</i> (ATCC19977)	9.0	8.0	6.0	0.0	14.0	12.0
<i>Mycobacterium phlei</i>	7.0	6.0	4.0	1.0	10.0	10.0

(ATCC19240)						
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Unit of inhibition : mm

242 **Plate 4:** Plates showing zone of inhibition of *Mycobacterium phlei* seeded with *Morinda lucida* leaf
243 extract.



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247 **TABLE 5;**Effect of ETHANOLIC LEAF EXTRACT of *Morinda lucida* on the test
248 organisms.

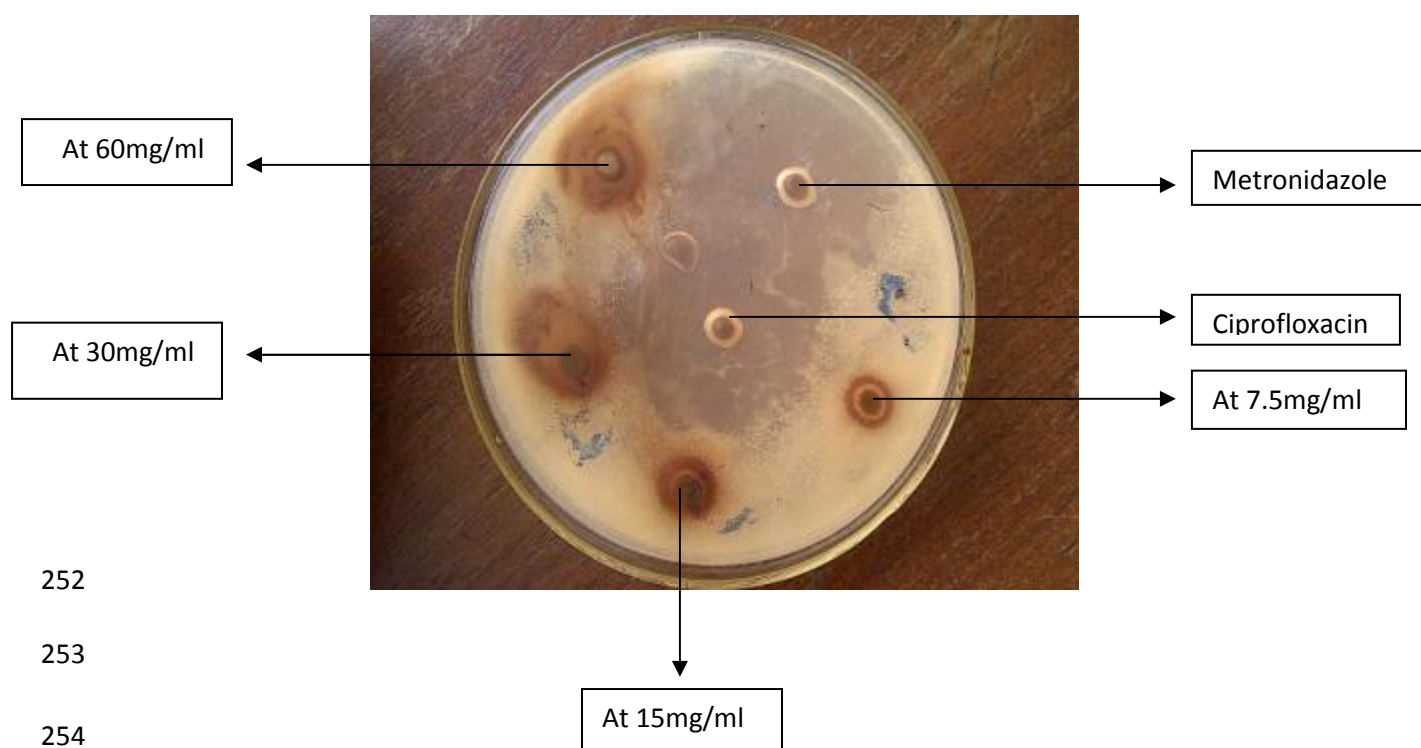
TEST ORGANISMS	ZONES OF INHIBITION					
	60mg/mL	30mg/mL	15mg/mL	7.5mg/mL	Ciprofloxacin 20mg/mL	Metronidazole 20mg/mL
<i>Mycobacterium fortuitum</i> (ATCC6841)	7.0	4.0	3.0	0.0	12.0	10.0
<i>Mycobacterium smegmatis</i> (ATCC19420)	8.0	5.0	2.0	1.0	12.0	8.0

<i>Mycobacterium abscessus</i> (ATCC19977)	7.0	6.0	5.0	2.0	10.0	10.0
<i>Mycobacterium phlei</i> (ATCC19240)	8.0	6.0	5.0	3.0	12.0	11.0

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Unit of inhibition : mm

250 **Plate 5:** Plates showing zone of inhibition of *Mycobacterium abscessus* seeded with *Morindalucida*
251 leaf extract.



