EFFECT OF AQUEOUS *Phyllanthusamarus* LEAF EXTRACT ON FEED UTILIZATION AND SERUM LIPID PROFILE OF BROILER CHICKENS

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ABSTRACT

Thisstudyinvestigatedtheeffectofvaryinglevelsof*Phyllanthusamarus*leafextract(PALE)in1Lofdrinking wateronfeedutilisationandserumlipidprofileofbroilerchickensfor42days.120dayoldchickswererandoml yallocatedtofourtreatmentswiththreereplicatesoftenbirdseach,inacompletelyrandomiseddesign(CRD).P ALEwasobtainedbyaddingground*Phyllanthusamarus*leavesat0g,15g,20g,and25gto1Lofboiledwaterres pectively,andsteepedforthirtyminutes.ThetreatmentsweredesignatedasT_1(0ml/L),T_2(15ml/L),T_3(20ml/ L),T_4(25ml/L).ResultsshowedthatPALEhadnoeffect($P<0.05$)onfeedintake,feedconversionratioandweig htgainofbroilerchickensacrossthetreatments,buttherewereeffectsonthelipidprofileindicesatthesamelevel ofsignificance.BirdsonPALEhadlowercholesterol,triglycerides,highdensitylipoproteins(HDL),andlow densitylipoproteins(LDL)thanthecontrol.Itwasconcludedthattheextracthadhypolipidermiceffectonthebr oilers.

Keywords:*Phyllanthusamarus*,leafextract,feedutilisation,lipidprofile.

INTRODUCTION

Theever-increasingglobalpopulationgrowthhasledtoaresultantincreaseintheinitialisationofintensivelivestockpro ductionpracticesthatcanefficientlymeetthehigherdemandsforfood.Acommonmethodappliedtomaximise yieldistheuseofsub-therapeuticdosesofantibioticgrowthpromoters(Evangelista*etal*.,2021).Antibioticsincreaseanimalgrowth efficiencybyinhibitingthegrowthofmicrobesinthegutstherebyenhancingimmuneresponseinthehost(Gas kins*etal*.,2002).Theyhavebeenshowntoimprovethehealthstatusofintensivelyraisedanimalsandtoreducet hemicrobialloadinmeatthatcancausefoodbornediseasesforhumans(OMAFARA,2005).Theuseofsynthet icantibioticshashoweverbeenassociatedwithanincreasingriseinantimicrobialresistance(AMR).Theimpo singriskpresentedbythepossibilityofcrossresistancewhichmaybringabouttheemergenceofmulti-drugresistancepathogenswhichwillfurtherlimittreatmentinbothmanandanimals(Mehdi*etal*.,2018),neces sitatedthebanontheirusagebytheEuropeanUnionsince2006.Thishasledtosearchfornaturalalternativesthat canguaranteefoodsafety(Evangelista*etal*.,2021).

Oneofsuchnaturalalternativesarephytogenicfeedadditives,whichhavehadtheirusesinethno-medicineforages.Studieshavebeendoneusingleafmealsofmedicinalplants,theuseoftheseformonogastrics arelimitedduetothelimitedextenttowhichtheycanutilisefibrousmaterials(OloghoboandAdejumo,2015). Abetteralternativemightbetheuseofinfusionsofsuchplants.

Stableextractsforvaryingbiologicalactivitieswereobtainedfor*Phyllanthusamarus*usinghexane,acetonean dwater.Mohammad*etal*.,(2018),Nguyen*etal*.(2017)howeverreportedhigherpreferencefortheaqueousext ractwhenmaximumyieldofbiologicallypotentantioxidantcompoundsthatcaninhibitlipidperoxidationare desired.

*Phyllanthusamarus*issaidtohavehepatoprotectiveanalgesic,anti-inflamatory,hypolipidemic,anti-oxidant,andanti-microbialproperties.Joseph*etal*(2011).Itcontainssomebioactivecompoundswhichmayaffecthaematologi calandserumbiochemicalparametersaswellasnutrientutilisationinanimals.Ogbuewu*etal*.,(2010).Ithowe vercontainssomeanti-nutritionalcompoundsliketannins,cyanide,oxalates,phytate(Gafar*etal*.,2012).Thereisthereforeneedtoasc

ertainthesafelevelofadministrationofthisplantasanalternativetosyntheticantibiotics.AccordingtoSharma *etal*.,(2015),serumbiochemicalresponsesareusedtoassesstheclinicalandphysiologicalresponsivenessand well-beingofchickens.

