

## Effect of some Traditional Alcoholic Beverages on Sexual Behavior of Albino Rats

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### Abstract:

**Background:** There are growing concerns regarding the production, distribution and uncontrolled use of alcoholic beverages in our society today. The effects of these traditional alcoholic beverages on the sexual behavior of male and female albino rats is the aim of the study.

**Materials and Methods:** A total of 60 normal albino rats (spaue Dawley strain) weighing 180-200g of about 12 weeks and were in different cages of thirty males (a) and females (b) respectively. These were randomly divided into five groups of six animals per cage and were administered with various doses of four freshly brewed local alcoholic beverages - goskolo, burukutu, pito and ogogoro purchased daily from the same commercial brewer for a period of 30 days. On day 31, the animals were placed in transparent glass cage and after an adaptation period of 10 minutes, sexually receptive females were presented to the males at a time by introducing them into the cage. Iordiosis display and receptivity were all observed. The total time spent by each female rat was 12 minutes while the following sexual behavior parameter were observed - Mount Latency, Intromission Latency, Number of Mounts without Intromission, Number of Mounts with Intromission, Ejaculation Latency and Mount Frequency.

**Results:** Pito administered albino rats did not exhibit any sexual disinhibitory effect in male rats, but significantly inhibited the female sexual motivation. The trend suggests a gradual but mild suppression of the quantity and quality of sperm cells in the male albino rats. In the burukutu fed albino rats, the trend suggests a mild to moderate sexual disinhibition in the male rats, while female sexual motivation suggest a suppression. The ogogoro fed albino rats, depict a trend that suggests a significant sexual disinhibition effect in the male rats, while female sexual motivation suggest an inhibitory effect, while in goskolo fed albino rats, the trend initially suggested an inhibitory effect.

**Conclusion:** The effect of traditional alcoholic beverages 'pito', 'burukutu', 'ogogoro', and 'goskolo' has revealed the classical effects of alcoholic drinks in that, they were able to cause sexual disinhibition in male rats and suppression of sexual motivation in female rats.

The sexual behavior of rats administered with these alcoholic beverages should be tested within more frequent intervals within longer duration and paired male and female rats in order to observe the possible reproductive outcomes are suggested.

**Key Word:** Fermentation; Mount Latency; Intromission Latency; Ejaculation Latency; Mount Frequency; two chambered model; sexual motivation test.

### I. INTRODUCTION

Reproductive toxicity is a hazard associated with some chemical substances that they will interfere in some way with normal reproduction. Such substances are called reprotoxin. Reproductive toxicity is defined as adverse effects of a chemical substance on sexual function and fertility in adult males and females, as well as developmental toxicity in the offspring<sup>1</sup>. Most studies of reproductive toxicity have focused on occupational or environmental exposure to chemical and their effects on reproduction (Kim and Scialli, 2017)<sup>2</sup>. It may be noted that consumption of alcohol and tobacco smoking are known to be reprotoxic (WHO, 2001)<sup>3</sup>. Alcohol is a depressant. After consumption, alcohol causes the body's systems to slow down. Often, feelings of drunkenness are associated with elation and happiness but other feelings of anger or depression can arise. Balance, judgment, and coordination are also negatively affected. One of the most significant short term side effects of alcohol is reduced inhibition. Reduced inhibitions can lead to an increase in sexual behavior (Crowe and George, 1989)<sup>4</sup>.

Historically and indeed till today, alcoholic drinks have played some important roles in religion and festivals. It has served as a source of energy and nutrition, for medicinal purposes such as analgesic, antiseptics<sup>5</sup>. It also facilitated relaxation; promoted conviviality and social bonding. Although certain social environments clearly facilitate alcohol intake in humans, the role of social factors in alcohol consumption by animals is less clear<sup>6</sup>. Most studies of reproductive toxicity have focused on occupational or environmental exposure to chemical and their effects on reproduction<sup>2</sup>.

