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Evaluation of Different Aphrodisiac Therapy Effect by Using Some Biochemical Parameters in Female Wistar Albino Rats

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Since ancient times, humans across diverse tradition, cultures and religious background have shown keen interest in traditional herbal products which enhance sexual ability, pleasure and libido as well as improving sexual functions and potency. The use of herbal aphrodisiacs among men and women in Nigeria is on the high side.

This research aimed to study the effect of *Mi jian fen* (MJF) (a foreign aphrodisiac) and *Tsumin marke* (TM) (a local aphrodisiac) on female libido. The research also aimed at determining the possible effects of MJF and TM on some toxicological parameters.

Eighteen Female wistar albino rats were selected randomly and assigned into six groups of three animals each. Group A served as the control group. Group B served as the standard rats in this

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group were given 0.2mg/kg dose of Clomid. Groups C and D were given low (0.2mg/kg) and high (0.4mg/kg) doses of MJF respectively. Groups E and F were given low (0.2mg/kg) and high (0.4mg/kg) doses of TM, respectively. All treatments were administered for a period of thirty days after which rats were sacrificed and blood samples collected. FSH, LH, Estrogen, ALT, AST, ALP, Urea, Creatinine and Hematological parameters were assayed using standard methods.
At the end of the analysis, it was observed that the levels of LH increased significantly ($p<0.05$) in all the groups that were treated with high and low doses of MJF and TM, likewise FSH and estrogen. AST and ALT were slightly increased in all test groups while ALP was increased significantly ($p<0.05$) in all test groups. Urea increased significantly ($p<0.05$) in all test groups while creatinine increased slightly in all test groups.
The results obtained confirmed MJF and TM to be potent aphrodisiacs. However, MJF shows to be a bit more libido enhancer them TM. The toxicity of MJF on the liver and kidney of the animals seem to be higher compared to that of TM. It is then concluded that long term usage of these substances could lead to clinical complications among human users.

Keywords: Aphrodisiac; libido; Mi Jian Fen (MJF); Tsumin Marke (TM).

1. INTRODUCTION

"The increasing widespread use of traditional medicine has prompted the WHO to promote the integration of traditional medicine and complimentary or alternative medicine into the national health care systems of some countries and to encourage the development of national policy and regulations as essential indicators of the level of integration of such medicine within a national health care system" (WHO, 2011). "The plant materials include seeds, berries, roots, leaves, bark or flowers" [1].

"An aphrodisiac is a substance that increases sexual desire" [2]. "Many foods, drinks, and behaviors have had a reputation for making sex more attainable and/or pleasurable" [3]. "The name comes from *Aphrodite*, the Greek goddess of sexuality and love, and substances are derived from plant, animal or mineral and since the time immemorial they have been the passion of man. Men and women alike have continued to use aphrodisiacs whether or not these drugs have any scientific basis of truly improving sexual satisfaction without regards to their composition" [3]. "For centuries men and women have attempted to enhance their sexual experiences with a variety of chemicals" [3]. "There is a rich history in all cultures of using substances derived from plants and animals, as well as synthetic materials, to change the sexual experience. Aphrodisiac can be classified by their mode of action into three types, those that can increase libido, potency or sexual pleasure" [3].

"Ficus sycomorus (*F. sycomorus*), also known as fig-mulberry belonging to the family of moraceae is a semi-deciduous tree that grows up to 20 -21 m tall, not exceeding 46 m" (Okpara *et al*., 2017). "Aqueous extract of *F. sycomorus* stem bark and other parts of the plant have been reportedly used traditionally to treat infertility and sterility in humans and animals in parts of Africa" [4,5].

Its common names in English include: Stranglerfig, Sycamore, sycamore fig, and bush fig. Locally, it is called Baure in Hausa, "Epin" (Yoruba) and Tarmur in Kanuri (Wakili et al., 2019).