Thisstudywasaimedatassessingtheeffectof*Phyllanthusamarus*ontheserumlipidprofileofbroilerchickens.

Materials and Method

2.1 Experimental Site:
TheexperimentwasconductedatthepoultryunitoftheAgriculturalScienceDepartmentalLivestockFarm,KwaraStateCollegeofEducation,Ilorin,KwaraState,Nigeria.Ilorinislocatedwithcoordinates8°30′Northand 4°33′East;withanannualrainfallof1185mmandtemperaturerangeof33°C-37°C.The*Phyllanthusamarus*werecollectedfromthepremisesoftheKwaraStateCollegeofEducationandair-driedatroomtemperatureandgroundintopowder.Thedayoldchickswerepurchasedfrom Yamfyhatchery,Ilemona,KwaraState,Nigeria.

Abroilerdietwasformulatedfortheresearchandusedforallthetreatments.:

Maize56kg,GNC16kg,Soya21kg,Fishmeal2kg,Bonemeal3kg,Oystershell1kg,premix0.25kg,Salt0.25kg ,DL-methionine0.50kg,Enzyme0.50kg.

ExperimentalDesign–
Onehundredandtwenty(120)unsexeddayoldchickswereassignedtothefourtreatmentsoftheexperiment,with ten(10)birdseachforthethreereplicatesondeeplitter,inacompletelyrandomiseddesign(CRD)

FeedIntakeEvaluation–
Parameters(liveweightandfeedintake)weremeasuredusingadigitalscale.Feedconsumedwascalculatedby findingthedifferencebetweentheservedandleftoverfeedquantitieseachday.Bodyweightwasmeasuredweekly andthechangedeterminedbysubtractingthenewfromthatofthepreviousweeks.ThePALEwasprepared andadministereddaily.

BloodCollection: Two(2)birdswererandomlyselectedandfastedtwenty-four(24)hoursbeforeslaughtering,samplewascollectedintoplainbottlesfortheserumprofileparameters.

ChemicalAnalysis–
Theproximatecompositionofthefeedandthe*Phyllanthusamarus*leafweredeterminedbythemethodofAOAC(2019).

StatisticalAnalysis–
Dataobtainedwereanalysedbyonewayanalysisofvariance(ANOVA)Duncan'smultiplerangetestwasused toseparatethetreatmentsmeanswheredifferencesoccurredat$P<0.05$.

RESULTS AND DISCUSSION
Table1:
PerformanceCharacteristicsofBroilersFedwithVaryingLevelsof*Phyllanthusamarus*LeafExtract

Parameters	**LevelSofPALE**			
	0ml/L	10ml/L	20ml/L	25ml/L
Initialbodyweight(g/b)	54.67±2.0	55.67±2.1	56.67±1.8	56.11±1.9
Finalbodyweight(g/b)	1666.11±10	1688.00±8.2	1603.22±9.0	11682.33±9.8
Averagedailyfeedintake(g/b)	143.14±2.1	139.21±2.0	138.60±2.2	141.97±2.0

Averagedailyweightgain(g/b)	67.20±0.5	66.93±0.48	66.00±5.1	67.93±0.49
Waterintake(m/l)	3678.97±4.2	3660.50±3.8	3597.8±4.0	3670.32±4.1
Feedconversionratio	2.13±0.2	2.08±0.1	2.10±0.09	2.09±0.08

Table1showsthemeanvaluesforaveragedailyweightgain,averagedailyfeedintake,andfeedconversionratio.Therewerenosignificantdifferencesacrossthetreatments,themeanvaluesforfeedconversionratioforothertreatmentswerehoweverlowerthanthatofthecontrol,thismaybeduetoimproveddigestibility,activationoftheimmunesystemandantehelminticaction(Mudalat*etal*.,2021).*Phyllanthusamarus*issaidtocontainessentialoils,andthereforeiscapableofincreasingdigestibilityofnutrientsbystimulatingenzymesecretion,andstabilizingthegutmicroflorewhilenotimprovinggrowthperformance(Amad*etal*.,2011).

