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**THE IMPACT OF *OCIMUM GRATISSIMUM* ON SOME FERTILITY HORMONES AND HISTOLOGY OF THE OVARY AND UTERUS IN FEMALE WISTAR RATS**

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*Ocimum gratissimum*, popularly known as scent leaf, is one of the medicinal plants with the potential to serve as an alternative therapy for the treatment of various ailments or as a source of a new drug. The aim of this research was to determine the effect of *Ocimum gratissimum* leaf extract on some fertility hormones in female wistar rats. Twenty four adult female wistar rats were randomly divided into 4 groups (n=6) consisting of low dose (LD), medium dose (MD), and high dose (HD) groups which were orally administered with 100mg/kg, 300mg/kg, and 500mg/kg doses of *Ocimum gratissimum* leaf extract respectively, and the control (C) group which received normal feed and water for four weeks. Results showed that there were significant decreases in oestrogen levels for LD and HD groups compared with the control and a significant increase in progesterone level for MD group compared with control. Histological analysis of the ovarian samples showed increased folliculogenesis and active stromal congestion in the LD group while the MD and HD groups showed decreased folliculogenesis and active stromal congestion when compared to control. Uterine histology showed active stromal congestion and glandular cell epitheliosis for all groups when compared to control with the LD group showing endometrial lining epithelial crowding and cytoplasmic clearing and MD group showing endometrial lining epithelial hyperplasia. Conclusively, *Ocimum gratissimum* showed a decrease in estrogen level with an increased folliculogenesis at low dose and an increase in progesterone level with endometrial lining hyperplasia at medium dose in female wistar rats.

**Keywords:** *Ocimum gratissimum*, fertility hormones, contraceptive, folliculogenesis, stromal congestion, epithelial hyperplasia.

**EFFECT OF CHRONIC CONSUMPTION OF CALABASH CHALK ON GASTRIC ULCER SCORE IN ALBINO WISTAR RATS.**

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Calabash chalk is a naturally occurring substance that is readily consumed all over the world as a form of geophagy and pica (Dean et al, 2004). Its consumption has been known

to cause histomorphological changes to the architecture of the gastrointestinal tract (Ekong et al, 2009). This research was aimed to study its effects on gastric ulcer score and its predisposing factors. Forty (40) adult Albino Wistar rats were randomly divided into 4 groups of 10 rats and each group was randomly sub-divided into 2 groups of 5 rats each. Group 1 served as the test group and was administered 1ml of calabash chalk suspension (40mg/kg) while group 2 served as the control group and was administered 1ml of distilled water orally and daily for 28 days. The mean basal gastric acid output in the test group was  $0.61 \pm 0.37 \mu\text{Mol}/10\text{min}$  while that of the control group was  $0.58 \pm 0.22 \mu\text{Mol}/10\text{min}$ . There was no significant difference in basal gastric acid output between the 2 groups. The pH value of the test group was  $2.94 \pm 0.14$  while that of the control group was  $4.10 \pm 0.37$ . The pH of the test group was significantly lower than that of the control group ( $P < 0.05$ ). The mean gastric mucous output of the test group was  $0.08 \pm 0.01\text{g}$  while that of the control group was  $0.14 \pm 0.014\text{g}$ . The gastric mucous output in the test group was significantly reduced ( $P < 0.01$ ) when compared to the control. The mean gastric pepsin concentration in the test group was  $0.57 \pm 0.02\text{mg}/100\text{ml}$  while that of the control group was  $0.46 \pm 0.02 \text{mg}/100\text{ml}$ . The gastric pepsin concentration in the test group was significantly higher ( $P < 0.01$ ) when compared to the control group. The mean gastric ulcer score in the test and the control groups were  $7.50 \pm 1.25$  and  $3.70 \pm 0.30$  respectively. The ulcer score was significantly higher ( $P < 0.05$ ) in the test group. In conclusion, chronic consumption of calabash chalk leads to low gastric pH, increased pepsin concentration and low gastric mucous which predisposed to a higher ulcer score in Albino Wistar rats.

**AMELIORATIVE EFFECTS OF THE HYDROMETHANOL LEAF EXTRACT OF *CRATERISPERMUM SCHWEINFURTHI* ON PHENYL HYDRAZINE INDUCED ANEMIA IN MALE WISTAR RATS**

