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TO DETERMINE THE CONCENTRATION OF BROWN TOP MILLET FOR CONSUMPTION ACCORDING TO BODY WEIGHT/DAY

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ABSTRACT
Millets are a group of small-grained cereal crops known for their high nutritional value and health benefits. Brown top millet (Urochloa ramose) is an introduced, warm-season grass often used in forage and pasture management systems. Millet grains come in various colours such as white, grey, yellow, or red and are gluten- free, making them suitable for individuals with celiac disease or digestive issues. Brown top millet is rich in protein, fibre, and low in carbohydrates. It has been found to lower badcholesterol(LDL), prevent clot formation in the airways, and improve heart function. Acute oral toxicitystudies have shown that brown top millet issafe to consume up to a dose of 5000 mg/kg. Specific concentrations of brown top millet can be provided to individuals based on their body weight per day. The LD50 (lethal dose 50%) helps identify the target organ affected by toxicity to predict potential harmful effects in humans. It has been concluded that oral administration of brown top millet does not induce histopathological alterations in the liver of mice, indicating its safety for consumption.
Keywords -Brown top millet, acuteoral toxicity.

INTRODUCTION

Millets are a group of small-grained cereal crops known for their high nutritional value and resilience in marginal or low-fertile soils, requiringminimal inputs such as fertilizersand pesticides. Referred to as "smart food" or "smart crops," millets are staple foods for people living in arid and semi-arid regions, particularly in Asian and African countries. They are also known as"coarse grains"or"poorman'scrop," with brown top millet gaining recognition for its importance in addressing poor ecological conditions and ensuring economic and nutritional security for small-scale farmers. Brown top millet has been identified as particularly beneficial for preventing and managing several non-communicable diseases.

To promote its popularity among farmers and consumers, systematic studies in agriculture, nutrition, toxicology,naturopathy,andbiomedicalsciencareessential.Browntopmilletisgluten-free,non-acid forming, and easy to digest,makingit an excellent alternative to rice and wheat in daily diets.It is rich in iron,zinc, andfiber, and contains phytochemicals such as flavonoids, tannins, quinones, and resins. The grains of brown top millet contain carbohydrates, crude fiber, and fat,contributingtoitsnutritional profile [1].

Millets have a rich history spanning thousands of years and hold significant importance in human civilization. Believed to have originated in Africa and Asia, millets have been cultivated since ancient times. They were among the first grains to be domesticated by early

agricultural societies and have served as a staple food in many regions worldwide for centuries. In ancient India, millets played a crucial role in the diet and agricultural practices. They were cultivated alongside other grains such as rice and wheat, contributing to the dietary diversity of the population. Millets were highly valued for their nutritional density, resilience to adverse growing conditions, and ability to thrive in poor soil. In addition to their nutritional benefits, millets were versatile in culinaryapplications. Theywere used to makevarioustraditionalfoods,includingflatbreads,porridge,andfermentedbeverages.Theversatility andadaptabilityofmilletsmadethemanessentialcomponentofancientdietsandagriculturalsystems, shaping food cultures and livelihoods for generations [2].

Millets have indeed left a lasting mark on African and Asian cuisines, where they continue to hold a prominentplace.VarietieslikepearlmilletandsorghumarestaplesinmanyAfricanregions,providing vital nutrients and sustenance to numerous communities. In recent times, there has been a renewed interest in millets, driven by their impressive nutritional profile, environmental sustainability, and resilience to changing climatic conditions. Millets are prized for being gluten-free and packed with fiber, protein, and essential micronutrients, making them an excellent dietary choice.

Moreover, their abilitytothrivewithminimalwaterandfertilizermakesthemamoreenvironmentallyfriendly optioncomparedtocropslikericeandwheat,contributingtoagricultural sustainability.The resurgence of interest in millets reflects a growing recognition of their potential to address contemporary challenges in food security, nutrition, and sustainable agriculture. As we delve deeper into the historyof millets, weuncover their enduringlegacyas valuable crops that have nourished and sustained communities for millennia. [3, 4].

Fig. 1.BTM

Nomenclatureofbrown-top millet[5]

Commonname–Dixiesignalgrass

Scientificname–*Brachiariaramosa*(L.)Stapf,*Panicumramosum*L., *Urochoa ramosa* (L.)Nguyen

Taxonomicrank[6]

Kingdom–PlantaePhylum–Magnoliophyta Class – liliopsida

Subclass–Commelinidae Order – cyperales

Family – poaceae Genus–Urochloa

Classificationofmillets[7]

Fig2.Classification ofmillets

Geographical distribution of brown top millet: Browntopmillet(*Urochloaramosa*)thrivespredominantlyintropicalandsubtropicalregions,spanning SouthAsia,Africa,andpartsofSoutheastAsia.Belowarekeyareaswherebrowntopmilletcultivation is common [8].Brown top millet, a staple crop across several Indian states such as Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana, and Odisha, is predominantly grown in dry and semi-arid regions, relying mainly on rainfall. This resilient crop is also cultivated in Africa, notably in Nigeria, Sudan, Ethiopia, Uganda, and Kenya, where its nutritional value and ability to withstand droughts make it a vital food and fodder source. In Southeast Asia, countries like Vietnam, Thailand, and Myanmar cultivate brown top millet for both human consumption and animal feed, benefiting from warm, moderatelyhumid climates. Moreover, brown top millet is cultivated in parts of Australia, the Middle East, and the Americas, although its distribution is more limited compared to South Asia and Africa. Its adaptability to hot, dry climates and its versatility as a food crop and forage grass have led to its widespread cultivation globally [9].

NutritionalAttributes: Brown top millet possesses a unique nutritional profile that benefits both the body and mind. It is nutrient-denseandhighinenergy.Infact,100gramsofBrownTopMilletcontainsmorecalories(338 Kcal) and carbohydrates (71.32 grams) than a combination of wheat, sorghum, proso millet, finger millet, barnyardmillets, and foxtailmillets.Additionally, millets are abundantin phytochemicals, also referred to as secondary metabolites, which encompass flavonoids, quinones,phenols,tannins,and alkaloids, along side carbohydrates and proteins. Here's the nutritional compositionofBrownTop Millets per 100 grams: [10, 11].