Anogeissus leiocarpus locally known as '*Marke*' in Hausa language and commonly called African birch or axle-wood [6] is a deciduous tree species that can grow up to 15–18 m of height and measure up to 1m diameter. Bark greyish, scaly.

Many traditional uses have been reported for the plant. In Sudanese traditional medicine the decoction of the barks is used against cough [7]. "Rural populations of Nigeria use sticks for orodental hygiene, the end of the sticks are chewed into fibrous brush which is rubbed against teeth and gum" [6]. "Ivory Coast traditional practitioners use the plant for parasitic disease such as Malaria, Trypansomiasis, Helminthasis and dysenteric syndrome" [8]. "In Togolese traditional medicine it used against fungal infections such as dermatitis and Mycosis, also the decoction of leaves is used against stomach infections" [9]. "The plant is also used for the treatment of diabetic ulcers general body pain, blood clots, asthma, coughing and tuberculosis" [6].

Mi Jian Fen Power Female Products Description Spanish Female Sex Powder Mijianfen is the latest female aphrodisiac imported in Spain, also known as “MiJianFen”.The product is a kind of powder containing powerful formula (Personal contact, 2022)

“It will work in 5 minutes before sex and bring you a strong sexual desire instantly, as well as breast inflating, fully activating the strong sex desire women to man” (Personal contact, 2022). The product does not contain any hormones and mental paralysis composition, long-term use, non-toxic non-addictive, safe and reliable.

“Clomiphene citrate (CC), a selective oestrogen-receptor modulator, used for treatment for infertile women” [10]. “It works to induce ovulation by inhibiting negative, endogenous, oestrogen-feedback on the hypothalamic-pituitary axis, resulting in increased FSH secretion, follicular growth, and ovulation” [11]. “On the other hand, uses of clomiphene citrate was accompanied with many adverse effects, such as ovarian enlargement, vasomotor flashes, nausea, vomiting, breast discomfort, headache, abnormal vaginal bleeding, visual symptoms, weight gain and shortness of breath” [12,13], reported that CC induced acute pancreatitis. It also caused myocardial infarction [14], hypertriglyceridemia [15], deep vein thrombosis [16] and pulmonary embolism [17]. “Clomiphene citrate has been shown to cause ovarian and uterine abnormalities” [18].

“Open discussions concerning sex and sexual activities are considered as taboo on private and as such, aphrodisiac usage is something that is talked about in low tones especially among women in our society” [3]. “In the course of improving sexual performance, some married men chose to use aphrodisiac herbs as a source of improving sexual pleasure and activeness, culturally referred to as fixing their marriage. The aphrodisiac is getting increasingly popular amongst young adults and sexually active men to enhance their sexual ability” [19]. Aphrodisiac herbs are increasing in our society because every woman expects that their men are “capable” sexually [20]. The herbs are prepared in different forms. There are local variants such as a mixture of local gin and herbs (Agbo Gbogbonise, Sepe or Paraga), Tsumi (a local concoction prepared in different ways using plant stem bark and other ingredients. There are also well packaged industrially made variants in packets of pills, or tablets such as “Spanish fly, Enpulse, Vimax, Virillis, M-Energex, High T, Male X “and those in liquid forms such as Alomo bitters among others. Due to the high utilization and in some cases abuse, of local aphrodisiacs among northern women, questionnaires were issued to married women in Keffi community to have an overview of the most popular and active aphrodisiac. Majority of the women confessed to the fact that the tsumi concoction is the most active widely used aphrodisiac as a result Hajiya Sa’iha Abdullahi (Personal contact, 2022) who is a user and a dealer of aphrodisiac was interviewed and the method for the preparation of TM was obtained.

1.1 General Objective

To study the effects some of commonly used aphrodisiacs in Nigeria on female libido and some toxicological parameters.

1.2 Specific Objective

To study the effects *Mi jian fen* (MJF) and *Tsumin Marke* (TM) aphrodisiacs on female libido and some toxicological parameters.