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Anaemia is a clinical condition characterized by a reduction in the normal values of haemoglobin concentration, circulating erythrocytes and other erythrocyte indices per unit of blood. The present study evaluates the potential ameliorative effects of the hydromethanol extract of the

leaves of *Craterispermum schweinfurthi* following phenyl hydrazine induced anemia in male Wistar rats. A total of 40 male wistar rats weighing between 100-250 g were randomly divided into 8 groups of 5 rats each. Phenyl hydrazine was administered in 3 separate doses: 9am on day 0; 9am and 6pm on day 1 to all rat groups except groups 1 and 8. The rat groups were subsequently treated as follows: Group 1 (negative control) received extract vehicle only; Group 2 received 40 mg/kgbw of phenyl hydrazine only; Groups 3-5 received 250, 500 and 750 mg/kgbw respectively of hydromethanol leaves extract of *Craterispermum schweinfurthi*; Group 6 received 0.23ml/kgbw of Bioferon®; both Groups 7 and 8 received 2000mg/kgbw of phytosterol. The extract, Bioferon and phytosterol were administered once daily using oro-gastric cannula for 14 days. On day 15, the rats were placed under chloroform anaesthesia and blood samples collected by direct cardiac puncture into appropriate sample tubes for estimation of erythrocyte count, haemoglobin concentration, haematocrit, platelet count, total white blood cell count and differential counts using automated methods. Amongst Group 2 rats, values of erythrocyte, platelet and leucocyte indices were significantly reduced ( $p < 0.05$ ) following phenyl hydrazine administration compared to Group 1 rats. However, administration of the extract, significantly increased ( $p < 0.05$ ) these parameters in a dose dependent manner amongst Groups 3, 4 and 5 rats. A similar increase was observed amongst Groups 6 and 7 rats administered Bioferon® and phytosterol respectively: suggesting a potential ameliorative effects of the extract comparable to the effects of Bioferon®. Apparently the hydromethanol leaf extract of *Craterispermum schweinfurthi* exhibits potential beneficial dose dependent effects on haematopoiesis in experimental animals. These validates the use of the leaves of the plant in our environment as a tonic. Our findings are preliminary requiring further investigations.

**Keywords:** *Craterispermum schweinfurthi*, phenyl hydrazine, phytosterol.

#### AMELIORATIVE EFFECT OF CO-ADMINISTRATION OF CAFFEINE AND MENTHOL ON OXIDATIVE STRESS IN RESERPINE-INDUCED DEPRESSION IN MICE

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The projected increase in Depression as the leading global disease burden by 2030, as per WHO projections, emphasizes the limitations of current standard antidepressant therapies for Major Depressive Disorder (MDD). 30% of MDD patients do not respond sufficiently to these treatments, underscoring the need for novel antidepressants or adjuncts to augment their effectiveness. In this study, the combined impact of caffeine and menthol, commonly found in beverages like coffee and tea, on depression using a mouse model was assessed. Both substances individually show

varied effects related to depressive disorders, and understanding their interaction is essential due to their widespread consumption and potential implications for public health. Twenty-four hours post intraperitoneal (IP) delivery of reserpine (6mg/kg), Forced Swim Test (FST) was performed to assess depressive-like behaviour. Following this, menthol and caffeine were orally administered separately and in combination at doses of 25, 50, 100 mg/kg, and fluoxetine 20mg/kg for three consecutive days. The Forced Swim Test was then conducted again after the three-day treatment period. Mice were sacrificed by sudden decapitation and blood was collected for the analysis of Malondialdehyde (MDA), Superoxide Dismutase (SOD), and Reduced Glutathione (GSH). Reserpine(6mg/kg) significantly increased immobility time after 24hrs. Following treatment, there was significant decrease in immobility time in forced swim test after treatment for 3 days. Additionally, a significant decrease in serum levels of MDA and increased levels of SOD and GSH at dose of menthol and caffeine of 50mg/kg and 100mg/kg were observed. The results suggest that co-administration of caffeine and menthol decreased depressive-like behaviours by decreasing oxidative stress, which further supports the potentials of these combination as antidepressants.

**Keywords:** Reserpine, Depression, Menthol, Caffeine, Oxidative Stress.

#### ANTI INFLAMMATORY EFFECT OF LYCOPENE ON CARRAGEENAN INDUCED KNEE OSTEOARTHRITIS IN MALE WISTAR RATS

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Osteoarthritis is an inflammatory joint disease that is characterized by the presence of inflammatory markers in the blood and synovial fluids resulting in deterioration and loss of articular cartilage with concomitant structural and functional changes in the entire joint. Lycopene is a natural pigment that has been reported to possess anti-inflammatory, antioxidant and anti-proliferative properties. The aim of this study was to evaluate the anti-inflammatory effect of lycopene administration on carrageenan-induced knee osteoarthritis in male Wistar rats. A total of thirty male Wistar rats were used for the study, and were divided into six groups of five rats each as follows: Group I received intra-articular injection of normal saline and 0.1 ml of olive oil which served as vehicle control. Group II received intra-articular injection of carrageenan and 0.1 ml of olive oil and served as negative control. Groups III, IV, V and VI received intra-articular injections of carrageenan (0.02ml of 1% w/v) and 10mg/Kg diclofenac sodium, 5 mg/Kg, 10 mg/Kg and 20 mg/Kg lycopene respectively orally for three weeks. The results showed significantly higher ( $p < 0.05$ ) knee joint diameter in a negative control compared to the vehicle control. Lycopene caused a decrease in knee joint diameter, Neutrophil-Lymphocyte Ratio and Serum Interleukin 1 $\beta$ , while increasing paw grip latency and Serum Interleukin 10. It can be concluded that Lycopene has anti-inflammatory action that was effective in protecting against knee osteoarthritis.