Table1.Nutritional composition of BrownTopMillets

Sr.no.	Nutrients	Composition
1	Protein(g)	11.5
2	Fiber(g)	12.5
3	Minerals(g)	4.2
4	Iron(mg)	0.65
5	Calcium(mg)	00.1
6	Thiamine (mg)	420
7	Riboflavin(mg)	290
8	Zinc (mg)	2.7
9	Potassium(mg)	408
10	Phosphorus(mg)	276

11	Sodium(mg)	7
12	Copper(mg)	1.23
13	Magnesium (mg)	95

HealthbenefitsofBrownTop Millet: Brown top millet boasts a spectrum of health advantages, rendering it an excellent choice for various dietary requirements. Primarily, it stands out as an optimal grain for individuals managing diabetes, owing to its low glycaemicindexandelevatedcarbohydratecontent.Thesepropertiescontributetostabilizingblood sugarlevels, enhancing insulin sensitivity, and regulating HbA1C levels. Furthermore, its gluten-free nature makes it a suitablealternativeforindividualswithceliacdiseaseorglutensensitivity.Moreover,browntopmillet facilitates weight loss dueto its rich fibre content, containing12.5 grams of fibreper100 grams of grains. This high fibre contentextendsthedurationfoodremainsinthedigestivesystem,makingitapreferredoptionforthose pursuing weight reduction goals [12].

Furthermore, brown top millet plays a significant role in promoting digestion and gut health, making it an excellentalternativeforindividualscopingwithconditionslikeceliacdiseaseandirritablebowelsyndrome.Itsregularconsumptioncanenhancethebody'scapacitytobreakdownandabsorbcarbohydrates,therebyreducing bloating,cramps,andregulatingbowelmovements,consequentlyalleviatingconstipation.Additionally, brown top millet contributes to heart health by mitigating blood pressure and lowering the risk of cardiovascular diseases.Arecentmeta-analysisstudyhighlightedthattheconsumptionofmilletsledtoan8%reductionintotal cholesterol and a 5% decrease in diastolic blood pressure, underscoring its potential to enhance heart health. Lastly, brown top millet is replete with essential nutrients including iron, magnesium, phosphorus, zinc, B vitaminssuchasniacin,thiamine,andfolate,aswellasproteinandfibre,renderingitahighlynutritious addition to any diet [13].

Toxicity:

Toxicityisthedegreetowhichasubstancecanharmlivingorganismsorecosystems.Itisafundamental concept in toxicology, thestudyoftheadverseeffects ofchemicals on biological systems. Toxicitycan varydepending onfactorssuchasthetypeofsubstance,itsconcentration,durationofexposure,routeofexposure,and individual susceptibility [14].

- **Acuteoral toxicity:**

Acuteoraltoxicityreferstotheharmfuleffectsthatmanifestwhenasubstanceisconsumedinasingle, concentrated dose within a brief timeframe. Typically, this toxicity is evaluated through laboratory experimentswheretestanimalsareorallyadministeredthesubstance,andanyensuingimpactsontheir health and well-being are monitored and documented.The outcomes of acute oral toxicity assessments serve to gauge the potential hazards associated with ingesting a specific substance, whether it be a chemical, pesticide, pharmaceutical drug, or another product.

Thetoxicitylevelofasubstanceisoftenquantifiedasan LD50value,representingthedoseat which 50% of the test animals succumb to the exposure [18].Regulatory agencies around the world use data from acute oral toxicity studies to establish safety guidelines and regulations for the use and handling of substances to protect human health and the environment. Understanding the acute oral toxicity of a substance is crucial for assessing its potential hazards and ensuring appropriate safety measures are in place to prevent harmful exposures [22].

- **Typesoftoxicity:**

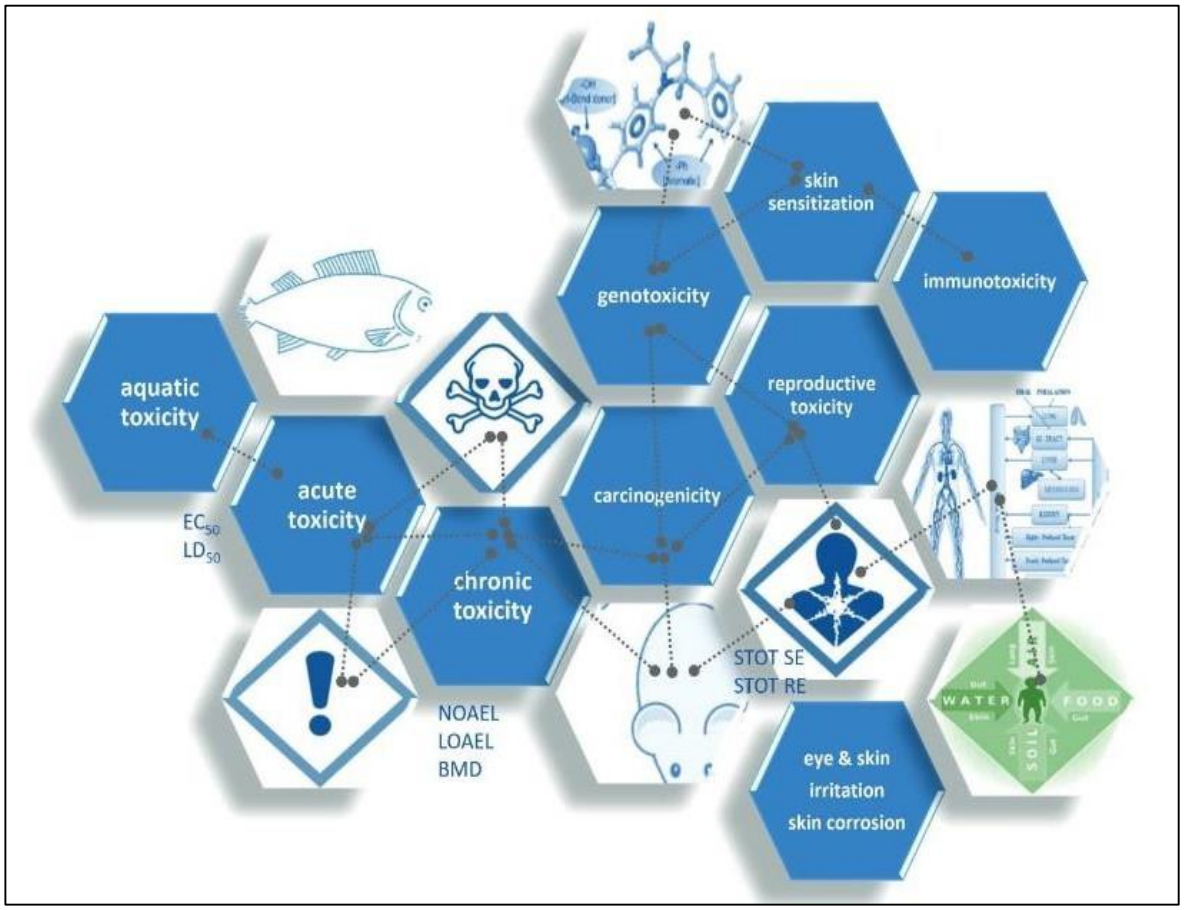

Fig3.Typesof Toxicity [15]