Table2: SerumLipidIndicesofBroilersFedwith*Phyllanthusamarus*LeafExtract

Parameters	**LevelsofPALE**			
	0ml/L	10ml/L	20ml/L	25ml/L
Cholesterol(mg/dl)	129.50^{b}±0.8	126.7^{ab}±0.6	118.59^{ab}±0.7	114.89^{a}±0.8
Triglycerides(mg/dl)	235.90^{b}±2.2	211.94^{ab}±2.1	189.10^{a}±2.0	199.24^{a}±1.8
LDL(mg/dl)	36.93±0.7	24.67±0.5	31.74±0.7	31.65±0.6
HDL(mg/dl)	119.24^{b}±3.0	59.67^{a}±2.5	49.40^{a}±2.7	37.39^{a}±2.6

Meanswithdifferentsuperscriptsonthesamerowdiffersignificantly($P<0.05$)HDL–Highdensitylipoprotein,LDL–Lowdensitylipoprotein

Table3: PhytochemicalsinPALE

Saponin	Coumarins
Glycoside	Tripertenes
Alkaloids	Steroids
Phenolics	

triglyceridelevelsmusthavebeenofdietaryoriginorduetootherfactorsasthebirdsonPALEhadlowerindicesforserumlipidsandthereforelowerrisksofcardiovascularandothertypesofdiseasesassociatedwithhyperlipidemiawhencomparedwiththoseonthecontrol(MahanandStump,2014).Thevalueswereindicativeoflowerlipidlevelsintheserumofthebirds

andtriglyceridesweresignificantlydifferentbetweenthecontrolT_1andthetreatmentswithPALE,T_2,T_3andT_4.Thevaluesforthecontrolwerehigherthanthoseof*Phyllanthusamarus*leafextract,thelowdensitylipoprotein(LDL)andhighdensitylipoprotein(HDL)wereofsimilarpattern.Themeanvaluesforserumcholesterol,andlowdensitylipoproteinswerewithinthenormalrangerecommendedbyBasmaciogluandErgu(2005).23.77±5.83mg/dl–32.47±8.84mg/dl(≤1.30mg/dl)and125mg/dl–200mg/dlfortheLDLandtriglyceridesrespectively.Thecontrolhadthehighestmeanvalueforgiventhe PALE.ThisagreeswiththefindingsofOloghoboandAdejumo(2015).Putakala*etal*(2017)reportedthatthecardioprotectivepotentialof*P.amarus*aqueousextract,ismainlyduetoitsameliorativeandantioxidantpotential,coupledwithitsantihyperglycemiaandantihyper-lipidemicproperties,theywentfurthertoreportthatitsabilitytoreducebodyfatmaybeattributedtothepresenceofflavonoids,quercetion,rutin,ligans(phyllanthinandhypophyllanthin),saponinsandthephenoliccompoundgallicacidwhichareallcardioprotectiveinaction.

Resultsofthephytochemicalanalysisalsoshowedthatthe*Phyllanthusamarus*leafcontainedantinutritionalfactors,butthebetterfeedconversionratiosobtainedwiththebirdsonPALEsuggestthattheymusthavebeenneutralizedappreciablywiththehighheatusedfortheextractionwhichreducessuch(Patterson*etal*.,2017,MaphosaandJideani,2017)thiscoupledwiththeshortperiodusedforsteeping,mostprobablyreducedthetoxicityofthePALE.

TheresultsindicatethatthelevelofPALEgivendidnotadverselyaffectthehealthstatusofthebirds,butratherimprovedit.

ConclusionandRecommendation

Itcanbeconcludedthatthe*Phyllanthusamarus*leafextracthaspotentialsforimprovingfeedconversionefficiencyofbroilers,intermsofimprovedfeedutilisation,andithashypolipidemiceffect.

References

AkpanM.S.,Enyenihi,G.E.,Obasi,O.L.,Solomon,I.P.,&Udedibe,A.B.(2008).Effectsofdietaryneemleafextractontheperformanceoflayinghens.Proceedingsof33rdAnnualConference,NASAP,Nigeria;396-98.

Amad,A.,Manner,K.,Mendler,K.,Neumann,K.,&Zentek,J.(2011).Effectsofphytogenicfeedadditiveongrowthperformanceandillealnutrientdigestibilityinbroilerchickens.*Poult.Sc.,90,*2811-6.

AOAC(2019).Officialmethodsofanalysisoftheassociationofofficialanalysischemists:Officialmethodsofanalysisof AOACInternational.21stEditionAOAC:WashingtonDC.

Evangelista,A.G.,Correa,J.A.F.,Printo,A.C.S.M,&Luciano,F.B.(2021).Theimpactofessentialoilsonantibioticuseinanimalproductionregardingantimicrobialresistance–areview.*CriticalReviewinFoodScienceandNutri.,61*(2).