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255 **TABLE 6:**Effect of ETHANOLIC BARK EXTRACT of *Morindalucida* on the test
256 organisms.

TEST ORGANISMS	ZONES OF INHIBITION					
	60mg/mL	30mg/mL	15mg/mL	7.5mg/mL	Ciprofloxacin 20mg/mL	Metronidazole 20mg/mL
<i>Mycobacterium fortuitum</i> (ATCC6841)	10.0	8.0	5.0	2.0	13.0	10.0

<i>Mycobacterium abscessus</i> (ATCC19977)	8.0	7.0	5.0	4.0	9.0	12.0
<i>Mycobacterium phlei</i> (ATCC19240)	10.0	8.0	5.0	3.0	12.0	11.0
<i>Mycobacterium smegmatis</i> (ATCC19420)	5.0	4.0	3.0	0.0	9.0	6.0

Unit of inhibition : mm

Plate 6: Plate showing zone of inhibition of *Mycobacterium smegmatis* seeded with *Morindalucida* bark extract

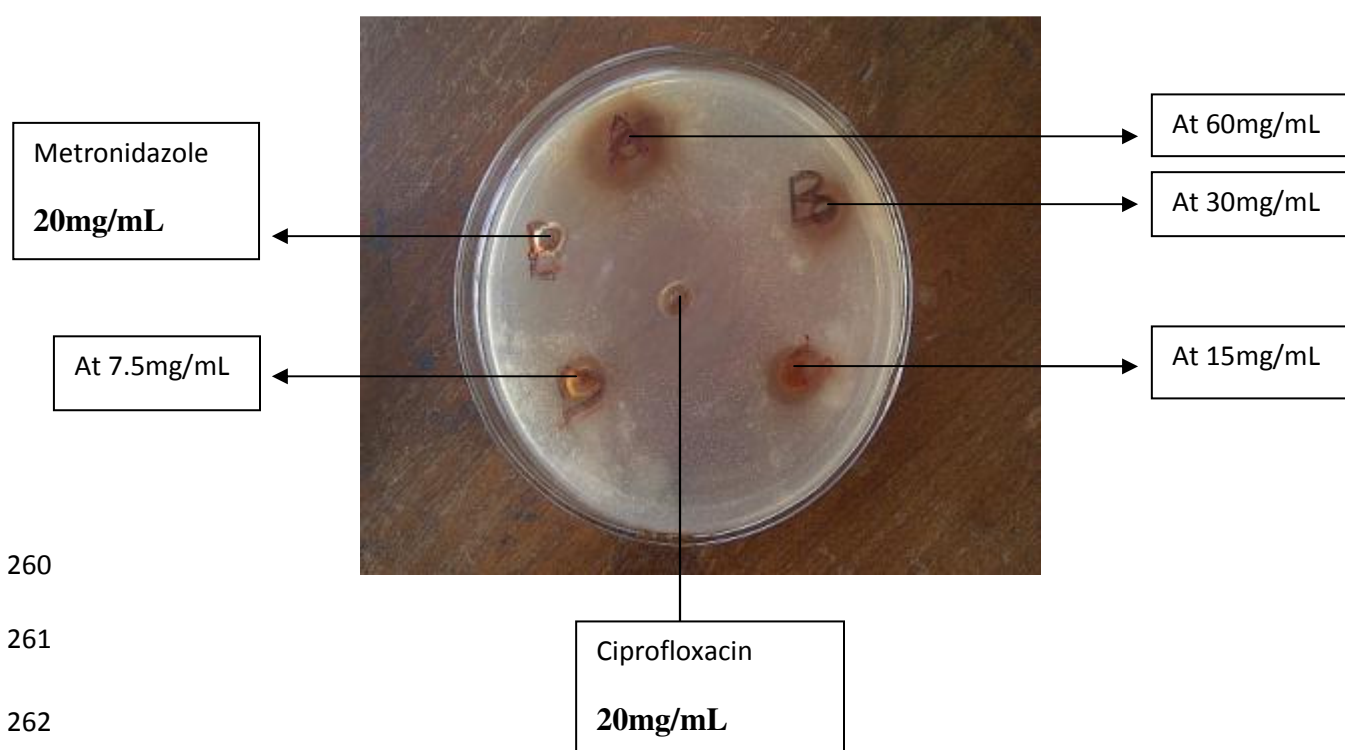