Mechanismof acute oral toxicity[17-19]:

Acuteoraltoxicityreferstotheadverseeffectsthatoccurshortlyaftertheingestionofasubstance.The mechanism of acute oral toxicitycan varydepending on the specific substance involved, but there are some general mechanisms that can contribute to the toxic effects of ingested substances:

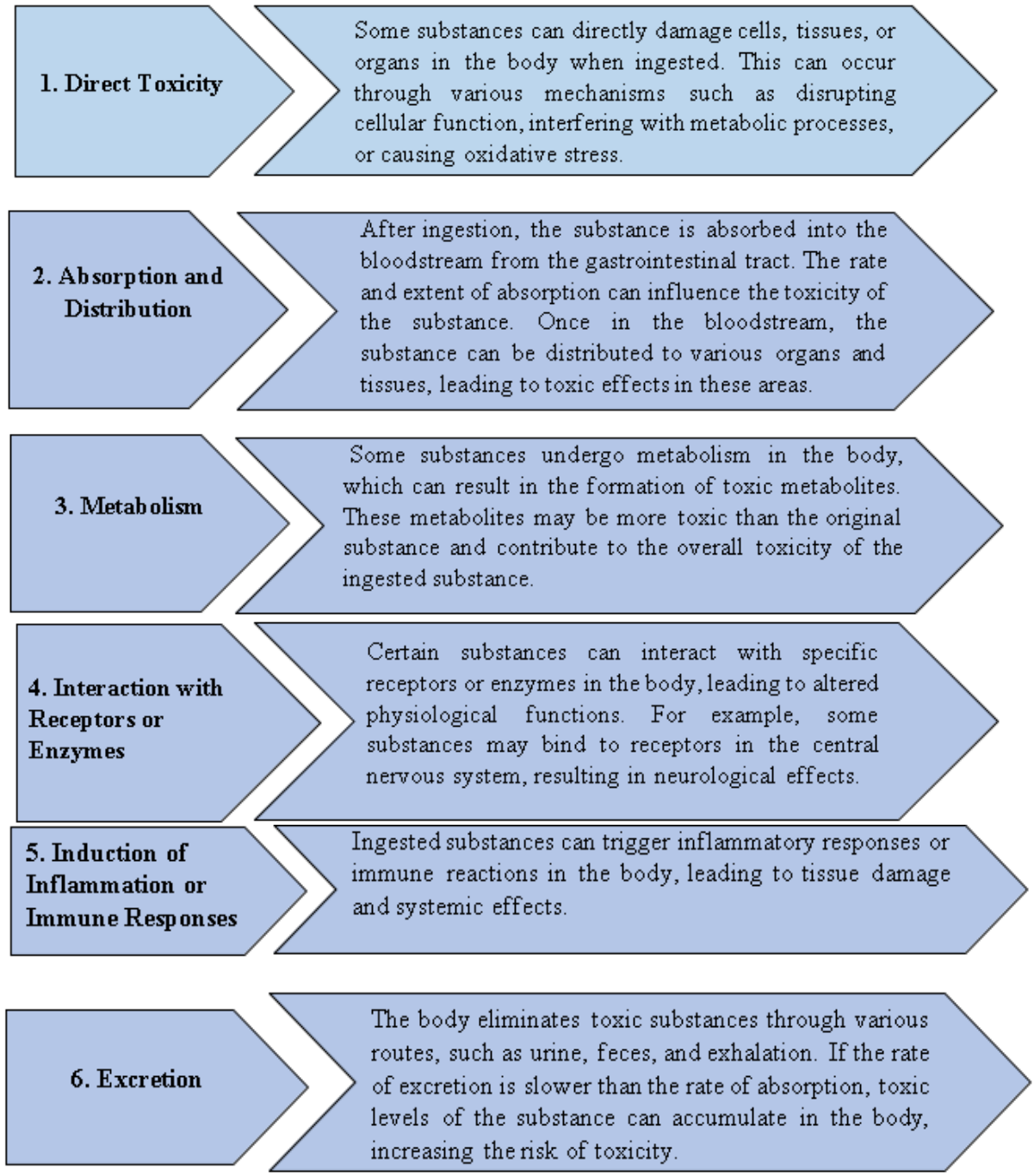

Fig. 4. Mechanism of acute oral toxicity

Test Parameter [16]:

Atypicalbloodtestthatgivesvitalinformationaboutthemanycelltypesinyourblood,suchasredbloodcells,
whitebloodcells,andplatelets,isthecompletebloodcount(CBC).ThefollowingareessentialelementofCBC.

1. Haemoglobin(RBCs)
2. WhiteBloodCells (WBCs)
3. Platelets:
4. Serumglutamicpyruvictransaminase(SGPT)
5. Interleukin6
6. IL8(Interleukin-8)
7. Total Bilirubin

MATERIALSANDEQUIPMENTS[17-20]

MaterialforAnimalTrial

Table2.Requirementof Animals

Sr. No.	Species	Rat
1	Strain	Wisterrat
2	Ageand sex	Non-pregnantandnulliparousfemales
3	Bodyweight range	80-120gm

Initialparametertocheck-

1. CBC(completebloodcount).
2. SGPT(Serumglutamicpyruvictransaminase)
3. IL-6andIL-8(ELISAANDPCRtest)
4. Totalbilirubin

Finalparametertocheck-

1. CBC(completebloodcount)
2. SGPT(Serumglutamicpyruvictransaminase)
3. IL-6andIL-8(ELISAANDPCR test)
4. Total bilirubin

Procedureofanimaltrial

Step 1: Threeovernightfastingfemaleratswereadministeredthetestdrugdilutedincarboxy methylcellulose atthe doseof300mg/kgbodyweight.Theratsweredeprivedoffoodovernightbeforedosingand2hours after thedosing. Waterwas allowed ad. Libitum throughoutthestudyperiod.Allthe animals wereobserved for 14 days after dosing.

Step 2: Threeovernightfastingfemaleratwereadministeredtestdrugdilutedincarboxymethylcelluloseat the doseof300mg/kgbodyweight,afteranimalswerefoundtobesafeinstep1.Theratsweredeprived offood overnight before dosing and 2 hours after the dosing. Water was allowed ad. Libitum throughout the studyperiod. All the animals wereobserved for14 days after dosing.

Step 3: After confirmation of safety at 300 mg/kg at previous step, 3 overnight fasting female rat were again administered with test drug the diluted in carboxy methyl cellulose at the dose of 2000 mg/kg body weight. The rats were deprived of food overnight before and 2 hours after the dosing. Water. All the animals were observed for 14 days after dosing.

Step 4: Step3wasagainrepeatedafterconfirmationofthesafetyat2000mg/kgofDose.