**Keywords:** lycopene, carrageenan, knee, osteoarthritis

**BIOTIN SUPPLEMENTATION IMPROVED REPRODUCTIVE, METABOLIC AND BIOCHEMICAL PARAMETERS OF POLYCYSTIC OVARIAN SYNDROME IN FEMALE WISTAR RATS. Onyeso G. I, Emeghara, G, \*Reuben, E, Lekara, N.L., Gbarator F.S.**

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Polycystic ovarian syndrome (PCOS) is one of the most common endocrine diseases that has several aspects in terms of pathology such as metabolic, endocrine, reproductive, and psychological. However, the etiology of PCOS remains poorly understood. The study investigated the effects of biotin supplementation on the reproductive, metabolic and biochemical functions in female Wistar rats induced with polycystic ovarian syndrome. Twenty five (25) Female Wistar rats (100- 120)g were randomized into Six groups (n = 5/ group): I (control), II Letrozole-treated: 1mg/kg BW ; III Co-treated with Letrozole 1mg/kg and metformin 2mg/100g BW, IV Co-treated with Letrozole (1mg/kg) and biotin low dose (100mg/kg) BW, V Co-treated with Letrozole (1mg/kg) and biotin high dose (150mg/kg). After Six weeks, samples were collected for biochemical markers (Blood glucose, Lipid profile, Oxidative stress markers), Sex hormone profile (Testosterone, progesterone, oestrogen, follicle stimulating hormone and luteinizing hormone) as well as histology of the ovaries. The results of the study showed that biotin supplementation significantly improved dyslipidemia, and biochemical changes in the PCOS rats as high dose of biotin significantly reduced the blood glucose, and LDL while increasing the HDL. The biotin treated group also showed a statistically significant decrease in the level of luteinizing hormone and increase in the level of progesterone and oestrogen levels when compared to the PCOS group. The observation of primary follicles in the ovaries suggests that the treatment with biotin may be influencing or modulating follicular development. These findings suggest that biotin supplementation may be a potential therapeutic option for improving metabolic and biochemical as well as the reproductive changes associated with PCOS and it has a positive impact on the ovaries in PCOS.

**Keywords:** Biotin, PCOS, oxidative stress.

**ANTIDEPRESSANT AND ANXIOLYTIC-LIKE EFFECTS OF AQUEOUS BARK EXTRACT OF CINNAMON IN A MOUSE MODEL OF CHRONIC STRESS**

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Depression and anxiety are prevalent mental health disorders, often coexisting and sharing common symptoms. Antidepressants are one of the most common treatment options available; however, their effects can vary greatly from person to person. Cinnamon is a widely used spice derived from the bark of trees in the Cinnamomum genus

that has gained attention for its potential neurological benefits. This study assessed the potential therapeutic effects of aqueous bark extract of cinnamon on depression and anxiety in mice exposed to chronic unpredictable mild stress. Thirty Swiss Albino mice were divided into six groups (n=5). Group I received distilled water (control) 10 mL/Kg; Group II (CUMS) were exposed to chronic unpredictable mild stress without treatment, Groups III, IV, and V received 50, 100, and 200 mg/Kg of cinnamon, respectively; and Group VI received fluoxetine 20mg/kg. Chronic mild stress was applied for 14 days without treatment followed by forced swim test (FST) on day 15, then another two weeks of chronic mild stress exposure with treatment followed before the second FST. Open field test (OFT) and elevated plus maze (EPM) test were used to assess anxiety at the end of the treatment sessions. There was significant increase in immobility time in the groups exposed to chronic mild stress in the first forced swim test when compared to the unexposed group (Group I). However, after treatment a significant ( $p < 0.05$ ) decrease in immobility was observed in groups treated with 100 (Group IV) and 200 mg/Kg (Group V) of cinnamon when compared to the untreated group (Group II) as assessed by the second FST. Cinnamon 50 mg/kg significantly improved rearing in OFT. Although, there was no statistically significant change observed in anxiety-like behaviours in EPM. In conclusion, the results suggest that aqueous bark extract of cinnamon possesses antidepressant-like and anxiolytic-like effects in mice exposed to chronic unpredictable mild stress.

