COMPARATIVE ANALYSIS OF EFFECT OF ORUWO (MORINDA LUCIDA) EXTRACTS AND CONVENTIONAL ANTIBIOTICS ON BACTERIA THAT CAUSES TYPHOID FEVER

EMIOLA O. K. STEVE[1], ABBAH E. A[2] , ODEYEMI J. B[3] and TAIWO T. B[4].

[1 3 4] Department of Mathematics and Statistics Federal Polytechnic Offa Kwara State Nigeria

[2]Department of Science Laboratory Technology Federal Polytechnic Offa Kwara State Nigeria

---***---

Abstract - *This study is concentrated on the comparative analysis of effect of different antibiotics on bacteria that causes typhoid fever. And it was aimed to show that the effect of Morinda lucida on some selected bacteria is the same when compared using the normal antibiotics. Data were obtained from the experiment carried out in the department of Science Laboratory Technology, Federal Polytechnic, Offa. Complete Randomized Block Design (CRBD) was used to carry out the experiment and two way Anova Analysis Of Variance (ANOVA) to test for significant difference in the effect of various antibiotics on bacteria, using MINITAB 16 statistical software computations to analyze the data collected. Result of the analysis reveals that there is no significant difference in the effect of different antibiotics (conventional and non-conventional) on bacteria that causes typhoid fever. Although, it was observed that the levels of inhibition of each antibiotics were not the same but they all possess antibacterial properties that could be used to treat typhod fever. Therefore it was concluded that Morinda lucida is as effective as conventional antibiotics in the treatment of selected bacteria. Its reaction is also similar to that of conventional antibiotics. Therefore it is recommended that this plant can be used in place of conventional antibiotic.*

Keywords: Morinda lucida, Antimicrobals.

1. INTRODUCTION.

Typhoid fever also known simply as typhoid is a common worldwide bacterial disease transmitted by the ingestion of food or water contaminated with the feaces of an infected person, which contains the bacterium Salmonella enterica subsp. enteric or serovar Typhi.

The disease has received various names, such as gastric fever, enteric fever, abdominal typhus, infantile remittant fever, slow fever, nervous fever, and pythogenic fever[1],[5]. The name typhoid means "resembling typhus" and comes from the neuropsychiatric symptoms common to typhoid and typhus. Despite the similarity of name, typhoid fever and typhus are distinct diseases and are caused by different species of bacteria. The occurrence of this disease fell sharply in the developed world with the rise of 20th century sanitation techniques and antibiotics. In 2013 it resulted in about 161,000 down from 181,000 in 1990[2],[6],[7].

Typhoid fever is contacted by drinking or eating the bacteria in contaminated food or water. People with acute illness can contaminate the surrounding water supply through stool, which contains a high concentration of the bacteria. Contamination of the water supply can, in turn, taint the food supply. The bacteria can survive for weeks in water or dried sewage. About 3%-5% of people become

carriers of the bacteria after the acute illness. Others suffer a very mild illness that goes unrecognized. These people may become long-term carriers of the bacteria, even though they have no symptoms and be the source of new outbreaks of typhoid fever for many years.

The use of plants as source of medicine in treating disease is an ancient practice. People on all continents have long applied poultices and imbibed infusions of hundreds, if not thousands of indigenous plants dating back to pre - history [4]. The widespread use of herbal remedies and health care preparation, such as those described in the ancient text like the bible and the Vedas, has been traced to the occurrence of natural product with medicinal properties. Infact, plants produce a diverse range of bioactive molecules, making them rich sources of different types of medicines[3],[4].

But for the purpose of this research work, ORUWO extracts are monitored, observed and analyzed as an antibacterial/antibiotic agent.

Also, the following conventional antibiotics were used; Streptomycin, Gentamycin, Amoxillin, Chloramphenicol and Erythromycin for the treatment of the following bacteria, Escherichia Coli, Klebsiella Pneumia, Bacilus bubtilis , Flavobacterium Sp., Staphylococus aureus, Pseudomonas aeuroginosa, and Salmonella typhy.