OBSERVATIONAND RESULTS

Animalswereobservedindividuallyforfirst30,60,120,180and240minutesafterdosing,withspeci alattention andonce dailythereafter,fora totalof 14days.However, the durationof observationwasnotfixedrigidlyandwasdeterminedbythetoxicreactionsandtimeofonsetandlengt hofrecoveryperiod.Allobservationsoftoxic signs were systematically recorded for each animal in the daily observation record format.

ClinicalSignsandSymptoms: All animals were observed for the following signs Changes in skin, fur, eyes, mucous membranes, respiratory, circulatory, and autonomic and central nervous systems, somato motor activity, behaviour pattern. Attention should be directed to the observations of tremors, convulsions, salivation, diarrhoea, lethargy, sleep and coma.

BodyWeight: The body weights were recorded on test day 0 (pre-administration - fasting weight) and on days 7 and 14 post treatment or at death.

Necropsyand Pathology: All animals were subjected to gross necropsy. In gross necropsy the animals were observed at all the body openings, opened up and observed it with naked eye for any alterations in normal body organs. At this point majororganslikeliver,lungs,ovaries,kidneys,adrenalgland,spleen,pancreas,heart,brainetc.were

observed.

Haematology: Blood samples were collected into vacationer sterile tubes coated with EDTA as an anticoagulant. Full blood count was conducted using the Automated cell Analyzer.

Biochemistry: All biochemical estimations were carried out using standard test kits provided by Delta Lab. These kits were used according to directions given along with kits; Smart 5 Semi auto Biochemistry analyser was used for the estimation.

Procedure-

Collectedbloodsampleswerecentrifugedforseparationofserum/Plasma.Sampleswereincubated with Standard reagents samples were aspirated for desired parameter as per work instructions. Concentrations appeared on the screen were noted and mentioned in results. SGPT & Bilirubin were examined. IL-6 & IL-8 were examined using Elisa Reader.

ElisaTest

1) IL-6

Table3.IL-6

StandardConcentration	StandardNo	DilutionParticulars
230ng/ml(Lyophilized)	StandardLyophilized	OriginalStandardprovidedinthekit +40µLassaydiluent
8000pg./ml	StandardNo.8	34.78µL original standard +965.22µLof assaydiluent
4000pg./ml	StandardNo.7	500µLStandardNo.8+500µLassayDiluent(1X)
2000pg./ml	StandardNo.6	500µLStandardNo.7+500µLassayDiluent (1X)
1000pg./ml	StandardNo.5	500µLStandardNo.6+500µLassayDiluent(1X)
500 pg./ml	StandardNo.4	500µLStandardNo.5+500µLassayDiluent(1X)
250 pg./ml	StandardNo.3	500µLStandardNo.4+500µLassayDiluent(1X)
125 pg./ml	StandardNo.2	500µLStandardNo.3+500µLassayDiluent(1X)

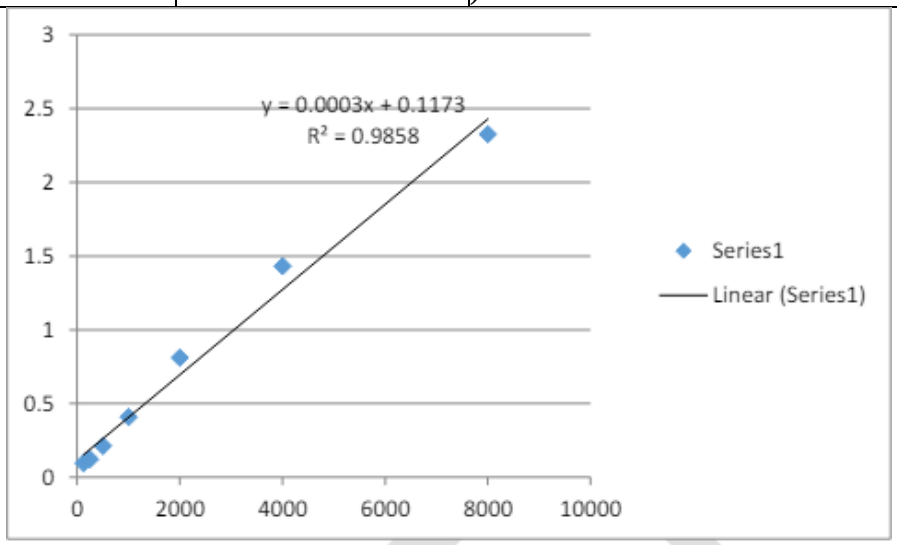

Fig5.IL-6

2) IL-8

Table4. IL-8

StandardConc.	StandardNo	DilutionParticulars
640 pg./mL	OriginalStandard	OriginalStandardprovidedinthekit+ 40µLassaydiluent
320 pg./mL	Standardno.5	34.78µL original standard + 965.22µLof assaydiluent
160 pg./mL	StandardNo.4	500µLStandardNo.8+500µLassayDiluent(1X)
80 pg./mL	StandardNo.3	500µLStandardNo.7+500µLassayDiluent (1X)
40 pg./mL	StandardNo.2	500µLStandardNo.6+500µLassayDiluent (1X)
20 pg./mL	StandardNo.1	500µLStandardNo.5+500µLassayDiluent(1X)
0 pg./Ml	StandardNo.0	500µLStandardNo.4+500µLassayDiluent (1X)

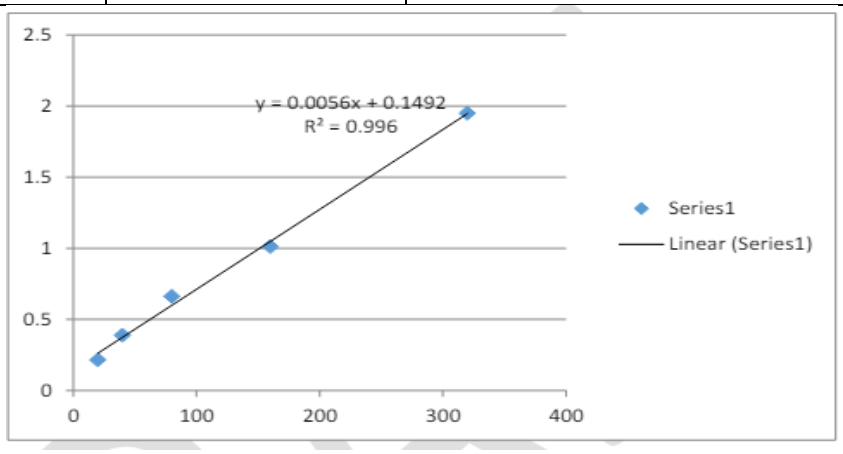

Fig6.IL-8

Thisstudyrequiredatotaloftwelvefemale Wistar Ratstobetestedattwodoselevels.**"BrownTopMillet"**didnot causemoralityin thefemaleWistar Rats treated at thedoseof 300mg/kgand2000 mg/kg.