**Keywords:** Depression; Anxiety; Cinnamon; Forced swim test; Open field test; Elevated plus maze test

**THERMOXIDIZED PALM OIL DIET (TPO) INDUCED BIOCHEMICAL DISORDERS IN RATS IS AMELIORATED BY FRESH PALM OIL (FPO) AND VITAMINE**

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TPO have been reported to possess a deteriorative effect on dietary oils because it changes the physicochemical properties of oil thereby destroying many of its beneficial components. However, human populace consuming TPO is on the increase and there is no recognized remedy to it associated diseases. This study was aimed at evaluating the impacts of FPO and vit E on biochemical indices of TPO fed rat. Sixty albino male rats were grouped into 6 (n=10). Group 2, 3, 4, 5 and 6 were fed TPO, FPO, vit E, TPO + FPO and TPO + vit E respectively. Group 1 acted as the control. 15g

of the oils was added to 85g rat chow to prepare respective diet and vit E administered 200mg/kg/day orally. Group 1-4 were fed for 4 weeks, while TPO fed rats in Group 5 and 6 were further treated with FPO and vit. E for another 4 weeks. At the end of the feeding period, blood samples were collected via cardiac puncture. Serum was used for analysis. Total protein, albumin, globulin, total and conjugated bilirubin levels were spectrophotometrically determined using standard kits. Unconjugated bilirubin estimated by subtracting the conjugated bilirubin from bilirubin. Lipid profile were determined using diagnostic kits. Serum analysis revealed that TPO significantly ( $P<0.05$ ) alter biochemical indices negatively compared to control. But FPO and vit E significantly ( $P<0.05$ ) ameliorated the negative biochemical indices of TPO fed rats. Vitamin E was more potent than FPO in reversing lipid profiles, while FPO significantly ( $P<0.05$ ) reverses total protein and bilirubin levels in TPO fed rats than vit E. FPO and vit E may boost biochemical indices and lessen the associated diseases of TPO fed diet.

**Keywords:** Thermally oxidized palm oil, vitamin E, fresh palm oil, cholesterol, total protein, cholesterol, conjugated bilirubin.

### **GESTATIONAL ADMINISTRATION OF AQUEOUS LEAF EXTRACT OF *JATROPHA TANJORENSIS* ALLEVIATES POSTPARTUM-LIKE NEUROBEHAVIOURS IN EXPERIMENTAL RATS**

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This study examines the effect of gestational administration of aqueous leaf extract of *Jatropha tanjorensis* (JT) on postpartum-like neurobehavioural outcomes to delineate its possibility as a prophylactic, therapeutic agent in the treatment of postpartum symptoms. Inseminated female rats (120-150g) were grouped into two-control and JT group ( $n=10$ ). Control received 20 ml/kg of distilled water and JT group received 500 mg/kg of JT orally once daily for 21 days in gestation. Non-pregnant rats were excluded from the study. Assessed at postpartum include antidepressant-like (force swim test, FST; tail suspension-test, TST), locomotor (open field test, OFT), anxiolytic-like (elevated plus maze, EPM; light-dark box, LDB), learning and memory (T-maze; novel object recognition task, NORT), social (nest score) and analgesic-like (hot plate test, HPT; tail flick test, TFT) behaviours. JT increased ( $P<0.05$ ) mobility and latency to immobility durations in FST and TST; open arm entry ( $P<0.001$ ) and duration ( $P<0.01$ ) in EPM and light box duration ( $P<0.05$ ) in LDB; locomotion and exploration, but reduced anxiety-like levels in EPM, LDB and OFT. It increased nest score ( $P<0.05$ ); mean retraction time ( $P<0.01$ ) of TFT. JT showed positive score for short- and long-term memory in NORT and improved percentage alternation in T-maze though not significant compared to control. In conclusion, the aqueous extract has a therapeutic effect that reduces postpartum-like depression and anxiety, it improve

locomotor activity. JT can be a preventive and adjuvant therapeutic option for pregnant women.

**Keywords:** *Jatropha*, postpartum disorder, Emotionality, Pain, Gestation

### **EVALUATING THE POSSIBLE MECHANISM AND ROLE OF *RAUWOLFIA VOMITORIA* IN IMPROVING MEMORY AND MOTOR COORDINATION IN MICE**

