

## Efficiency of *Taraxacumofficinale*(Dandelion) leaf Extract in alleviating Ulcer Occasioned by long ingestion of Non-Steroidal Anti-inflammatory Drug (NSAID) in Wister Rats.

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**Abstract:**The main objective of this study is to investigate the potentials of aqueous extract of *Taraxacumofficinale* leaf on injury occasioned by the long ingestion of Non-Steroidal Anti-inflammatory Drug (NSAID) Ibuprofen, in wistar rats. Rats weighing between 108 – 200g were used for the study. The ulcer was confirmed by administering 20mg/kgbw of the NSAID for 3 days. The rats were randomly divided into five (5) groups. Group 1 rat received distilled water that served as the normal control; group 2 animal had no treatment (Ulcer Control), group 3 received 20mg/kgbw Omeprazole (Reference drug), while group 4 and 5 rats were treated with 250mg/kgbw and 500mg/kgbw of plant extract administered orally for 14 days. The rats were sacrificed after Day 1, Day 7 and Day 14 of extract administration. The ulcer area (mm<sup>2</sup>), gastric mucus weight, ulcer index and percentage inhibition were determined. The ulcer control group exhibited severe mucosal injury with an ulcer index value of 5.77± 0.5, low mucus weight of 41.70 and 1.49 and reduced percentage inhibition of 18.53± 2.56 compared to the normal control group. Rats administered with 250mg/kgbw of Omeprazole and those administered with 500mg/kgbw of plant extract showed significant decrease ( $P < 0.05$ ) in the ulcer area and ulcer index with a corresponding increase in mucus weight and percentage inhibition respectively compared with the ulcer control group. Gastric homogenates evaluation revealed a significant reduction ( $P < 0.05$ ) in the lipid peroxidation (MDA) level and an increase in the glutathione (GSH) activity in the Omeprazole and plant extract treated groups. Histological studies of the gastric walls of plant extract treated rats showed marked reduction of leucocyte infiltration of the mucosal layer in contrast to the ulcer control group. Results obtained in the present study are suggestive of the fact that *Taraxacumofficinale* contains anti-oxidant phytochemical properties that may be responsible for the ameliorative and regenerative effect of the gastric mucosa injury induced by the ulcer causing Non-steroidal Anti-inflammatory Drug.

**Keywords:** *Taraxacumofficinale*, Ulcer, Non-Steroidal Anti-Inflammatory Drug, gastric Mucosa, ulcer.

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### I. Introduction

Ulcer is one of the common gastrointestinal diseases caused by distortion between the gastric acid secretion (offensive) level and the gastric mucosal integrity (defensive) (Laine *et al.*, 2008). The imbalance between offensive and defensive factors can be attributed to several reasons including Stress, Ingestion of Non-Steroidal Anti-Inflammatory Drugs (NSAID), smoking, *Helicobacter Pylori* etc (Vonkeman *et al.*, 2007).

Synthetic drugs have been used to lessen or alleviate the pains of the ulcerations, but such drugs have been researched to have side effects that are damaging to other organs of the body (McQuaid 2000 and Shirode *et al.*, 2008).

*TaraxacumOfficinale* (Dandelion) is one of the many plants used by alternative medicine practitioners for the treatment of diverse disease. Traditional /alternative type of medicine have utilized natural plants with a great variety of bioactive chemical compounds isolated and characterized for the treatment of diseases (Elizabeth *et al.*, 2013, Schmeda – Hirschman and Yesilade, 2005).

Investigations on the bioactive components of medical plants reveal the pharmaceutical potentials that can lead to their use as cure for diseases (Akhtar 1995 and Lima *et al.*, 2006). Among these medicinal plants is *Taraxacumofficinale* (dandelion) which has been widely used by Ayurvedic physicians (Dale, 2000 and Amin Mir *et al.*, 2013). In folk medicine the plant is used in the treatment of hepatic disorders, inflammation and widely used as diuretic, choleric, cancer and digestive stimulants (Grieve 2008, Bcredi *et al.*, 2010 and 2013). *TaraxacumOfficinale* is an herbaceous perennial plant of the Asteraceae family, native to Asia, it is found in temperate regions of Europe and North America (Amin Mir *et al.*, 2013).

The young leaves of dandelion are used to make delicious sandwiches; the older leaves can be cooked, drained and eaten as spinach-like pot herb. The root can be peeled and boiled or dried and pounded to powdered form as a substitute to coffee. The Chinese physicians have long used the roots to cure cold, bronchitis, pneumonia, hepatitis, dental problems, pre-menstrual problems and to reduce high blood pressure (Leny 1984).

Recent research revealed that the bioactive components in the plant include phenolic acid compounds like caffeic acid, chlorogenic acid, alkaloids such as protopine, cryptopine, tannins such as tannic acid (Williams *et al.*, 1996). Dandelion leaves is richly composed in minerals like iron, calcium, potassium magnesium, phosphorous. Present in the plant also are vitamins A, C, and B, vitamins of thiamine and riboflavin (Jackson, 1982). The conspicuous bitter taste of the leaves and root is due to the presence of *sesquiterpene lactones* (Kuusi, 1985). Studies on the effects of different extracts of *Taraxacumofficinale* with respect to hormone detoxification, lymphocyte populations or body tissues indicate that the plant is capable of modulating immune reactions (Greenlee *et al.*, 2007 and HU, 2005).

Omeprazole is one of the several drugs used for the treatment of ulcer. It functions as a proton pump inhibitor by blocking the enzymes of the mucosa responsible for the secretion of gastric acid. Inhabitation of the gastric acid thus decreases the acid concentration, thereby allowing the stomach to regain its integrity.