Table5.SummaryofMortality Results

Step	Dose (mg/kg)	No.of Treated WistarRats	Terminally Sacrificed	FoundDead(X)
1	300	3	3	0
2	300	3	3	0
3	2000	3	3	0
4	2000	3	3	0
TOTAL	-	12	12	0

1) **Body Weight:**Normal Body weight gain was observed during 14 days observation period and there were no any signs of toxicity considering weight gain.

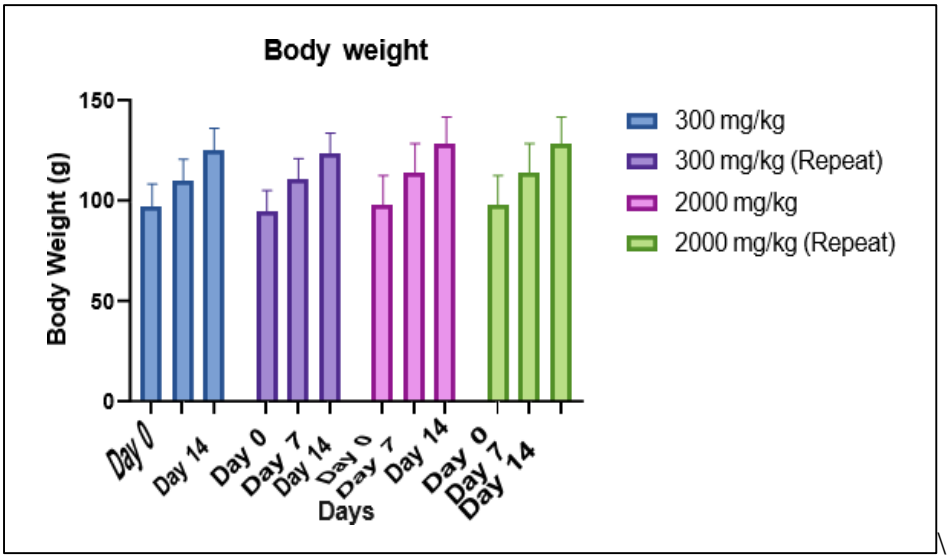

Fig7.BodyWeight

Valuesareexpressedasmean±SD,n=3,*p<0.05,**p<0.01,***p<0.001,****p<0.0001.Valuesof were comparedwithlowestconc.byt-test.Valuesoftestgroupswerecomparedwithlowestconc.byOne-way ANOVA by Dennett's test.

2) **GrossNecropsyandPathology:**Nogrosspathologicalalterationswereencounteredin anyofthefemaleWistarRatsinanygroup.

Table6.GrossNecropsy

AnimalMark		**Dosemg/kg**	**Fate(TS/FD)**	**GrossObservations**
1	H	300	TS	NAD
	B		TS	NAD
	T		TS	NAD
2	HB	300	TS	NAD
	BT		TS	NAD
	HT		TS	NAD
3	FL	2000	TS	NAD
	FR		TS	NAD
	HL		TS	NAD
4	RLS	2000	TS	NAD
	LLS		TS	NAD
	W		TS	NAD

TS:TerminallySacrificed;FD:FoundDead;
NAD:NoAbnormalitiesDetectedOtherPathologicalchangesobservedduringgrossnecropsy.

3) Hematology

Table 7. Hematology

Day 0																				
Animal Marking	WBC	LYM	MID	NEUT	LYM	MID	NEUT	RBC	HGB	HCT	MCV	MCH	MCHC	RDW CV	RDW SD	PLT	MPV	PDW	PCT	P_LCR	P_LCC
Units	10^9/L	(%)	(%)	(%)	10^ 9/L	10^ 9/L	10^ 9/L	10^ 12/L	g/dL	(%)	fL	pg	g/dL	(%)	fL	10^ 9/L	fL	fl	(%)		10^ 9/L
300 mg/kg																					
H	8.02	71.45	7.85	20.70	6.12	0.50	1.40	9.25	18.80	59.00	67.40	18.80	35.2	12.80	32.10	795.00	8.80	8.10	0.61	17.20	69.00
B	7.79	69.89	8.75	21.36	5.89	0.60	1.30	9.11	17.10	67.00	69.40	20.10	34.9	13.10	31.40	810.00	7.50	7.80	0.59	17.10	71.00
T	8.05	70.85	8.74	20.41	5.95	0.70	1.40	8.85	17.50	65.00	70.20	18.40	33.8	12.60	33.40	801.00	6.90	8.20	0.61	16.90	70.00
Mean	7.95	70.73	8.45	20.82	5.99	0.60	1.37	9.07	17.80	63.67	69.00	19.10	34.63	12.83	32.30	802.00	7.73	8.03	0.60	17.07	70.00
SD	0.14	0.79	0.52	0.49	0.12	0.10	0.06	0.20	0.89	4.16	1.44	0.89	0.74	0.25	1.01	7.55	0.97	0.21	0.01	0.15	1.00
300 mg/kg (Repeat)																					
H	8.11	71.85	7.95	20.20	6.11	0.60	1.40	7.95	17.90	61.20	64.40	19.40	34.2	12.20	32.20	799.00	7.90	7.80	0.63	19.50	76.00
B	8.19	69.88	8.52	21.60	5.89	0.70	1.60	8.65	18.10	59.80	63.20	20.10	31.8	12.80	32.30	795.00	8.40	8.10	0.61	18.10	74.00
T	8.20	71.12	7.89	20.99	6.10	0.60	1.50	8.45	17.50	62.10	65.40	20.50	30.8	13.70	31.20	810.00	8.10	8.30	0.59	20.10	69.00
Mean	8.17	70.95	8.12	20.93	6.03	0.63	1.50	8.35	17.83	61.03	64.33	20.00	32.27	12.90	31.90	801.33	8.13	8.07	0.61	19.23	73.00
SD	0.05	1.00	0.35	0.70	0.12	0.06	0.10	0.36	0.31	1.16	1.10	0.56	1.75	0.75	0.61	7.77	0.25	0.25	0.02	1.03	3.61
2000 mg/kg																					
H	7.75	71.10	7.70	21.20	5.95	0.60	1.20	6.92	16.80	59.40	62.10	18.50	31.8	14.20	30.40	815.00	7.90	8.20	0.63	19.80	78.00
B	8.25	72.69	7.19	20.12	6.25	0.50	1.50	7.21	17.40	63.10	64.50	19.40	32.5	13.80	33.10	798.00	8.10	7.90	0.58	18.10	72.00
T	8.14	71.57	8.12	20.31	6.14	0.60	1.40	6.49	18.10	61.50	59.80	20.10	34.5	13.70	32.10	804.00	8.20	7.80	0.62	18.50	73.00
Mean	8.05	71.79	7.67	20.54	6.11	0.57	1.37	6.87	17.43	61.33	62.13	19.33	32.93	13.90	31.87	805.67	8.07	7.97	0.61	18.80	74.33
SD	0.26	0.82	0.47	0.58	0.15	0.06	0.15	0.36	0.65	1.86	2.35	0.80	1.40	0.26	1.37	8.62	0.15	0.21	0.03	0.89	3.21
2000 mg/kg (Repeat)																					
H	8.12	72.80	7.35	19.85	6.12	0.70	1.30	6.35	18.30	62.40	59.40	20.10	33.1	12.80	30.10	810.00	8.20	8.10	0.61	19.50	71.00
B	8.21	70.45	8.25	21.30	6.21	0.50	1.50	7.61	17.90	63.10	61.20	19.80	32.2	13.10	32.50	811.00	7.80	7.50	0.59	20.50	70.00
T	8.18	72.45	7.55	20.00	5.98	0.60	1.60	7.22	18.40	63.40	62.40	20.40	31.4	13.40	31.20	798.00	8.10	8.10	0.63	18.90	74.00
Mean	8.17	71.90	7.72	20.38	6.10	0.60	1.47	7.06	18.20	62.97	61.00	20.10	32.23	13.10	31.27	806.33	8.03	7.90	0.61	19.63	71.67
SD	0.05	1.27	0.47	0.80	0.12	0.10	0.15	0.65	0.26	0.51	1.51	0.30	0.85	0.30	1.20	7.23	0.21	0.35	0.02	0.81	2.08