The objective of this study is to compare the level of the antibacterial effect of different conventional antibiotics with that of Morinda lucida, and to ascertain if we can use Morinda lucida in place of antibiotics to treat typhoid fever.

2. MATERIALS AND METHODS

The standard organisms were collected from the University of Ilorin Teaching Hospital. Plant leaf collected from the botanical garden, University of Ilorin, Kwara state.The experiment was carried out at the Micro-Biology Laboratory of Federal Polytechnic, Offa

There were outlined in a Completely Randomized Block Design (CRBD) manner. This was done in order to enable the effects of the drugs on the selected bacteria to be measured. The data obtained were analyzed in Two – way Analysis Of Variance (ANOVA) to enable difference among antibiotics to be measured as well as ascertaining its difference in the effect of antibiotics is due to different bacteria.

The general statistical model for Two – way ANOVA is $Y_{ij} = \mu + T\iota + B_j + E_{\iota j}$, where in this work, μ is the grand mean of the effects of all the antibiotics on all the bacteria, $T\iota$ is the effect of a particular antibiotic on a particular bacteria, B_j is the effect of a particular bacteria in a particular antibiotic, Y_{ij} is effect of an antibiotic on a bacteria. $E_{\iota j}$ is an error measurement of each stage.

The Anova table for Randomized Complete Block Design is to test for the difference in these effects an ANOVA table is prepared. The two – way Anova table is of the form below.

Source	DF	SS	MS	F
Treatment	t-1	SS_t	MSt= SS_t/t-1	F_t= MSt/MSe
Blocks	b-1	SS_b	MSb= SS_b/b-1	F_b= MSb/MSe
Residual	(t-1)x (b-1)	SS_e	MSe= SS_e/(t-1)(b-1)	
Total	N-1	SS_T		

The two hypothesis of interest are: (a) Ho; there is no significant difference in the effect of different antibiotics on bacteria.
(b) Ho: there is no significant difference among the various bacteria treated with antibiotics. The two hypotheses are tested at 5% less significance respectively.

Data Presentation:
Data obtained from the experiment is presented below
Table 1: The level of inhibition of selected antibiotics against various bacteria that causes typhoid.

Antibiotics (Treatment)	Bacteria (Observation Block Yıj)							Antibiotics Mean response
	Sa	St	Pa	Kp	Ec	Bs	Fs	Tı
Chloraphenicol	26.0	2.0	27.0	0.0	0.0	19.0	10.0	12
Gentamycin	0.0	27.0	18.0	26.0	26.0	11.0	7.0	16.4
Erythomycin	0.0	0.0	0.0	28.0	28.0	0.0	21	11
Amoxillin	0.0	10.0	8.0	30.0	30.0	22.0	14.0	16.3
Streptomycin	29.0	0.0	15.0	30.0	30.0	13.0	0.0	16.7
Morinda Lucida	14.0	18.0	0.0	16.0	18.0	23.0	25.0	16.3
Bacterial Mean Response ỹ.j	11.5	9.5	11.3	21.7	22	14.7	12.8	14.8

KEY
Sa: *Staphylococus Aureus*
St: *Salmonella Typhy*
Pa: *Pseudomonas Aeuroginosa*
Kp.: *Klebsiella Pneumia*
Ec: *Escherichia Coli*
Bs: *Bacilus Subtilis*
Fs: *Flavobacterium Sp.*
Data Analysis:

3. ANALYSIS OF DATA

The data was processed using Minitab software with the result shown below

(a) Two-way ANOVA: Response versus Antibiotics, Bacteria

Source	DF	SS	MS	F	P
Antibiotics	5	231.07	46.214	0.34	0.883
Bacteria	6	923.24	153.873	1.14	0.364
Error	30	4050.76	135.025		
Total	41	5205.07			

