

**WEIGHT CHANGES INDUCED BY INGESTION OF ALOMO BITTERS (A COMBINATION OF HERBAL CONSTITUENTS): EXPERIMENTAL STUDY ON WISTAR RATS**

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**ABSTRACT**

This study investigates Weight changes induced by ingestion of Alomo bitters (A combination of herbal constituents): Experimental study on Wistar rats. The sixteen Wistar rats ( $151.67 \pm 2.89$  grams) involved in the study were divided into four groups; a control (Group A) and three test groups (B, C and D). For 3 weeks, group A (control) received normal feed (growers mash) with distilled water only, while groups B-D (test) received normal feed with water mixed with graded quantities of Alomo Bitters: B (7.5ml/kg), C (15ml/kg) and D (22.5ml/kg). Comparatively, the results showed that body weight gain was highest in the test groups (B-D) in a dosage duration fashion and lowest in the control group ( $22.40 \pm 11.21$ g). Also, a non-significant variation in organ-weight was observed for the testis. The observed changes on body weight and weights of the liver, kidney and testis were dosage and duration dependent. Thus, *alomo bitters* may be important in weight and appetite management considering its effect on body weight. However, further investigations are required in this regard.

**Keywords:** *Mondia whitei, Herbs, Weight, Obesity, Appetite, Public Health issues.*

Received: 12<sup>th</sup> July, 2012

Accepted: 20<sup>th</sup> August, 2012

Published: 31<sup>st</sup> October, 2012

**INTRODUCTION**

The human body system itself has a measure of developing a defensive mechanism that enables the storage of energy thereby increasing the chance of survival during food scarcity/shortage and prolonged starvation and this is done by storing the excess food in form of fat (Keith, 2007).

However, this may lead to excessive weight gain which is attributed to diverse health complication (Akpamu et al., 2011). According to Barness et al. (2007), Kopelman and Caterson (2005) and WHO (2000), weight complication is reported as a leading preventable cause of death worldwide with increasing prevalence in adults and children with increasing negative impact ranking high on the health care profile.

Although overweight and obesity is passive as an alien occurrence or a more western occurrence which is not common in developing countries but it is fast becoming our next door neighbor (Seidell, 1995). However, many literatures has attributed the cause of obesity to decrease physical activities and increase

energy intakes as the main factor which boils down to life style (Adams and Murphy 2000, Westerterp et al., 2006, Kushner, 2007)

Moreover, obesity is known to be a leading factor to a number of co-comorbidities like coronary heart diseases, non-insulin dependent diabetes mellitus, pulmonary dysfunction, osteoarthritis and certain types of cancers (Haslam and James, 2005), hyperlipidemia and fatty liver (Lau et al., 2007).

In light of all these, management of obesity still remain a problem faced worldwide as a public health issue. In accordance to Hermanussen et al. (2001), obesity is not a problem only the obsessed faced as individual alone or in isolation but appears to be a characteristic feature of modern population as a whole. Fat deposition, which is a defensive mechanism for the substance of life in the case of food survival is now posing a dangerous treat to life itself as it become a death toll in the health system (Akpamu et al. 2011)

However, the science of nutrition is said to play a significant role in preventive medicine and maintenance of health (Akpamu et al., 2011, Clifford, 2000), herbs and spice have also been reported to be of utmost advantage for the management of obesity and overweight (Clifford, 2000). Of interest in this study is Alomo bitter, an alcoholic beverage which is a combination of several herbs in alcohol. The complex combination of spices and additives (herbs) has become the subject of several scientific investigations (Nwaopara et al., 2009).

## MATERIALS AND METHODS

**Experimental animal and grouping:** Sixteen adult male Wister rats of comparable weight ( $151.67 \pm 2.89$  grams) and sizes were procured from the animal farm of the Department of Physiology, College of Medicine, Ambrose Alli University, Ekpoma, and moved to the site of the experiment (animal house of Anthonio Research Centre) where they were housed in wooden cages. They were assigned into four groups; a control group (A) and three test groups (B, C and D). The rats were allowed to acclimatize for two weeks, during which they were fed *ad libitum* with water and Feed (grower mash from Bendel Feeds and Flour Mills, Ewu, Edo State, Nigeria).