2. MATERIALS AND METHODS

2.1 Samples Collection and Preparation

Fresh stem barks that of *Ficus sycomorus* and of *Anogeissus leiocarpus* were purchased from Keffi market in Nassarawa state, they were identified and authenticated at the Department of Plant Science and Biotechnology of Nasarawa State University, Keffi. The stem barks were thoroughly washed with water to remove the adherent impurities and shade-dried.

According to the method described by Mrs. Sa’iha Abdullahi (personal contact, 2022) 50g of the *Ficus sycomorus* and 50*g of Anogeissus leiocarpus* was cooked with 1ltr of distiled water for 30minutes and then allow to cool. The decoction was filtered after cooling and stored in a clean plastic bottle.

The Clomifene and Mi Jian Fen aphrodiciac were also purchased from keffi market and identified by specialists.

2.2 Sampling Method and Sample Size Determination

Eighteen (18) adult female Albino rats weighing between 160 – 220g each were assigned randomly for the study. The rats were housed in cages of three rats each and allowed to

acclimatize to laboratory status for two weeks before the experiment commenced. Animals were maintained at room temperature and with a 12h light/12h dark cycle and allowed ad libitum access to water.

2.3 Study Design

A Completely Randomized Designed (CRD) was used with three replicates assigned to each group. Oral administrations standard diet and water for group 1 (control), 0.2 mg/kg of clomid group 2 (standard), 0.2 mg/kg of *Mi jian fen* group 3, 0.4 mg/kg of *Mi jian fen* group 4, 0.2 mg/kg *Tsumin Marke* group 5, 0.4 mg/kg *Tsumin Marke* group 6.

2.4 Biochemical Assay

After the administration for thirty (30) days, the rats were anaesthetized with diethyl ether and blood sample was collected with the aid of capillary tube via an ocular vein puncture into sample containers for biochemical analysis. The blood samples were centrifuged at 2000 rpm for 20 minutes and plasma was separated. The biochemical parameters including Alanine Aminotransferase (ALT) and Aspartate Aminotransferase (AST) were determined using the method of Reitman and Frankel (1957), Alkaline phosphatase was determined using commercial kit [21], Urea and Creatinine were determined using the method of Bartels and Bohmer (1972). Serum will be separated and assayed for Follicle stimulating hormone, Lieutinizing hormone and Estrogen using enzyme linked immunosorbent assay (ELISA) kits by the method of Tietz [22] following the manufacture's manual.

2.5 Statistical Analysis

Statistical analysis was performed with the Statistical Package for Social Sciences Software (SPSS; version 27.0). Differences between groups was examined by one-way ANOVA- test with mean and standard error of mean (M±S.E.M). P value ≤ 0.05 was considered as statistically significant.

3. RESULTS

3.1 Effect of Oral Administration of Clomid, Mi Jian Fen and Tsumin Marke on LH, FSH and Estrogen

The mean and standard deviation values of LH, FSH and estrogen for groups that were administered Clomid, Mi jian fen and Tsumin marke and their control are presented in Fig. 1. There was statistically significant ($P<0.05$) increase in the mean values of LH, FSH and estrogen in all the groups compared to the controls.

3.2 Effects of Oral Administration of Clomid, Mijian Fen and Tsumin Marke on Liver Function Parameters

The mean and standard deviation values of AST, ALT and ALP of rats that were administered Clomid, Mijian fen and Tsumin marke and their controls are presented in Fig. 2. There were slight increases in the mean values of ALT and AST in all test groups compared to the controls. A statistically significant ($P<0.05$) increase in the mean values of ALP in all test groups was observed compared to the controls.