Day 14																				
Animal Marking	WBC	LYM	MID	NEUT	LYM	MID	NEUT	RBC	HGB	HCT	MCV	MCH	MCHC	RDW CV	RDW SD	PLT	MPV	PDW	PCT	P_LCR	P_LCC
Units	10^9/L	(%)	(%)	(%)	10^ 9/L	10^ 9/L	10^ 9/L	10^ 12/L	g/dL	(%)	fL	pg	g/dL	(%)	fL	10^ 9/L	fL	fl	(%)		10^ 9/L
300 mg/kg																					
H	5.80	85.00	10.00	5.00	4.90	0.60	0.30	7.66	14.30	40.00	42.30	18.60	35.70	15.20	24.20	445.00	4.70	6.60	0.32	0.60	43.00
B	9.90	88.80	7.00	4.20	8.80	0.70	0.40	8.86	15.70	43.90	41.50	17.70	35.70	13.10	28.60	471.00	4.50	6.40	0.21	0.40	46.00
T	8.70	87.10	8.30	4.60	7.30	0.80	0.60	8.45	11.80	45.50	38.50	14.80	34.80	12.40	25.60	485.00	4.40	6.20	0.20	0.50	52.00
Mean	8.13	86.97	8.43	4.60	7.00	0.70	0.43	8.32	13.93	43.13	40.77	17.03	35.40	13.57	26.13	467.00	4.53	6.40	0.24	0.50	47.00
SD	2.11	1.90	1.50	0.40	1.97	0.10	0.15	0.61	1.98	2.83	2.00	1.99	0.52	1.46	2.25	20.30	0.15	0.20	0.07	0.10	4.58
300 mg/kg (Repeat)																					
H	7.60	86.00	9.00	5.00	6.48	0.73	0.38	7.88	13.70	42.65	41.25	16.88	34.57	13.15	26.95	499.50	4.50	6.42	0.27	0.60	49.17
B	1.89	92.86	6.13	1.00	1.62	0.12	0.15	7.67	12.40	41.90	44.34	17.29	31.54	12.15	21.96	390.91	4.26	6.16	0.08	0.14	44.07
T	5.50	84.20	5.10	10.70	2.40	1.90	1.20	7.85	12.40	47.60	46.40	18.40	32.40	13.80	28.50	489.00	6.80	8.50	0.28	0.90	56.00
Mean	5.00	87.69	6.74	5.57	3.50	0.92	0.58	7.80	12.83	44.05	44.00	17.53	32.84	13.03	25.80	459.80	5.19	7.03	0.21	0.55	49.75
SD	2.89	4.57	2.02	4.87	2.61	0.90	0.55	0.11	0.75	3.10	2.59	0.78	1.56	0.83	3.42	59.89	1.40	1.28	0.11	0.38	5.99
2000 mg/kg																					
H	6.30	75.60	14.70	9.70	3.70	1.50	1.10	8.12	12.50	41.40	45.20	17.80	34.20	14.60	24.90	458.00	7.20	8.20	0.29	1.30	54.00
B	7.60	79.30	11.20	9.50	2.90	2.60	2.10	8.21	11.90	44.80	44.90	19.20	34.80	15.20	25.60	465.00	7.80	9.60	0.31	1.50	58.00
T	5.98	83.00	11.00	6.00	2.38	2.13	1.47	8.03	12.12	43.78	47.55	18.30	33.27	14.03	26.23	426.83	6.87	8.60	0.28	1.17	57.00
Mean	6.63	79.30	12.30	8.40	2.99	2.08	1.56	8.12	12.17	43.33	45.88	18.43	34.09	14.61	25.58	449.94	7.29	8.80	0.29	1.32	56.33
SD	0.86	3.70	2.08	2.08	0.66	0.55	0.51	0.09	0.30	1.75	1.45	0.71	0.77	0.58	0.67	20.32	0.47	0.72	0.02	0.17	2.08
2000 mg/kg (Repeat)																					
H	11.20	87.00	8.00	5.00	8.40	1.20	1.60	7.25	13.50	42.40	44.20	16.58	31.80	14.80	29.40	324.00	5.20	9.40	0.41	1.20	52.00
B	10.80	79.90	10.30	9.80	5.40	2.00	3.40	7.37	12.40	48.40	51.40	17.70	32.60	13.50	28.60	356.00	4.50	8.60	0.30	0.90	65.00
T	9.90	78.30	10.50	11.20	8.60	0.80	0.50	8.65	14.40	46.50	52.70	15.90	33.20	12.80	30.50	489.00	5.70	8.30	0.25	1.00	59.00

Mean	10.63	81.73	9.60	8.67	7.47	1.33	1.83	7.76	13.43	45.77	49.43	16.73	32.53	13.70	29.50	389.67	5.13	8.77	0.32	1.03	58.67
SD	0.67	4.63	1.39	3.25	1.79	0.61	1.46	0.78	1.00	3.07	4.58	0.91	0.70	1.01	0.95	87.50	0.60	0.57	0.08	0.15	6.51

4) Biochemistry

Table8.Biochemistry (Day0)