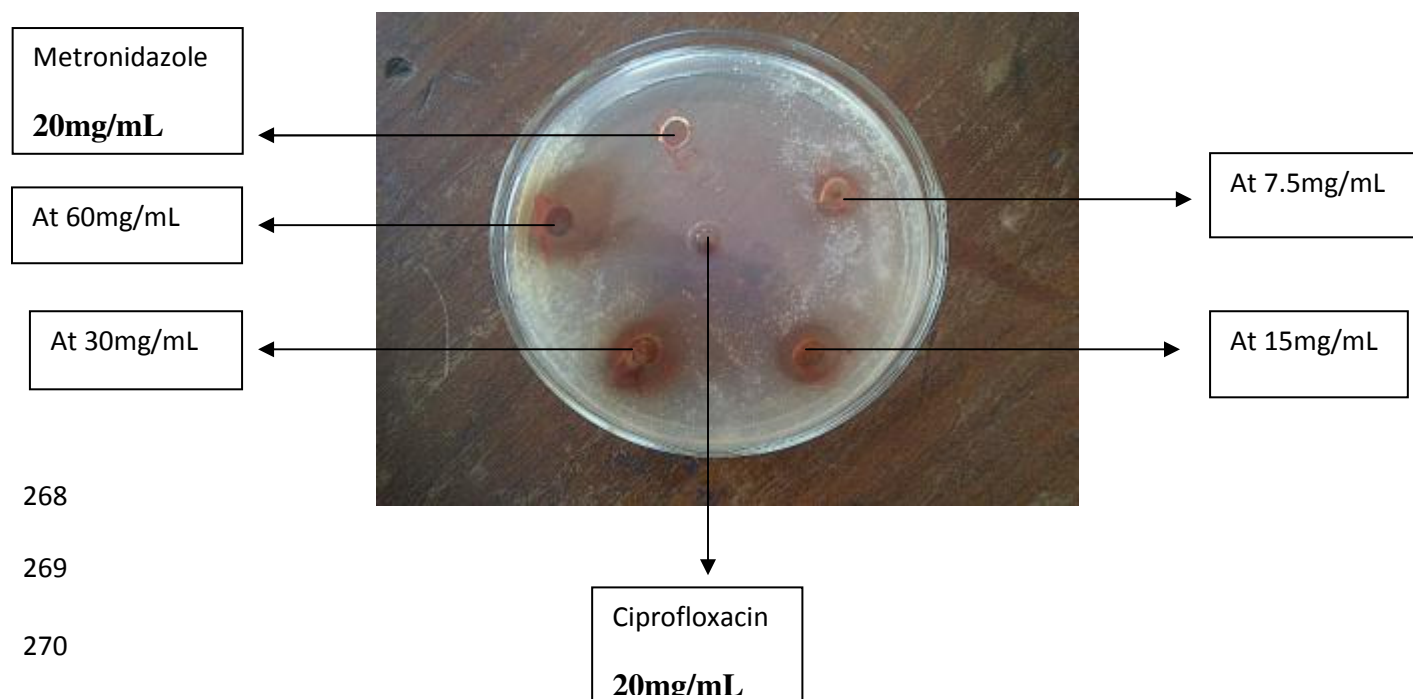


Plate 7: Plate showing zone of inhibition of *Mycobacterium abscessus* seeded with *Morindalucida* bark extract



DISCUSSION

Morindalucida family of rubiaceae is an indigenous plant found in most African countries including some parts of Nigeria such as western part like Ondo and Ekiti State.(Osuntokun 2015).

The evidence of the potency of Murida Lucida was demonstrated in this table 1,it can be used to control the effect of deleterious organism like mycobacteria which is the cause of tuberculosis infection.this is to say that medicinal plants is obviously a very important tool in human well being and it can be used to bambat infectious diseases.(Osuntokun2015).