3.3 Effect of Oral Administration of Clomid, Mijian Fen and Tsumin Marke on Kidney Function Parameters (Urea and Creatinine)

Fig. 3 showed the mean values of Urea and Creatinine for of rats that were administered Clomid, Mijian fen and Tsumin marke and their control are presented in Fig. 3. Statistically significant increase ($P<0.05$) was observed in the level of urea in all the test groups compared to the control. Creatinine level slightly increased in the all the test groups compared to the control.

4. DISCUSSION

Although there is an increased acceptance and utilization of medicinal plants worldwide, many are used without reference to any safety (Melanie, 1999). However, they are generally considered to be safe and effective agents [23]. Several researches have indicated that chemical substances including plant extracts could interfere with the concentration and function of sex hormones [24], likewise certain physiological fluids.

Estrogen is the main female gonadal hormone produced by the ovaries. Its importance for the maintenance of normal sexual behavior (libido) in females cannot be over emphasized. The neuroanatomical site at which oestrogen acts to facilitate sexual behavior (libido) has been reported to be the ventromedial nucleus of the hypothalamus [25]. The increase in the estrogen

levels in all the treatment groups may be linked to the induction of hormone synthesis by the granulosa cells of the growing follicles in the ovary, which enhanced the secretion of the hormone. This implies that the MJF and TM stimulated the mechanism intervening in the process of the hormonal synthesis in the granulosa cells and its secretion into the blood stream (Moundipa et al., 1999). Such increase in the estrogen concentration may account for the enhanced libido in the female rats following the administration of MJF and TM to the animals in the present study. Normal female reproductive functions depend on the secretion of LH and FSH by the pituitary gland under the influence of hypothalamic gonadotropin-releasing hormone (GnRH). In females, LH stimulates the theca cells of the ovaries to secrete testosterone while FSH induces the granulosa cells of the growing follicles to produce estrogen and also aromatase, an enzyme that converts testosterone to estrogen. The testosterone produced is then converted to estrogen by the aromatase. Therefore, the elevated levels of LH and FSH in this study may be ascribed to a stimulatory effect on the hypothalamic-pituitary axis; it suggests a progonadotropic and consequently effect on libido [26].

Liver enzymes are well known biomarkers for the prediction of liver toxicity and as such, have been used in scientific reports (Gray and Howorth, 1982) [27]. Available evidence show that damage to liver cells results in elevations of these enzymes in the serum and the measurement of enzyme activities is of clinical and toxicological significance in determining liver damage by toxicants or in diseased conditions [28,29]. The level of these enzymes in the blood is directly related to the extent of the tissue damage [28,29].

The slight increase in AST and ALT activities in all the test groups compared to controls indicates that the MJF and TM may have capacity to induce liver damage in all the test groups [12,13].

ALP level was observed to increase significantly in the groups that were administered Clomid, low dose of MJF and low dose of TM. Hepatic alkaline phosphatase are most densely represented near the canalicular membrane of the hepatocyte [30]. Obstructive diseases, bile duct obstruction, primary biliary cirrhosis are some examples of diseases in which elevated ALP levels are often predominant over transaminase elevation [30]. This then signifies a possible predisposal of these ailment by the substances users.

Although elevated levels of ALP have been associated with bone diseases, it is also an indicator for obstructive jaundice and intra-hepatic cholestasis [31]. Hence, the observed higher activities of the enzymes in the test groups relative to control, suggests that the Clomid, MJF and TM can induce hepatic cell damage and/or other diseases like osteotoxicity [18].

“Increasing serum creatinine and urea level is an important indicator of poor glomerular filtration and has been a significant clinical marker for renal dysfunction and loss of renal integrity” [32]. Creatinine as a definitive marker for kidney function, was observed to increase slightly in all test groups. As regards urea being an indicator for kidney disorder, the significant increase observed in the test group implies that the TM may contain some toxic components that are nephrotoxic which, according to Varely et al. [33], can be linked to the presence of increased toxic compounds in the blood.