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This study evaluated the possible mechanism and role of *R. vomitoria* in improving memory and motor coordination on three nitropropionic acid (3-NP) induced oxidative stress in mice. Seventy (70) albino mice weighing 19 – 35g divided into 7 groups ( $n=10$ ) were used for the study. The work was carried out in two phases: first is the oxidative stress model which had three groups (control, oxidative stress group without treatment, oxidative stress group treated with *R. vomitoria*). The second phase is the cholinergic model which had 5 groups (control, Atropine treated group 2mg/kg, Atropine + *R. vomitoria* treated group, Neostigmine group 2.5mg/kg, Neostigmine + *R. vomitoria* treated group). Animals had free access to feed and clean drinking water. After administration for 21 days, memory and motor impairment symptoms were evaluated using Morris water maze, Novel object recognition task and Beam walking test. Thereafter, spectrophotometry was used to estimate the degree and expression of biomarkers of oxidative stress. In MWM, the group treated with *R. vomitoria* improved memory and learning better when compared to the control and the 3-NP groups. In the NORT, *R. vomitoria* also showed great improvement in learning and memory. In Beam walking test, *R. vomitoria* still showed tremendous improvement of learning and memory ( $p<0.05$ ) compared to the control and 3-NP groups indicating better motor coordination. For the cholinergic model: in the NORT, Atropine treated group had the least improvement on learning and memory and when compared to other experimental groups there was no significant difference. In the MWM, Atropine treated group had least quadrant retention ( $p<0.05$ ) when compared to the control and other experimental groups. During the beam walking test number of lines crossed and number of foot slips increased in the Atropine treated group but was not significant compared with the experimental groups. The number of reversals was least in the Atropine treated group while the other had increased but when compared to the control group it was not significant. Also, for the oxidative stress model: the

concentration of CAT, SOD, GSHPX were significantly lower ( $p < 0.001$ ) in the 3 -Np group compared to the control and lipid per oxidation was significantly higher compared to the control. Higher concentration of CAT, SOD, GSHPX and lower lipid per oxidation ( $p < 0.001$ ) were recorded after treatment with *R. vomitoria*. These findings suggest that treatment with *R. vomitoria* significantly improved learning and memory through the oxidative stress model than through the cholinergic model.

**Keywords:** *R. vomitoria*, 3-NP, Learning and Memory, Motor Coordination, Oxidative Stress.

### THE EFFECT OF EDIBLE CLAY SUSPENSION ON SOME HEMATOLOGICAL INDICES AND HISTOLOGY OF THE LUNGS OF FEMALE WISTAR RATS

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The purpose of this study was to determine the effect of Edible clay (Eko) on some hematological indices and histology of the lungs of Female Wistar rats. Forty female Wistar rats weighing 150–250 g were sorted into four groups named group 1 to 4 and further subdivided into 2 subgroups tagged week 2 and week 4 with five rats each ( $n = 5$ ). Group 1 was the control and orally received distilled water daily, while Groups 2–4 received various doses of edible clay ranging from 200, 800 and 1600 mg/kg respectively, through the same route for 28 days. Five rats were sacrificed from group 1 to 4 on the second and fourth week. Results showed that there was a significant decrease in Monocyte count in the 3 dose groups, a significant decrease in Granulocyte count for the low and high dose groups and a significant decrease of Platelets count in the medium and high dose groups compared to the control after two weeks of administration of edible clay suspension. After four weeks of treatment, there was a significant decrease in White Blood Cell count and Haematocrit for low dose group, a significant decrease in Mean Corpuscular Volume and Platelets count in medium dose group, and a significant increase in Mean Corpuscular Haemoglobin Concentration in the medium dose group compared to control. Histological evaluation revealed moderate activation of Bronchiolo-alveolar lymphoid aggregates and active interstitial congestion in the low, medium and high dose groups after two weeks of administration of Edible clay. After four weeks, activated cells of the mononuclear phagocyte system, activated lymphoid tissue with vasodilation and dilated bronchiole, and florid lymphoid tissue activation were seen in the low, medium and high dose groups respectively. It can be inferred from this study that the ingestion of Edible clay suspension alters some hematological indices and histology of the lungs of Wistar rats.

**Keywords:** *Edible clay*, *Hematological Indices*, *Histology*, *Lungs*.

**CAFFEINE CONSUMPTION DISRUPTS SOME REPRODUCTIVE FUNCTIONS OF PERI-PUBERTAL FEMALE WISTAR RATS**  
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Consumption of over-the-counter medicines and caffeinated-beverages is prevalent among adolescents. Caffeine has been associated with infertility. This study investigated the impacts of caffeine consumption on some reproductive functions of peri-pubertal female Wistar rats. Twenty-five peri-pubertal Wistar rats ( $70 \pm 20$  g) were randomly divided into five groups ( $n=5$ ). I-control (distilled water), II and III received 120 and 180 mg/Kg/day caffeine orally for 28 days respectively, IV and V received 120 and 180 mg/Kg/day caffeine respectively for 28 days and allowed to recover for same period. Vaginal smears were obtained daily to study estrous cycle which occurs 4-5 days in rats. The animals were sacrificed and the ovaries and uteri were harvested for tissue 8-hydroxyguanosine (8-OHdG), Tumor Necrosis Factor Alpha (TNF- $\alpha$ ) and C-reactive protein levels were measured by Enzyme linked immunosorbent assay (ELISA). Data were analyzed using ANOVA and  $p < 0.05$  was considered statistically significant. Caffeine caused an increase in the frequency of occurrence of metestrus phase even upon its withdrawal, but reduced the frequency of occurrence of the diestrus phase of the estrous cycle. Caffeine increased uterine 8-OHdG but reduced TNF- $\alpha$  and C-reactive protein in the ovary and uterus. Caffeine consumption adversely alters the reproductive functions of peri-pubertal Wistar rats.