**Study duration:** The duration for this study was five weeks (2weeks for acclimatization and 3 weeks for animal treatment). During the 5-week period, the animals were fed and monitored between the hours of 8:00am – 12:00 noon.

**Substance of study:** The bottle of “Alomo bitters” was purchase from a shop at the popular market square in Ekpoma, Edo State, Nigeria with NAFDAC registration number, A1-8029, the manufacturing date, 14/10/2010, batch number ALM 287101 and no expiration date was found on the bottle. This was checked to ensure the authenticity of the product.

**Substance preparation and administration:**  
**Instrument of Administration of Alomo bitter:** The Alomo bitter was administered using a sterile syringe of 20ml gauge in order to conveniently measure the appropriate ml. Each measurement was done in accordance to the measurement required per group and administered into the drinking water of the animals in the groups respectively.

**Substance Administration:** All the animal groups were fed with feed (growers mash) plus water given *ad libitum*. However, as group A (control) received distilled water only, test groups B to D received

water mixed with graded quantities of Alomo Bitters: B (7.5ml/kg), C (15ml/kg) and D (22.5ml/kg).

**Sample collection and analysis:** At the end of each week, the rats in each group were weighed and the average recorded accordingly. At the expiration of 3 weeks, the animals were scarified to obtain selected organs for measurement using the electric balance (Denver Company USA 200398). The average weights were determined and recorded.

**Data analysis:** All the data collected were then subjected to statistical analysis using SPSS (version 17). The test groups’ values were compared with the control using ANOVA (LSD) at 95% level of confidence.

## RESULTS

Table 1 presents the physical observations of the experimental animals and control after the 5 weeks study. The body weights recorded for the control and experimental rats at various times are as shown in *table 2*. Weight gain was presented in both the control and treatment groups; however, those of the tests were more enhanced. Also, the patterns of body weight changes in the treatment groups were directly proportional to dose and duration. Comparatively, these enhanced weight gain were not significantly different ( $p \geq 0.05$ ) compared to the control rats at various stages of weight measurement.

Similarly, organ-weight values are as presented in *Tables 3*. The liver presented an increase in weight in a dose depended fashion and was significantly different ( $p < 0.05$ ) in test group C ( $6.05 \pm 0.22$ g) and test group D ( $6.52 \pm 0.20$ g) compared with the control ( $5.12 \pm 0.88$ g). Although the weights of the kidneys were increasing as dose of Alomo bitter increases, there were no significant changes ( $p > 0.05$ ) in their weight. On the other hand, although greater than the control, non significant ( $P > 0.05$ ) varying weights of testis were observed with increased dose of Alomo bitter.

## DISCUSSION

In the present investigation, acute ingestion of *Alomo bitters* does not cause any toxicity. However, the non significant increase in body weight may suggest its significance in the management of “weight and appetite”. It is interesting however, that weight increase was associated with increase feed intake by the experimental rat. Although the mechanism for this appetite- stimulating potential of Alomo bitters is

not yet known. As such, the role of the constituents in the substance of study as well as dosage and duration of ingestion cannot be ignored.

**Table 1: Physical observation of control and experimental rats during treatment with Alomo bitters**

Physical observations	Group A (Control)	Experimental groups		
		Group B	Group C	Group D
Skin Changes	-	-	-	-
Fur Changes	-	-	-	-
Eyes	-	-	-	-
Behaviour pattern	-	-	-	-
Tremors	-	-	-	-
Salivation	-	-	-	-
Diarrhoea	-	-	-	-
Death	-	-	-	-