“Clomiphen citrate (CC) works to induce ovulation by inhibiting negative, endogenous, oestrogen-feedback on the hypothalamic-pituitary axis, resulting in increased FSH secretion, follicular growth, and ovulation” [11]. As was observed from the result of this research, the substances used also acted in a similar manner as CC which suggest a similar mechanism of action of MJF and TM with CC [11].

On the other hand, uses of CC was accompanied with many adverse effects, such as ovarian enlargement, vasomotor flashes, nausea, vomiting, breast discomfort, headache, abnormal vaginal bleeding, visual symptoms, weight gain and shortness of breath [12]. Keskin et al., [13], reported that CC induced acute pancreatitis. It can also myocardial infarction [14], hypertriglyceridemia [15], deep vein thrombosis [16] and pulmonary embolism (Chamberlain and Cumming, 1986). Nagao and Yoshimura [18] reported that Clomiphene citrate has been shown to cause ovarian and uterine abnormalities. These observations can also be observed in the case of MJF and TM in long term users so also an effect on liver and kidney [34-39].

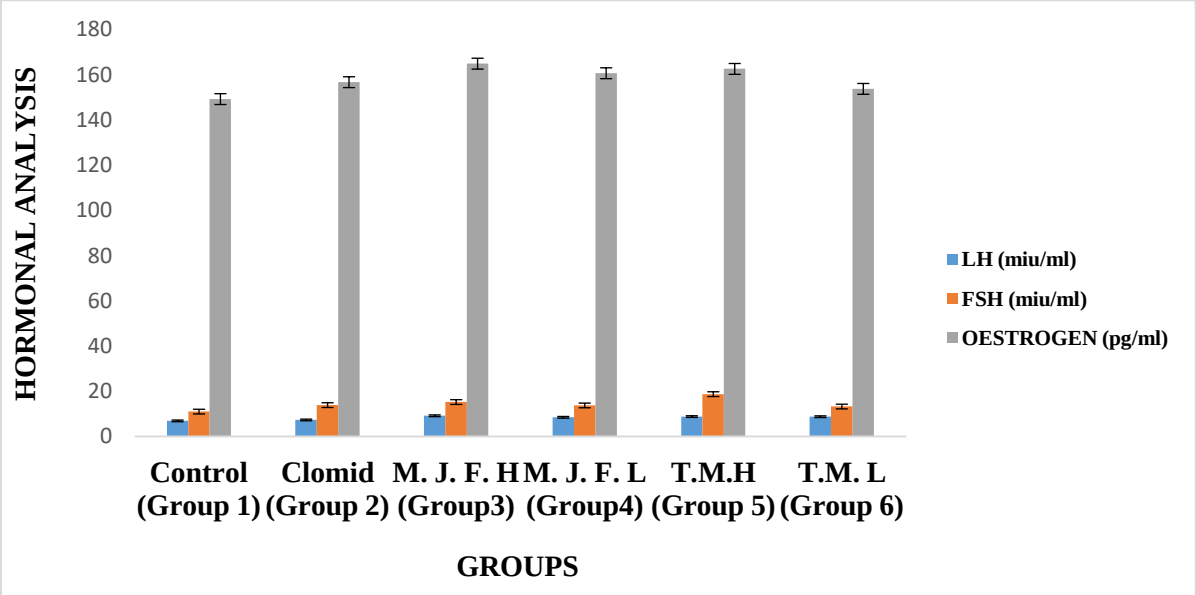

Fig. 1. Effects of oral administration of Clomid, Mi jian fen and Tsumin marke on LH, FSH and estrogen

Results are expressed as Mean ± SD, and are significantly different at p<0.05. Key: LH= Leutinizing Hormone, FSH= Follicle Stimulating Hormone, M.J.F.H= Mi Jian Fen High dose, M.J.F.L= Mi Jian Fen Low dose, T.M.H= Tsumin Marke High dose, T.M.L= Tsumin Marke Low dose