**Keywords:** *Caffeine*; *Ovary*; *Uterus*; *Infertility*; *Peri-pubertal rats*.

### AGE AND SEX VARIATIONS OF TEAR FILM ELECTROLYTE SECRETIONS AND TEARS BREAKUP TIME IN HUMANS

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Tear film, a vital fluid that lubricates and provide the ocular surfaces with electrolytes and oxygen. Never the less, abnormalities in tear osmolality leads to tear film instability which precedes dry eye disease, an ocular health condition reportedly found in 5-50% of the global population. This study evaluated the effect of age and sex variations on tear electrolytes and break-up time. Four hundred (400) human subjects, 6 years and above with relatively healthy eyes were grouped into twelve groups based on age and sex. Maximum blink interval (MBI) procedure was carried out monocularly for each subject. Tears was collected with plain glass microcapillary tubes and tear electrolytes (sodium, bicarbonate, potassium, calcium and chloride) and tear glucose levels were determined using spectrophotometer. Age and sex comparison for tear  $K^+$  in females showed a significant increase ( $5.08 \pm 0.65$  mMol/L) when compared with males' counterpart ( $3.54 \pm 0.47$  mMol/L); and tear  $Ca^{2+}$  also significantly increased ( $p < 0.05$ ) in males 'age group 36-45 years ( $5.81 \pm 0.75$  mMol/L) when compared with

corresponding females ( $3.12 \pm 0.62$  mMol/L) subjects. Furthermore, tear  $\text{Na}^+$  level significantly increased ( $p < 0.05$ ) in females between 45–59 years ( $166.38 \pm 16.67$  mMol/L) when compared with corresponding males ( $127.71 \pm 9.64$  mMol/L) while glucose level was significantly ( $p < 0.05$ ) decreased in females between 45–59 year ( $14.71 \pm 2.77$  mg/dl) when compared with corresponding males ( $28.89 \pm 5.14$  mg/dl) subjects. Finally, MBI increased significantly for male age group 13–19 years and 20–35 years but also decreased significantly ( $p < 0.05$ ) for group 36–45 years in female. Comparison of average MBI values for sex at different age groups was only significant ( $p < 0.05$ ) for 13–19 years. MBI had a weak positive correlation with  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{Ca}^{2+}$ ,  $\text{Na}^+$ , and  $\text{HCO}_3^-$  concentration but not ( $p < 0.05$ ) significant. However, had a significant ( $p < 0.05$ ) weak negative relationship with tear glucose. Conclusively, the study found that tears stability is age dependent but not gender related.

**KEYWORD:** Tears film, Electrolytes, Tears Breakup Time, Glucose, Age, Gender, Potassium, Sodium, Chloride, Bicarbonate.

#### ANTI-HEPATOTOXIC ACTIVITIES OF METHANOL FRUIT PULP EXTRACT OF *Azanza garckeana* IN EXPERIMENTALLY-INDUCED TYPE II DIABETIC RATS

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Diabetic hepatotoxicity is a microvascular complication of diabetes mellitus characterised by a damage to the liver majorly as a result of hyperglycemia. This study investigated the effects of methanol fruit pulp extract of *Azanza garckeana* (MFEAG) on liver tissue liver enzymes and oxidative stress biomarkers in experimentally-induced Type II diabetic male Wistar rats. Thirty rats (weighing 70–100 g) were grouped into six ( $n = 5$ ); normal control, diabetic control, 300, 600 and 1,200 mg/kg MFEAG- and metformin-treated groups respectively. Type II diabetes was induced by feeding the rats with high fat diet and water *ad libitum* for five weeks followed by administration of single low dose of streptozotocin (STZ, 40 mg/kg, i.p.) while normal control rats were fed with normal diet and STZ vehicle. Treatment was done orally for three weeks, with the diabetic control group receiving the extract's vehicle. Treatment with MFEAG significantly reversed an increase in levels of aspartate aminotransferase (AST) and malondialdehyde (MDA), while significantly reversing a decrease in levels of superoxide dismutase (SOD) and glutathione reductase (GSH) in the rats' liver homogenates. No effects were observed in the levels of alanine aminotransferase (ALT) and catalase (CAT). Histology of liver tissues of a diabetic control rat shows moderate vacuolation and necrosis, while those of the treated rats indicate normal features comparable to that of a normal control. These findings suggest that the methanol fruit pulp extract of *Azanza garckeana* possesses some abilities to reverse the hepatotoxic effects of experimentally induced type II diabetes mellitus in rats.