It is rather much more complex and difficult for people to believe that agents that by virtue of cultural background and antecedence, have been part and parcel of their daily lives, to be termed poison, therefore the increasing rate of “Poisophilicity”: the love for poison’ among our people<sup>7</sup>. Alcohol has a strong causal relationship with sexual arousal and disinhibited sexual behavior in humans; however, the physiological support for this notion is largely lacking and thus a suitable animal model to address this issue is instrumental<sup>8</sup>.

The ethanol-associated sexual behavior appears to be due to expectancy (outcome based on learned anticipation) as well as pharmacological effects<sup>9</sup>. The relationships between alcohol consumption and sexual behavior are complex, with empirical support for causal relationships in both directions, and for shared causes of both behaviors, depending on the context and population<sup>10,11</sup>. Alcohol and sex deals with the effects of the consumption of alcohol on sexual behavior<sup>12</sup>. The effects of alcohol are balanced between its suppressive effects on sexual physiology, which will decrease sexual activity, and its suppression of psychological inhibitions, which may increase the desire for sex<sup>4</sup>. Psychologically, alcohol has also played a role in sexual behavior. It has been reported that women who were intoxicated believed they were more sexually aroused than before consumption of alcohol<sup>13</sup>. Alcohol's effects on sexuality were once thought to be determined solely by pharmacology. However, researchers now routinely distinguish between pharmacological and expectancy effects on post-drinking sexuality<sup>14</sup>. Survey studies of adult males in Western societies also have shown that alcohol consumption is associated with frequency of sexual behaviors on a global level<sup>15</sup>.

Nigeria is a big country with an estimated population of 182 million people<sup>16</sup>. And alcohol consumption is a well-known part of the Nigerian culture and also frequently part of festivals and celebrations<sup>17</sup>. The worry here is that the rate at which individuals engage in the consumption of locally brewed alcohol irrespective of age, sex, gender and status as observed in the urban and suburbs of the Nigerian central region calls for utmost attention, especially with increasing cases of rape diseases and other social vices. Available literature suggests that the global burden of disease with regard to both alcohol and unsafe sex is considerable<sup>12</sup>.

Although certain social environments clearly facilitate alcohol intake in humans, the role of social factors in alcohol consumption by animals is less clear<sup>18</sup>. The effects of these traditional alcoholic beverages on the sexual behavior of male and female albino rats is the aim of the study.

## **II. MATERIAL AND METHODS**

### **Experimental animal preparation and ethical consideration**

A total of 60 normal albino rats (*spaue Dawley* strain) weighing 180-200g of about 12 weeks were purchased from the Animal House of the University of Jos, Nigeria. The animals were made up of 30 each of male and female sex, fed with compressed grower mash (Vital Feed Nigeria) and allowed water *ad libitum* and housed in 12 standard plastic cages of 5 animals of same sex each for acclimatization for 72 hours prior to commencement of experiment.

### **Procurement of alcoholic beverages**

Four types of freshly prepared locally brewed alcoholic beverages - *goskolo*, *burukutu*, *pito* and *ogogoro* were purchased daily from the same commercial brewer in Angwan Rukuba (a settlement in Jos North LGA Nigeria) for the period of experiment. This was done to eliminate the errors of fermentation. The animals were maintained throughout of experiment in accordance with the recommendations of the guide for the care and use of laboratory animals as reported by (Tuhin *et al.*,<sup>19</sup>).

### **Procurement of experimental cage**

A two chambered model cage was constructed in Building Materials Market Jos, Plateau Nigeria, selectively modeled after the Two-chambered apparatus that utilized operant responding (nose poking)<sup>20</sup>. The apparatus is a dual compartment chamber constructed with both transparent and opaque glass. Three of the side of the chambers were made-up of opaque quarter inch thick glass. One long side (front of the chambers) was made of clear glass to allow the animals to be viewed. The smaller of the two compartment (female chamber) is 22cm wide, 30 cm deep and 45cm high while the larger compartment (the male compartment) measures 36cm wide, 30 cm deep, and 45cm high. A door hinges between the two compartments and it measured 12cm wide.