Gafar,M.K.,Idodo,A.U.,&Senchi,D.S.(2012).Nutritiveandanti-nutritivecompositionofchancapiedra(stonebreaker).*FoodandPublicHealth,2*(2),21-27.

Gaskins,H.,Collier,C.&Anderson,D.(2002).“Antibioticsasgrowthpromoters.Modeofaction”.*AnimalBiotechnology*.

Joseph,B.,&Ray,S.J.(2011).Anoverview:Pharmacognosticpropertiesof*Phyllanthusamarus*–Limn.*InternationalJournalofPharmacology*,*7*(1),40-45,ISSN1811-1775/DOI:10.3923/15.

Kausik,B.,Ishita,C.,Ranaji,K.B.,&Uday,B.(2002).Biologicalactivitiesandmedicinalpropertiesofneem(*Azardirachtaindica*).*CurrentScience,82*(11),1336-45.

Mahan,K.L.&Stump,S.S.(2004).*Krause’sfood,nutrition,dandiettherapy.*Philadelphia:Saunders.

Maphosa,Y.,&Jideani,V.A.(2017).Theroleoflegumesinhumannutrition.M.ChararriiFunctionalFoodImproveHealththroughAdequateFood,103-109.https://www.intechopen.com/books/functional-food-improve-health-through-adequate-food

Mehdi,Y.,&Godbout,S.(2018).Useofantibioticsinbroilerproduction:Globalimpactsandalternative.*AnimaNutr.*,*4*(2),170-178.

Mudala,I.S.,Zaagaa,A.,&AboOmar,J.(2021).Effectsofmedicinalplantextractswithantibioticfreedietsonbroilergrowthperformanceandincidenceofmusclesabnormality.*BrazilianJournalofPoultryScience*,*23*(01),2021.

Nguyen,V.T.,Sakoft,J.A.,&Scarlett,C.J.(2017).Physiochemicalproperties,antioxidantandcytotoxicactivitiesofcondeextractsandfractionsfrom*Phyllanthusamarus*.*Medicines*,4,42.

Ogbuewu,I.P.,Okoli,I.C.,&Iloeje,M.U.(2010).Evaluationoftoxicologicaleffectofleafmealonanethnomedicalplant-meanonbloodchemistryofpuberal.Chinchillarabbitdoes.*ReportsandOpinion*,*2*(2),29-34.

Olabode,A.A.,Agu,C.I.,Ugwuowo,L.C.,Udoku,J.,Obaji,F.A.,&Oforbuike,U.N.(2017).Performancecharacteristicsandhaematologicalindicesofbroilerfinisherbirdsfeddifferentinfusionlevelsofmeanleafextract.42ndAnnualConferenceNigerianSocietyforAnimalProduction26th–31stMarch2017.

Ologhobo,A.D.&Adejumo,I.O.(2015).Haematologicalresponseandserumbiochemicalprofileofbroilerfinishersfedwithoxytetracyclineandstonebreaker(*Phyllanthusamarus*)leafmeal.*BritishBiotechnologyJournal*,*7*(1),51-56.

OMAFRA(2005).Biosecurityrecommendationsforcommercialpoultryflocksin OntarioToronto,Canada, OntarioMinistryofAgricultureFoodandRuralAffairs.

Patterson,C.A.,Curran,J.,&Der,T.(2017).Effectofproceedingonantinutrientcompoundsinpulses.*Cereal Chemistry*,*94*(11),2-10.

Putakala,M.,Gujjala,S.,Nukala,S.,Bongu,S.B.R.,Chintanta,N.,&Desireddy,S.(2017).Cardioprotectiveeffectof*Phyllanthusamarus*againsthighfructosedietinducedmyocardialandaorticstressinratmodel.*Biomed.Pharmacother*,95,1359-1368.

Sa’aci,Z.A.,Alabi,O.J.,&Chinma,C.E.(2017).Effectofaqueousgingerextract(*Zengiberofficirole*)ongrowthperformanceandnutrientdigestibilityofbroilerchickensaged28days.Proceedings42ndAnnualConferenceNigerianSocietyforAnimalProduction26th–31stMarch,2017.

Sharma,S.L.,Sing,P.,Patil,A.K.,&Sharma,J.(2015).Effectoffeedingcompressedcompletefeedblockcontainingguarmealonbloodbiochemicalprofileofcrossbredcalves.*JournalofAnimalResearch*,*5*(3),515.