Key: -Absent

**Table 2: Body weight (g) recorded by control and experimental rats during acute treatment study with Alomo bitter**

Groups	WBA (g)	WBE (g)	WAW1 (g)	WAW2 (g)	WAW3 (g)	AWAE (g)	WG (g)
<b>A (control)</b>	151.67 ± 2.89	170.67 ± 6.03	176.00 ± 6.93	183.33 ± 7.64	188.67 ± 4.16	174.07 ± 14.10	22.40 ± 11.21
<b>B (test 1)</b>	153.33 ± 2.89	171.67 ± 2.89	178.00 ± 6.25	183.33 ± 5.77	188.33 ± 12.58 <sup>b</sup>	174.39 ± 13.90	21.06 ± 11.01
<b>C (test 2)</b>	151.67 ± 2.89	170.00 ± 5.00	180.33 ± 2.52	188.33 ± 10.41	201.67 ± 2.89 <sup>a</sup>	178.40 ± 18.13	26.73 ± 15.24
<b>D (test 3)</b>	150.00 ± 0.00	171.67 ± 2.89	181.67 ± 0.89	190.00 ± 8.66	201.67 ± 2.89 <sup>b</sup>	179.00 ± 18.54	29.00 ± 18.54

Values are mean ± standard deviation; mean in a column having different superscript indicate significant different (p ≤ 0.05); WBA = Weight Before Acclimatization; WBE= Weight Before Experiment; WAW= Weight at week; AWAE= Average weight After Experiment; WG= Weight gain (AWAE-WBA)

**Table 3: Organ mass (g) changes by control and experimental rats after acute treatment with Alomo bitter**

Group	Liver (g)	Kidney (g)		Testis (g)	
		Left	Right	Left	Right
<b>A (control)</b>	5.12 ± 0.88 <sup>a</sup>	0.49 ± 0.05	0.49 ± 0.05	1.11 ± 0.26	1.08 ± 0.19
<b>B (test 1)</b>	5.78 ± 0.11 <sup>ab</sup>	0.50 ± 0.09	0.49 ± 0.06	1.25 ± 0.21	1.26 ± 0.22
<b>C (test 2)</b>	6.05 ± 0.22 <sup>b</sup>	0.54 ± 0.03	0.50 ± 0.04	1.18 ± 0.14	1.27 ± 0.58
<b>D (test 3)</b>	6.52 ± 0.20 <sup>b</sup>	0.56 ± 0.04	0.53 ± 0.03	1.26 ± 0.04	1.25 ± 0.13

Values are mean ± standard deviation; mean in a column having different superscript indicate significant different (p ≤ 0.05)

Furthermore, the increased in testicular weight agrees with the study reports of Watcho et al., (2004) on *mondia whitei* (one of its major constituent) and thus,

supports its androgenic, aphrodisiac and male fertility significance (Lampiao, 2009). Moreover, in rats, increase in serum testosterone or treatment with

androgens is associated with increased secretory activity and increased organ weight (Dewan et al, 2000; Gonzales, 2001; Gundidza et al., 2009; Venter et al., 2009; Sumalatha et al., 2010). Although the observed weight changes in the kidneys were not significant. There is a need however for further studies. On the other hand, the increased significant weight changes in the liver may suggest liver toxicity and hence, further investigation on the histology of the liver.

Considering therefore, the strong link between regulation of food intake having direct bearing to body weight and obesity (Graham et al, 2011), diabetes mellitus, dyslipidemia, hypertension and ischemic heart disease (Modan et al., 1985; NCEP, 1990), the observed weight increase potential of Alomo bitters on weight require thorough evaluation.

Specifically, the results of this study suggest that Alomo bitters can be used to induce appetite, androgenic stimulation and weight management. However, the effect on the liver requires further investigation considering the significant weight changes.

## ACKNOWLEDGEMENT

Our special thanks to all whom in one way or the other contributed to the success of this research and the presentation of the article.

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#### **AUTHORS' CONTRIBUTIONS**

Bankole JK., supervised this research. Okon AU., and Okpidu EE., were involved in the daily supervision of experiment (that is substance administration, feeding and care of the laboratory animals). Okhai O, Idehen C, Iyiola S, and Bankole SO provided necessary assistance.