**Figure no1:** Two chambered model to test the sexual motivation of female rats



#### **Animal grouping and administration local alcoholic beverages**

All the sixty normal animals housed in different cages of thirty males (a) and females (b) respectively. These were randomly divided into five groups of six animals per cage and were administered with various doses of local alcoholic beverages as described by the methods of Wannang *et al.*,<sup>21</sup> and Oyedeji *et al.*,<sup>22</sup> as follows:

Group I (a) and (b) received 10mL/kg of *pito*

Group II (a) and (b) received 10mL/kg of *burukutu*

Group III (a) and (b) received 10mL/kg of *ogogoro*

Group IV(a) and (b) received 10mL/kg of *goskolo*

Group V(a) and (b) received 0.5mL/kg normal saline

Administration was done orally with the aid of a canula. The local alcoholic beverages were administered daily for 30 days.

#### **Sexual motivation test model**

On day 31, the animals were placed in transparent glass cage and after an adaptation period of 10 minutes, sexually receptive females were presented to the males at a time by introducing them into the cage. The female albino rats were exposed to this model to recognize that there is a door between the male and female chambers prior to the test. Male rats were then introduced into the transparent cage one after the other, restricted to only its chamber for 10 minutes after which the females were introduced to the female compartment while *latency to enter the male compartment through a hedge door, time spent in seconds in the female chamber, total time spent in seconds in the male chamber, iordiosis display and receptivity* were all observed. The total time spent by each female rat was 12 minutes. The cage was constructed in such a way that the female rat slid through the transparent door to the male compartment and travelled back to the female chamber through the same. The male was tethered to the corner of the chamber farther from the door by a strong roped vast attached to a removable point. The tethering allowed the male to exhibit the full complement of sexual behavior: mounting, intromission, ejaculation and chasing, while limiting his ability to cross into the female compartment. Furthermore, the following sexual behavior parameter were in accordance Ravindra *et al.*,<sup>23</sup> as below:

*Mount Latency (ML)*-Time duration (in second) from the introduction of the female into the cage till the first mount.

*Intromission Latency (IL)*- Time duration (in seconds) from the introduction of the female into the cage till the Intromission Vaginal Penetration (IVP).

*Number of Mounts without Intromission (NMWI)* - Number of mounts without vaginal penetration.

*Number of Mounts with Intromission (NMI)* -Number of mounts with vaginal penetration.

*Ejaculation Latency (EL)* - Time duration (in seconds) from the first intromission till ejaculation.

*Mount Frequency (MF)* - Total number of mounts preceding ejaculation.

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These is in accordance Ravindra *et al.*<sup>23</sup>.

### Statistical analysis

Statistical package for social sciences (SPSS) version 20 was used in analysis of experimental data<sup>24</sup>. All statistical comparisons were by analysis of variance (ANOVA) and student t-test used where needed. The level of significance chosen was  $p < 0.05$ .

The data obtained from all groups were compiled and statistically analysed and expressed as  $\text{mean} \pm \text{SEM}$ . Since we had parametric data differences between groups were compared using One-Way ANOVA and t-test with  $p < 0.05$  considered significance.

### III. RESULT

#### Traditional alcoholic beverages and sexual behaviour in male rats

Table no 1 shows that under the influence of some traditional alcoholic beverages, five parameters of sexual behavior were reported:

#### Mount Latency

Mount latency in seconds of control group was 1183.80, while the experimental (under the influence of local alcoholic beverages) were *ogogoro* (452.4), *pito* (1446) and *guskolo* (1462). Statistically, there was a significant difference in the results for the mean of the group of rats under the influence of *ogogoro* ( $P < 0.05$ ) when compared with the control group unlike that of *pito* and *guskolo* that showed no significant difference. Summarily, the order of increasing mount latency under the influence of traditional alcoholic beverages was *ogogoro* > *burukutu* > *pito* > *guskolo*.