**Key words:** Diabetes, hepatotoxicity, *Azanza garckeana*, liver enzymes, oxidative stress, rat

#### EVALUATION OF THE EFFECT OF ETHANOLIC LEAF EXTRACT OF *JUSTICIA SECUNDA* ON OXIDATIVE STRESS AND RENAL FUNCTION IN ALLOXAN-INDUCED DIABETES.

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The statistics of Nigerians living with Diabetes Mellitus (DM) are disturbing as the current prevalence among adults aged 20–69 years is reported to be 1.7 million. Oxidative stress has been implicated in the pathophysiology of DM. Persistent hyperglycemia causes increased production of free radicals in tissues and can cause renal damage/injury over time. Medicinal herbs like *Justicia secunda* are being explored as alternatives to orthodox medicine as they are less toxic and eco-friendly. Twenty-five rats (150–200g) were divided into 5 groups. Diabetes was induced in Groups B–E with 150mg of Alloxan Monohydrate (IP). Group A (Normal) and Group B (Untreated Diabetes) received only feed and water, Group C received 150mg/kg of metformin while Group D and E received 200mg/kg and 400mg/kg ethanolic extract of *Justicia secunda* respectively for 14 days. *Justicia secunda* significantly reduced MDA levels and significantly increased SOD and Catalase levels. *Justicia secunda* significantly decreased urea levels while creatinine levels were unaltered. *Justicia secunda* showed antioxidant potential and was not toxic to the kidney, suggesting that it may be safe for consumption by diabetic patients.

**Keywords:** Diabetes mellitus, Oxidative stress, *Justicia secunda*, Antioxidants.

#### MODULATION OF CELL ADHESION MOLECULES AND LEPTIN BY AQUEOUS EXTRACT OF *Terminalia catappa* (ALMOND TREE) LEAVES IN ALLOXAN – INDUCED DIABETIC MODEL.

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Cell adhesion molecules (CAMs) are subset of cell surface proteins involved in the binding of cells with other cells. The influence of *Terminalia catappa* leaf extract on soluble cell adhesion molecules and leptin in diabetic rat model was investigated. Male Wistar rats weighing 150 – 200g were randomly distributed into five groups of six rats each. Group

1 was control administered distilled water orally at 5ml/kg bw. Group 2 received *Terminalia catappa* extract at 130mg/Kg bw orally. Diabetes groups 3, 4 and 5 were administered orally with distilled water, 5ml/Kg bw; *Terminalia catappa* 130mg/Kg bw and aspirin 30mg/kg bw respectively. Diabetic rats demonstrated significantly ( $p<0.05$ ) higher levels of ICAM ( $326\pm 1.14\text{mg/ml}$ ), VCAM ( $451.4\pm 0.93\text{ mg/ml}$ ) and P-selectin ( $450.6\pm 0.27\text{mg/ml}$ ) compared with control values  $91.2\pm 0.58\text{mg/ml}$ ,  $234.8\pm 1.2\text{mg/ml}$  and  $33\pm 0.6\text{mg/ml}$  respectively. Leptin also increased significantly ( $p<0.05$ ) from  $9.6\pm 0.98\text{mg/ml}$  in control to  $31.4\pm 0.51\text{mg/ml}$  in diabetic group and reduced to  $17.5\pm 0.96\text{mg/ml}$  in diabetic treated group. In diabetic rats treated with extract, the cell adhesion molecules were significantly ( $p<0.05$ ) lower than values of untreated diabetic but higher than those of control. Aspirin also lowered the concentration of cell adhesions molecules. *T. catappa* reduction of adhesion molecules and leptin can be harnessed for the management of cardiovascular complications in diabetes mellitus and other disease conditions.

**Keywords:** soluble adhesion molecules, ICAM, VCAM, diabetes mellitus, cardiovascular complications

#### AQUEOUS STEM EXTRACT OF COSTUS AFER (BUSH CANE) AMELIORATES ETHANOL-INDUCED MEMORY DEFICITS AND ENHANCES BRAIN ACETYLCHOLINESTERASE (ACHE) ACTIVITY IN MICE.

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Numerous studies have revealed the adverse effects of alcohol on memory. Despite being recognized to cause both acute and long-term cognitive deficits, alcohol is one of the most commonly abused psychoactive drugs in our society. Hence, the current study explores the neural processes behind the protective action of *Costus afer* (*C. afer*) in ethanol-induced memory losses in mice. The animals were weight-matched into 5 groups ( $n = 9$ ) as follows: Control, ethanol (5 g/kg b w), ethanol plus C. AFER 100 ml/kg b w, ethanol plus C. AFER 200 ml/kg b w, and ethanol plus C. AFER 500 ml/kg b w groups. The Morris Water Maze (MWM) and Novel Object Recognition Test (NORT) were used to evaluate cognitive impairment. Furthermore, levels of malondialdehyde (MDA) as a lipid peroxidation maker of oxidative stress, antioxidant capacity, and alterations in acetylcholinesterase (AChE) activity were assessed in mice

exposed to ethanol. Treatment with *C. afer* significantly improved antioxidant defense system (CAT and GSH) and balanced the elevated MDA levels in the ethanol-induced mice. At the same time, this study showed reduced AChE activity in the mice brain, thereby enhancing cholinergic neurotransmission. These findings coincided with an improvement in the MWM and NORT's performance in both spatial and non-spatial memory. The findings of this investigation demonstrate that *C. afer* has a positive therapeutic effect in acute ethanol consumption by reducing oxidative stress and cholinergic inhibition.