Day0			
Groups	**AnimalMarking**	**SGPT**	**TotalBilirubin**
		(U/L)	(mg/dl)
300 mg/kg	H	35.63	0.21
	B	36.18	0.31

	T	37.97	0.22
	Mean	36.59	0.25
	SD	1.22	0.06
300mg/kg(Repeat)	H	33.56	0.24
	B	35.62	0.26
	T	34.59	0.30
	Mean	34.59	0.27
	SD	1.03	0.03
	H	39.63	0.24
2000mg/kg	B	35.01	0.26
	T	35.36	0.25
	Mean	36.67	0.25
	SD	2.57	0.01
2000mg/kg(Repeat)	H	39.58	0.22
	B	39.54	0.21
	T	39.58	0.20
	Mean	39.57	0.21
	SD	0.02	0.01

Table9.Biochemistry(Day14)

Day14			
Groups	**AnimalMarking**	**SGPT (U/L)**	**TotalBilirubin (mg/dl)**
300 mg/kg	H	35.92	0.24
	B	32.21	0.21
	T	36.56	0.21
	Mean	34.89	0.22
	SD	2.35	0.02
300mg/kg(Repeat)	H	36.94	0.22
	B	32.68	0.23
	T	32.59	0.21
	Mean	34.07	0.22
	SD	2.49	0.01
2000mg/kg	H	34.62	0.24
	B	32.97	0.21
	T	31.59	0.23
	Mean	33.06	0.23
	SD	1.52	0.02
	H	30.59	0.22
2000mg/kg(Repeat)	B	30.69	0.21
	T	30.96	0.24
	Mean	30.75	0.22
	SD	0.19	0.02

Table10.SGPT prism data

SGPTPRISMDATA		
Groups	**DAY0**	**DAY 14**
300 mg/kg	36.59 ±1.22	34.89 ±2.35
300 mg/kg	34.59 ±1.03	34.07 ±2.49
2000mg/kg	36.67 ±2.57	33.06 ±1.52

2000mg/kg	39.57±0.02	30.75 ±0.19

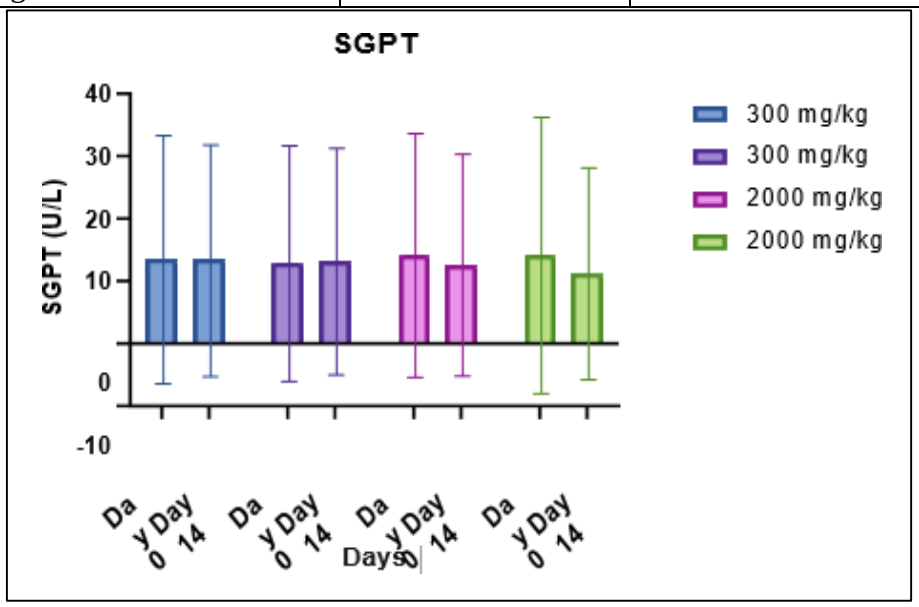

Fig8.SGPT

Values are expressed as mean±SD, n=3, *p<0.05, **p<0.01, *** p<0.001, **** p<0.0001. Values of werecompared with lowest conc. by t-test. Values of test groups were compared with lowest conc. by One-wayANOVAbyDennett'stest.

Table11.TotalBilirubin Prismdata

TotalBilirubinPrismdata		
Groups	**DAY0**	**DAY 14**
300 mg/kg	0.25 ±0.06	0.22 ±0.02
300 mg/kg	0.27 ±0.03	0.22 ±0.01
2000 mg/kg	0.25 ±0.01	0.23 ±0.02
2000 mg/kg	0.21 ±0.01	0.22 ±0.02

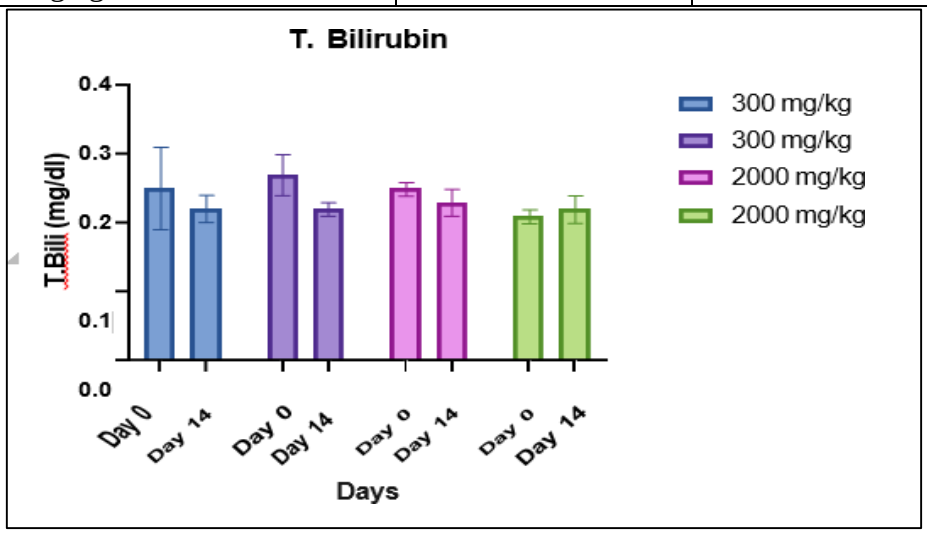

Fig9.TotalBilirubin

Values are expressed as mean±SD, n=3, *p<0.05, **p<0.01, *** p<0.001, **** p<0.0001. Values of were compared with lowest conc. by t-test. Values of test groups were compared with lowest conc. by One-way ANOVA by Dennett's test.