#### Mount without intromission

This was 1.80 mounts for the control group, without intromission. However, under the influence of *ogogoro*, the group had an average 3.0 mounts without intromission, while the groups under the influence of *burukutu*, *pito*, and *guskolo* had averages of 3.20, 2.40, and 2.0 mounts without intromission respectively with the highest in *burukutu*.

#### Mount with Intromission

Results showed that there was no mount with intromission in the control and experimental groups.

#### Ejaculation Latency and Mount Frequency

All groups showed no results.

**Table no 1:** Effect of traditional alcohol beverages on sexual behaviour parameters in male albino rats

Behaviour/Group	Mean $\pm$ SD	t-test	P
<b>Mount Latency (S)</b>			
Control	1183.80 $\pm$ 385.44	-	-
<i>Ogogoro</i>	452.40 $\pm$ 337.16	4.19	0.013*
<i>Burukutu</i>	862.80 $\pm$ 386.84	1.31	0.226
<i>Pito</i>	1446.40 $\pm$ 353.60	1.12	0.294
<i>Guskolo</i>	1462.40 $\pm$ 337.60	1.22	0.259
<b>Number of mount without intromission</b>			
Control	1.80 $\pm$ 1.56	-	-
<i>Ogogoro</i>	3.00 $\pm$ 1.09	1.41	0.196
<i>Burukutu</i>	3.20 $\pm$ 1.36	1.51	0.169
<i>Pito</i>	2.40 $\pm$ 1.90	0.55	0.600
<i>Guskolo</i>	2.00 $\pm$ 1.80	0.19	0.856
<b>Number of mount with intromission</b>			
Control	0.00 $\pm$ 0.00	-	-
<i>Ogogoro</i>	7.40 $\pm$ 5.12	-	-
<i>Burukutu</i>	6.40 $\pm$ 3.25	-	-
<i>Pito</i>	0.20 $\pm$ 0.15	-	-
<i>Guskolo</i>	8.40 $\pm$ 6.60	-	-
<b>Ejaculation Latency</b>			
Control	-	-	-
<i>Ogogoro</i>	-	-	-

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<i>Burukutu</i>	-	-	-
<i>Pito</i>	-	-	-
<i>Goskolo</i>	-	-	-
<b><i>Mount Frequency</i></b>			
Control	-	-	-
<i>Ogogoro</i>	-	-	-
<i>Burukutu</i>	-	-	-
<i>Pito</i>	-	-	-
<i>Goskolo</i>	-	-	-

\*Significantly different from control

**Traditional alcoholic beverages and sexual behaviour in female rats**

Table no 2 depicts the following:

**Latency of the female to entry into the male chamber**

Rats under the influence of LAB (*pito* and *burukutu*) had a period of 99 seconds while control group had 48.8 seconds. The *ogogoro* and *goskolo* administered groups was 77.60 second and 92.40 second respectively. The results showed a significant difference in the mean latency time for rats fed with *burukutu*, *pito*, *goskolo* ( $p<0.05$ ) by increasing the mean time of entrance into the male chamber. However, there was no significant difference for the *ogogoro* when compared with the control group. The order of increasing latency to approaching the male chamber was Control>*ogogoro*>*goskolo*>*burukutu*>*pito*.

**Mean time spent with the male**

The control group had the highest 605.00 seconds followed by *burukutu* (571.80 secs), *pito* (488.40 secs), *goskolo* (463.40 secs) and lowest with *ogogoro* (428.20 secs). While *ogogoro*, *pito* and *goskolo* administered groups significantly reduced the quantity and quality of time the rats spent for interaction at ( $p<0.05$ ) on the contrary, the group fed with *burukutu* did not achieve a significant effect when compared with the control rats. Similarly, the time spent in the female chamber in avoidance of sexual advances from the male was seen to be significant for the *ogogoro*, *pito* and *goskolo* ( $p<0.05$ ) while *burukutu* showed no significant difference when compared with the control group of rats. The order of time spent in male chamber in decreasing order was Control<*burukutu*<*pito*<*goskolo*<*ogogoro*.