**Keywords:** Ethanol; *C. afer*; Oxidative stress; Acetylcholinesterase; Spatial memory; Non-spatial memory

#### PREGNANCY OUTCOMES OF *Rauvolfia vomitoria* STEM EXTRACT TREATED WISTAR RATS.

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Phytomedicine is a globally accepted means of providing alternative treatment for a varied number of disease conditions. *Rauvolfia vomitoria*, a medicinal plant locally called "poison devil's pepper", is used in traditional medicine for various treatment of diseases such as hypertension, epilepsy, cancer, psychosis, diabetes etc. The ethanolic extraction of *Rauvolfia vomitoria* was carefully carried out and the extract administered to twenty rats, which were divided into four (4) groups. Group A (control) received 0.5ml/kg body weight of distilled water. Groups B, C and D received 200mg/kg, 400mg/kg and 800mg/kg body weight of *Rauvolfia vomitoria* stem extract respectively by oral gavage for 19 days. Hormonal assay for progesterone, estrogen, luteinizing hormone, follicle stimulating hormone and prolactin were done using enzyme immunoassay. Findings from this study revealed that *Rauvolfia vomitoria* stem extract caused a significant decrease ( $p<0.05$ ) in relative change in body weight, the weight of foetuses was significantly decreased ( $p<0.05$ ) but the weight of the ovary and uterus of the rats had no noticeable change. Serum level of follicle stimulating hormone (FSH) had a significant decrease where as a significant increase in luteinizing hormone (LH) occurred at 200mg/kg and a decrease at 400 and 800mg/kg. Serum prolactin level had no significant difference however it decreased in all groups compare to control. There was an initial significant increase ( $p<0.05$ ) in the serum levels of estrogen in 200mg and significant decrease in 400mg/kg groups, relative to the control. There was no observable death in foetuses delivered but resorption was significant at 800mg/kg. Histopathology findings showed more dose dependent degeneration, atretic cells in the ovary and glandular distortion of the uterus at 800mg/kg. The levels of glutathione Peroxidase (GPx) and catalase

(CAT) decreased significantly while the extract had no significant effect on superoxide dismutase (SOD) and malondialdehyde (MDA). The findings suggest that *Rauwolfia vomitoria* stem may possess a dose dependent abortifacient effect in pregnant rats.

**Keywords:** *Rauwolfia vomitoria*, *Pregnancy*, *Abortifacient*, *sex hormones*, *Antioxidants*, *gonadotrophins*

#### **MODULATORY ROLE OF QUERCETIN ON ANXIETY, DEPRESSION AND OXIDATIVE CHANGES IN PARAQUAT-INDUCED PARKINSONISM IN MALE WISTAR RATS**

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Parkinsonism is a complex neurodegenerative disorder characterized by motor and non-motor symptoms with signs of prominent bradykinesia and variable extrapyramidal signs and symptoms, accompanied by the degeneration of nigrostriatal dopaminergic system, with neuronal loss of the substantia nigra. Toxins are implicated in the etiology of the disorder. Anxiety, depression and oxidative stress are

common comorbidities, significantly affecting the quality of life in parkinsonian patients. Quercetin a naturally occurring flavonoid found in common fruits and vegetables such as spring onions, tea and red wine, with antioxidant properties, has shown promise as a potential modulator of these symptoms. This study aimed to investigate the modulatory effect of quercetin on anxiety, depression and oxidative changes in paraquat-induced parkinsonism in male Wistar rat model. Twenty (20) male Wistar rats were divided into four (4) groups of five (5) rats each. Group 1 rats received distilled water only, group 2 received tween 80, group 3 received paraquat (15mg/kg) and group four received paraquat (15mg/kg) followed by quercetin (40mg/kg) after 30minutes. Anxiety levels were assessed using established behavioral tests (open field and elevated plus maze tests); depressive like symptoms were also assessed using the tail suspension test at the end of weeks 1 and 2 of drug administration, while oxidative stress markers (MDA, CAT and SOD) were analyzed after termination of the study. The results obtained showed a significant reduction in both anxiety-like and depressive like behaviors and an increase in antioxidant activity in rats treated with quercetin, suggesting a modulatory role of quercetin in alleviating mood alteration and oxidative changes associated with parkinsonism.

**Keywords:** Parkinsonism, quercetin, paraquat, depression, anxiety, oxidative stress.