S = 11.62 R-Sq = 22.18% R-Sq (adj) = 0.00%

In order to test for the significant differences among the effect of different antibiotics treatment for bacteria that causes typhoid fever at o.o5 level of significance, the p value is compared to alpha (α) value, Since the *p* value is greater than α (0.05) value i.e 0.364>0.05, then the first hypothesis cannot

be rejected. Therefore there is no significant difference among the effect of different antibiotics used in the treatment of typhoid fever.
Also, since p value for Bacteria is greater than α value i.e. 0.364>0.05, then the second hypothesis is rejected. There is therefore no significant difference among the bacteria treated with antibiotics. As such any differences in the effect of antibiotic can be traced to difference in bacteria.
Also, using the mean effect of antibiotics, it can be seen that the mean effect are: 11, 12, 16.3, 16.3, 16.4 and 16.7 for Erythromycin, Chloramphenicol, Amoxillin, Morinda Lucida, Gentamycin and Streptomycin respectively. Simultaneously, the mean responses of bacteria to antibiotic are: 9.5, 11.3, 11.5, 12.8, 14.7, 21.7 and 22 for Solmonellatyphis, pseudomonas aeuroginosa, staphylococcus aureus, flavobacterium sp., Bacilus subtilis, klebsialsa pneumonia and Escherichia coli, repectively. These show the ranking of the scores from the least to the highest.

4. FINDINGS AND DISCUSSIONS

From the result above, the antibiotics are different by name nut the ANOVA table of P. value = 0.883 indicates that there is the significant difference in using them to treat typhoid bacteria. The implication of the statistical insignificance in their use as antibiotics mean in the long run their performance will be similar. This is also supported by the mean effects of computation. The mean value may be grouped into these two categories: 11 and 12; and 16.3, 16.4 and 16.7. It may be suggested that Morinda lucida performed better than both Chloraphenicol and Erythomycin but in the group of Amoxillin Gentamycm and Straptomycn. Therefore, Morinda lucida, if correct dosage is determined, could be used in place of conventional antibiotic.
However, bacteria sampled for this experiment are different by name. The ANOVA also shows that they are not the same since p – value = 0.364. As such the difference observed in the value of the response of antibiotic is due to the difference in the effectiveness of the bacteria. The antibiotics are similar in effect.

5. CONCLUSION

This study has shown that Morinda lucida extracts have antibacterial property which may offer a scientific basis from the traditional curative use of the plant. The bacteria tested are implicated in Typhoid Fever; therefore, constituents of the leaf could be useful in chemotherapy. Morinda lucida compete favorable with antibiotics, hence it is recommended for treating typhoid fever

References

[1]. Adomi P.O (2006). Antibacterial activity of aqeous and ethanol extracts of the stem bark of *Alstonia* and *Morinda lucida,* Sci. *Res. Essay 1(2): 50-53*
[2]. Anani K, Hudson JB, deSouza et al **(2000), Investigation of medicinal activities. Pharm. Biol. 38: 40 - 45.**
[3]. Babayi, H., Kolo, I., Okogun, J.J. and Ijah, U.J.J. (2004) **The** Antimicrobial activities of Methanolic extracts of Eucalyptus camadulensis and Terminalia catappa against some pathogenic microorganisms. *Biokemistri 16(2): 106-111*
[4]. Bauer A.W, **Kirby M.M; et al (1996)** Antibiotic susceptibility testing by a standard single disc method. American journal of clinical *pathology 45: 493 - 496.*
[5]. Burkil HM (1997). The useful plants of West Tropical Africa Vol **4** families *Mr. Royal Botanical Garden kew, pp. (435)*

[6]. Karachi (2006) Importance of Medical plants highlighted (2006) retrieved June 18th, *from http:*www.dawn*. com 72006/01/07/ local 14. htm.*

[7]. Karama, I., Sahin, F. and Sengui, M. (2003) Antimicrobial Activity of aqueous and Methanolic Extract of Juniperous exycedrus.
Journal of Ethnopathology 18(37): 1-5