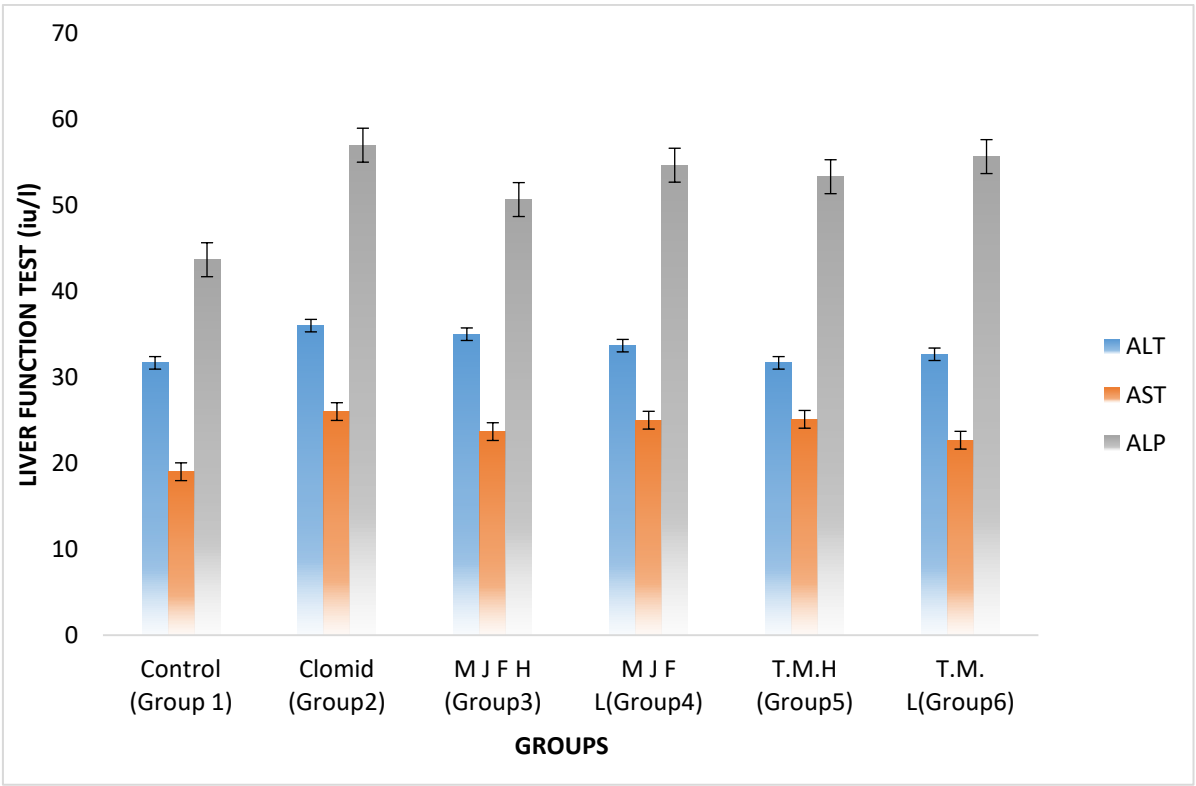

Fig. 2. Effects of oral administration of Clomid, Mi jian fen and Tsumin marke on liver function parameters

Results are expressed as Mean ± SD, and are significantly different at p<0.05. Key: AST = Aspartate amino transferase, ALT = Alanine amino transferase, ALP = Alkaline phosphate, M.J.F.H= Mi jian fen high dose, M.J.F.L= Mi jian fen low dose, T.M.H= Tsumin Marke high dose, T.M.L= Tsumin Marke low dose