**Table no 2:** Effect of traditional alcohol beverages on sexual behaviour parameters in female albino rats

<b>Behaviour/Group</b>	<b>Mean±SD</b>	<b>t-test</b>	<b>P</b>
<b><i>Latency to enter male chamber (S)</i></b>			
Control	48.80±13.09	-	-
<i>Ogogoro</i>	77.60±45.72	1.25	0.213
<i>Burukutu</i>	99.00±26.73	3.77	0.005*
<i>Pito</i>	99.00±52.61	3.54	0.008*
<i>Goskolo</i>	92.40±11.75	5.54	0.001*
<b><i>Time spent in female chamber (S)</i></b>			
Control	114.80±31.67	-	-
<i>Ogogoro</i>	292.60±82.50	4.50	0.002*
<i>Burukutu</i>	148.20±15.91	2.11	0.068
<i>Pito</i>	231.60±75.89	2.18	0.013*
<i>Goskolo</i>	256.60±40.98	6.12	0.001*
<b><i>Time spent in male chamber (S)</i></b>			
Control	605.00±31.67	-	-
<i>Ogogoro</i>	428.20±82.73	4.47	0.002*
<i>Burukutu</i>	571.80±15.91	2.11	0.068
<i>Pito</i>	488.40±75.89	3.18	0.013*
<i>Goskolo</i>	463.40±40.98	6.12	0.001*

\*Significantly different from control



#### IV. DISCUSSION

According to our findings, the effects of some samples of some traditional alcoholic beverages on the sexual behaviour of male albino rats suggests that *ogogoro*, and *burukutu* produced disinhibitory effect while rats fed with *pito* suggests that there was no change in the inhibition usually experienced by non-consumers of alcohol. Surprisingly, the *guskolo* fed rats which initially suggested what seems to inhibition, later gave way to clear expressions of disinhibition. Although, *burukutu*, *guskolo* and *pito* did not show a statistically significant effect on the sexual behaviour of the male albino rats, there was pronounced trend that showed disinhibition *viz* shortness of the mount latency, more numbers mount and intromissions and much more for *ogogoro* fed rats which was statistically significant. On the hand, there was inhibition for *pito* administered rats showing longer mount latency, less number of mounts and intromission. Further still, the trend suggests an indication of disinhibition for *ogogoro*, *burukutu*, and partly for *guskolo*, and inhibitory effect for *pito*. Interestingly it was only *pito* that showed an inhibitory effect contrary to <sup>4, 25</sup> which allured that alcohol ingestion disinhibit physiological sexual arousal and suppress physiological arousal and suppresses physiological responding.

In addition, our study showed that *pito*, *burukutu*, *ogogoro* and *guskolo* lowered the physiological arousal and decreased sexual motivation in female albino rats. In other words, the consumption of these alcoholic beverages tend not to result in disinhibition of sexual behaviors nor did it facilitate sexual encounter, but rather suggest an increase in the threshold for achieving disinhibition and sexual arousal which is in agreement with <sup>26, 27</sup> that suggested alcohol ingestion in female does not affect arousal and disinhibition as found in males, but rather suppress them. These may be as result of the fact that alcohol may cause the body's system to slow down, often associated with drunkenness, which be the reason for the suppression of desire.

Furthermore, female the body is made up higher body fat and less water, which may explain the impact of suppression or a slowdown of sexual desire as seen in our research indicating that alcohol will stay longer in a fat rich environment <sup>4</sup>. The opposing allusion that alcohol increase arousal in female for sex may just be a perception of experience by a minority <sup>13</sup>.

#### V. CONCLUSION

The effect of traditional alcoholic beverages '*pito*', '*burukutu*', '*ogogoro*', and '*guskolo*' has revealed the classical effects of alcoholic drinks in that, they were able to cause sexual disinhibition in male rats and suppression of sexual motivation in female rats.

The sexual behavior of rats administered with these alcoholic beverages should be tested within more frequent intervals within longer duration and paired male and female rats in order to observe the possible reproductive outcomes are suggested.

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