Elisa

IL-6:

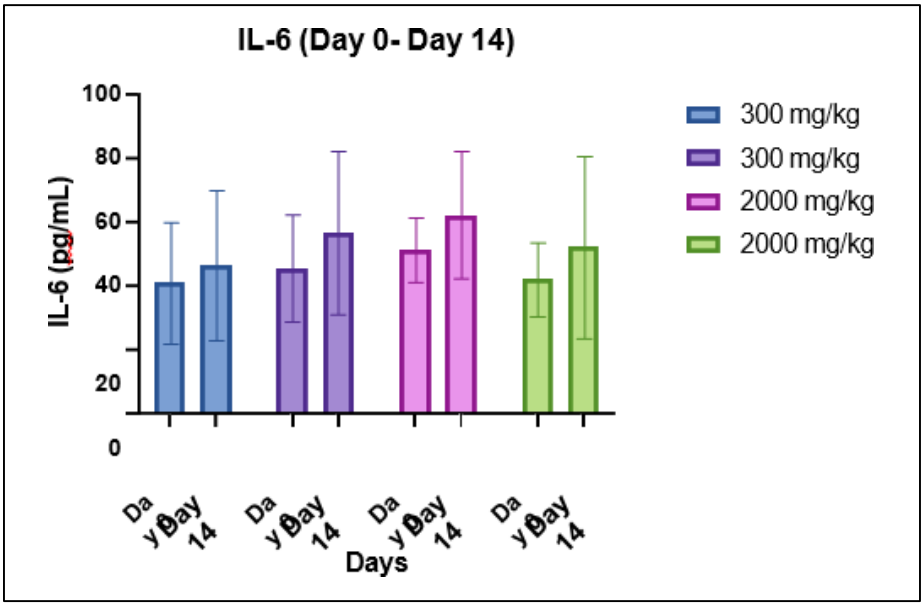

Fig10. IL-6 (Day0-Day 14)

Values areexpressed as mean±SD, n=3, *p<0.05, **p<0.01, *** p<0.001,**** p<0.0001. Values of were compared with lowest conc. byt-test. Values of test groups were compared with lowest conc. by One-way ANOVA by Dennett's test.

IL-8:

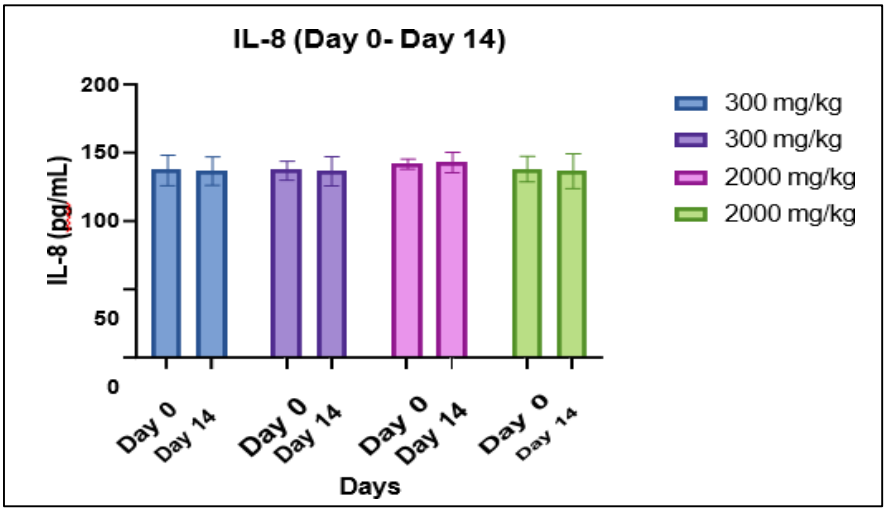

Fig11. IL-8 (Day0-Day 14)

Values are expressed as mean±SD, n=3, *p<0.05, **p<0.01, *** p<0.001, **** p<0.0001. Values of were compared with lowest conc. by t-test. Values of test groups were compared with lowest conc. by One-way ANOVA by Dennett's test.

DISCUSSION:

Brown top millet (*Urochloa ramose*) emerges as an exceptionally nutritious cereal crop, offering significant advantages, especiallyin regions with limited soil fertility. Its gluten-free characteristic positions it as an outstanding option for individuals managing celiac disease or gastrointestinal concerns. Abundant in protein, fibre, and low in carbohydrates, brown top millet plays a role in reducing LDL cholesterol, enhancing cardiovascular health, and promoting bone strength. The objective of the study was to assess the safety and potential health advantages associated with brown top millet consumption. Initial results indicate that brown top millet is a rich source of essential nutrients and phytochemicals, which may offer various health benefits [21-23].

During this study the plant material was collected, dried. The Soxhlet extraction method was

employedtoobtainplantextractsfrombrowntopmilletforfurtheranalysis.Theplantmaterial wasextractedusingethanolsolvent[24,25].Theobtainedextractswereconcentrated,andthe percentage yield was calculated to determine the extraction efficiency. After that phytochemical test are performed and this indicated that presence of alkaloids, tannins, saponins, anthraquinones, and flavonoids [26, 27].

The acute oral toxicity study aimed to as certain the safety of consuming brown top millet. Various tests, including CBC,SGPT,IL-6 & IL-8, and total bilirubin, were conducted to assess potential adverse impacts on liver function, inflammation, and overall health.TheLD50valuewascalculatedtogaugethelethal dose that could lead to mortality or severe toxicity effects. Wister rats were employed for the animal trial to evaluate the safety of brown top millet consumption. These rats were administered varying doses of the millet extract and closely monitored for any adverseeffects. Initial parameterssuchas CBC,SGPT, IL-6& IL-8,andtotalbilirubinweremeasuredbefore the trial, with subsequent assessments after the trial period to compare any changes or effects induced by millet consumption. The results of the acute oral toxicity study and animal trial indicated no harmful effects at the tested doses, thereby supporting the safety of brown top millet for consumption. However, further research is warranted to delve into its complete nutritional profile and potential therapeutic applications, advocating for its adoption as a sustainable and nutritious food source [28-30].

CONCLUSION:

Insummary, brown top millet(Urochloaramose)standsoutasahighlynutritiouscerealcrop, particularly suited for regions with low soil fertility. Its gluten-free nature renders it an excellent option for individuals with celiac disease or digestive concerns. With its abundance of protein, fibre, and low carbohydrate content, brown top millet offers a plethora of health benefits, including LDL cholesterol reduction, enhanced heart function, and bolstered bone health.Theinitialfindingsfromthisstudysuggestthatbrowntopmilletisrichinnutrientsand phytochemicalsbeneficialforhealth.Throughvariousassessments,suchasacuteoraltoxicity studies and animal trials, it was determined that brown top millet consumption at tested doses does not pose any harmful effects. However, further research is imperative to delve into its completenutritionalprofileandexplorepotentialtherapeuticapplications,therebyadvocating for its adoption as a sustainable and nutritious food source.

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