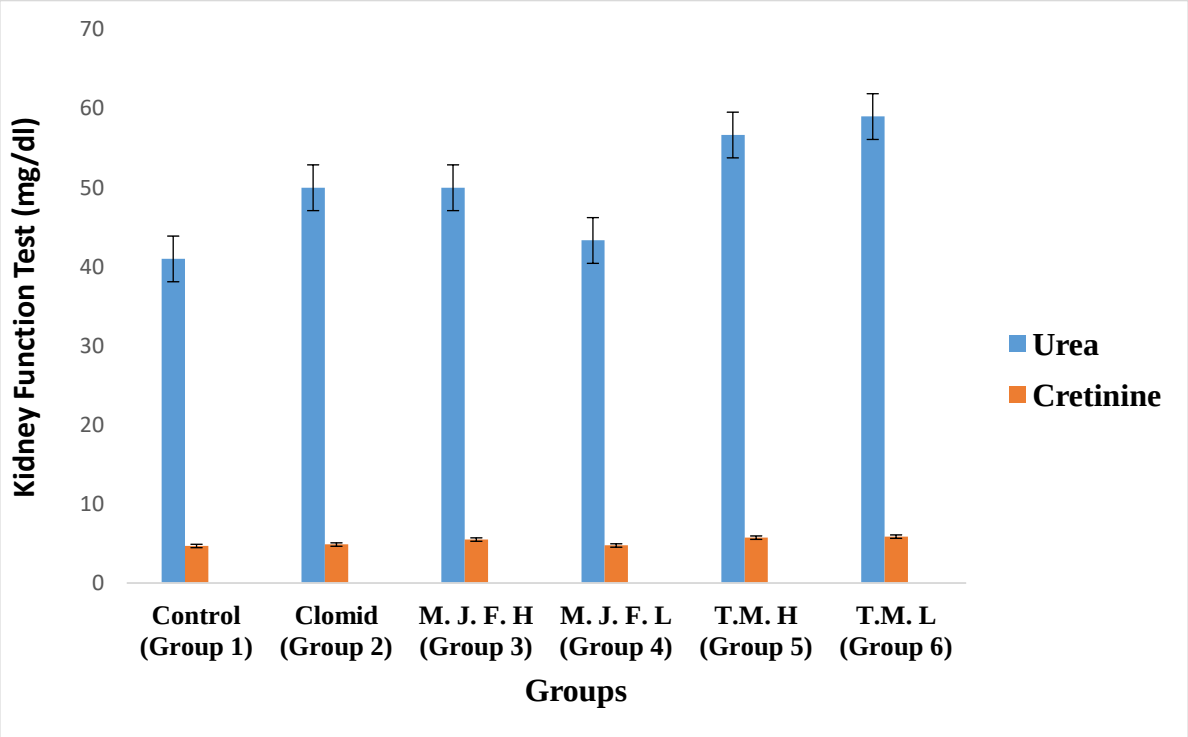

Fig. 3. Effect of oral administration of clomid, mi jian fen and tsumin marke on kidney function parameters (urea and creatinine)

Results are expressed as Mean ± SD, and are significantly different at p<0.05 Key: M.J.F.H= Mi jian fen high dose, M.J.F.L= Mi jian fen low dose, T.M.H= Tsumin Marke high dose, T.M.L= Tsumin Marke low dose

5. CONCLUSION

In conclusion, the study revealed that *Mi jian fen* and *Tsumin marke* possess estrogenic effect and a positive effect on LH and FSH. As was discussed, increased levels of estrogen, LH and FSH lead to enhanced libido, this then reveals that these substances have a positive effect on libido. However, MJF shows to be a bit more libido enhancer them TM. The toxicity of MJF on the liver and kidney of the animals seem to be higher compared to that of TM.

It is also observed from the result of this study that Clomid*, Mi jian fen* and *Tsumin marke* have an effect on liver, kidney and possibly the bone.

It is then clear from this research that MJF and TM can be recommended for women with low libido as a libido enhancement therapy.

ETHICAL APPROVAL

Ethical approval (REF: NSUK-ACUREC/BCH/23/04-13/01/2023) was sought and granted by the Ethical Review Committee Nasarawa State University Keffi.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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