The effect of ethyl acetate stem extracts of Murida lucida on test organisms were demonstrated in table 2. This observation in accordance with Balandrin, *et al*,.1985, who demonstrated the effect of natural medicinal plants on different test organisms.. it also shows that medicinal plants like Murida Lucida can be used in different forms for the cure and treatment of latent infection like typhoid fever, malaria, tuberculosis, and in some part of Nigeria, some sect use it in the treatment of sexually transmitted diseases. the uses of Muridalucidacan not be overemphasis because its uses if multifarious.

The plate 3 shows the effect of Muridalucida bark extract on the test organism *Mycobacterium phlei*. Chukwujekwu 2005, Daziel 1973 and Cowan, 1999 advocate for the use of medicinal plant like Muridalucida in our daily human activity, Farnsworth 2001, used some of this medicinal plant in the production and discovery of drugs which is efficacious in our daily activity. This is not to say that the other conventional drugs are not efficacious, but the God-given medicinal plants must be encouraged. The effect of nature of extracting solvent is another factor that must be discussed, ethanol, distilled water, ethyl acetate and methanol are various solvents used for extraction, but it must be clearly stated that all of the solvents used have no effect on the activities of the medicinal plant (Facey 1999).

The antibacterial activity of Muridalucida of ethanolic stem extract on the test organisms was demonstrated. This observation shows that all medicinal plant parts have their uses and demonstrate levels of antimicrobial properties. This is corroborated with the finding of Indu, 2006 which profaned the theory that all plant parts are useful for one purpose or the other. The increasing resistance to antibiotics has also resulted in search for leads for new organic molecules from plants with antimicrobial properties (Sofowora, 1993). Some plants which are of vital importance have been fully exploited and their utilization in the pharmaceutical industry.

The effect of ethanolic leaf extract of Muridalucida on the test organism and the growing plate of *Mycobacterium abscessus* were demonstrated in table and plate 5. El Astal 2005, reported the use of some medicinal plants extracts in Palestine. It was observed that the plant has no relationship with the solvent used in extraction but plant has antimicrobial potency against some clinical organisms. A clue can be taken from this in the production of drugs and drugs potent against multi-resistant microorganism. Another factor that must be put into consideration is the concentration used for the research work, on this research work, gradation of different concentrations were used like 60, 30, 15 and 7.5 mg/mL. This will give us the ability to detect the level of antimicrobial potency of the medicinal plant Muridalucida. This is most likely why it is used as folk medicine in Nigeria. These results support that of Ogundare and Onifade (2009) where the extract inhibited the growth of *E. coli* both in vitro and in vivo studies. It has been reported by Nwinyiet al. (2008) and Adejumo et al. (2008).

Table 6 shows the activity of Muridalucida ethanolic bark extract on the test organisms. Sowenimo et al., (2007) and Totte 1999, reported that ethanolic extract of Muridalucida is a better has a better

antimicrobial potency compare to the other two extracting solvent, but judging by the activity of *Morindalucida* in this research work, it is crystal clear that all the solvent and their extract has antimicrobial properties, and it can be predicted that all three parts used namely, leaf, stem and bark has antimicrobial potency and it can be used to formulate new set of antibiotic drug.

CONCLUSION AND RECOMENDATION

In conclusion, it is possible to state that the *Morindalucida* plant bear antimicrobial activity. Comparisons with pertinent data from literature indicate that, according to the methodology adopted in studies on antimicrobial activity, However, the extracts are additional answer to man's quest to its health problems showing that mostly all the plants parts possesses a lot of potential as an additional source of antibacterial substances to fight against or inhibit the medicinally important pathogens that has been eminent among man over the years. It is thereby recommended that the medicinal plant such as *Morindalucida* and other types of medicinal plants should be studied and exploited for use. It is necessary to investigate those plants scientifically which have been used in traditional medicine to improve the quality of healthcare. Plant extracts are potential sources of novel antimicrobial compounds (Balchin and Deans, 1997) especially against *Mycobacterium phlei* ATCC19240, *Mycobacterium abscessus* ATCC19977, *Mycobacterium smegmatis* ATCC19420, *Mycobacterium fortuitum* ATCC6841 (Michie, 1992, Aboaba and Efuwape, 2001, Aboaba *et al.*, 2006).

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