Omeprazole is used in this study as the reference anti-ulcer drug to compare with *Taraxacumofficinale* extract. The Omeprazole was orally administered to experimental animals in concentration of 20mg/kgbw suspended in 5ml/kg distilled water (Pedemera *et al.*, 2006).

Ibuprofen is a Non-Steroidal Anti-Inflammatory Drug (NSAID) amongst several others that cause serious gastrointestinal injury including inflammation, bleeding, ulceration and perforation of the stomachs, small or large intestine, which can be very fatal (Sultana *et al.*, 2014). Studies show that the NSAID inhibit the synthesis of prostaglandin by blocking the pathway of the prostaglandin pressure Arachidonic acid catalyzed enzymes, cyclooxygenase 1 and 2 (cox- 1 and cox – 2), resulting to side effects such as duodenal and gastric ulceration (Whittle, 1981). The ibuprofen was obtained in the same pharmacy drug store in Yenagoa, Bayelsa State, Nigeria.

## II. Materials And Methods

### Drugs

Omeprazole and Ibuprofen were purchased from a pharmacy drug store in Yenagoa, Bayelsa State, Nigeria.

### Plant Specimen and Extract Preparation

Fresh Dandelion (*Taraxacumofficinale*) leaves were harvested from a bush farm in KaiamaKolokuma/Opokuma Local Government Area of Bayelsa State, Nigeria. The leaves were identified and authenticated with the voucher specimen deposited at the herbarium of the University of Port Harcourt, Rivers State, Nigeria. The leaves were washed with stiller water to remove all extraneous matters and then sundried in shade for 14 days by constantly turning it to avoid mucor growth. The sun dried leaves was then pulverized to powder, 100gm of the leaf powder was added to 500ml of distilled water. The mixture was heated and stirred for 1 hour on a hot plate. The decoction was taken and allowed to cool for 45 minutes at room temperature filtered twice and then evaporated under preserver in a rotary evaporator (Sigma – Aldrich. USA), to give 19.07 of the aqueous extract. The extract was then frozen and dissolved in distilled water to desired concentration of 250 and 500mg/kgbw.

### Experimental Animals

Adult male Wistar albino rats between 12 and 15 weeks olds, weighing an average between 180 – 200g were obtained from the animal house the Department of Biochemistry, Federal University of Agriculture, Abeokuta (FUNAAB) Ogun State, Nigeria. The animals were caged and exposed to 12 hours dark/light cycle. They were fed on normal on normal laboratory rat diet with water given and libitum. The animals were acclimatized to laboratory conditions for 2days before experiment, to reduce any nonspecific stress.

### Treatment /Experimental Design

The treatment with 20mg/kgBW NSAID was given for 3 consecutive days to all groups except group 1 after fasting for 24 hours, to produce ulcer according to the method described by Javed, *et al* (2010). At the end of the 3<sup>rd</sup> day, when the final dose of the NSAID was administered, one rat from each group was selected and sacrificed to check and confirm ulceration by examination, ulcer induces and biochemical enzymatic assay. After the confirmation of ulcer in the rats, the treatment with the reference drug Omeprazole (20mg/kgBW) and the plant extract (250mg/kg and 500mg/kgBW) was commenced and it lasted for 14 days (2 weeks). At the end of the final dose on the 14<sup>th</sup> day, the animals were further fasted for 24 hours and then sacrificed.

The rats were randomly divided into five (5) groups of six (6) rats in each group. Group 1 rats served as normal control that received 5ml/kg distilled water only orally by intubation, which group 2 rats served as the negative control (untreated) received 20mg/kg NSAID only, group 3 rats served as the positive control animals that received

oral doses of 20mg/kg NSAID and 20mg/kg Omeprazole. The Group 4 and 5 rats received 20mg/kg NSAID with 250mg/kg and 500mg/kg doses of the aqueous extract of *TaraxacumOfficinale* (5ml/kg) by the same route (**Table 1**)

**Table 1: Experimental Design**

Animal Group	Treatment
Normal Control	Distilled water only
Negative Control	20mg/kg NSAID only for 3 days
Positive Control	20mg/kg NSAID + 20mg/kg Omeprazole for 14 days TOE
Treatment	20mg/kg NSAID + 250mg/kg TOE
Treatment	20mg/kg NSAID + 500mg/kg TOE

### Acute Toxicity Test

The acute toxicity method described by the Organization for Economic Cooperation and Development (OECD) was used to determine the LD<sub>50</sub> safe dose for the extract. Different doses of aqueous extracts of *Taraxacumofficinale* were administered orally to three (3) rats each weighing 200g. The rats were tested for 24 hours at concentration of 1000, 2000 ad 5000mg/kgbw prior to the extract administration. They were further tasted for another three (3) hours after dosing and were observed for signs of toxicity, mortality and behavioral changes. The animals were individually screened once for the first 30 minutes during the first four (4) hours after dosing. All surviving animals were observed for 24 hours.

### Ulcer Scoring /Ulcer Index

Immediately after the animals were sacrificed, the stomach was opened along the greater curative, washed thoroughly under running tap water. The flesh was put on a glass slide flat inside-up.

The length and width of the ulcer (mm) were measured using a planimeter(10x10mm<sup>2</sup> = Ulcer Area). The ulcerated area was measured by counting the number of small squares in observed under microscope at x10 magnification.

The ulcer score was measured as shown in Table 2, using modified method described by Kunchandry, *et al.*, (1985).

The ulcer index was evaluated using the method described by Singh (1999).

Ulcer Index = severity of ulcer + No of ulcer.

The inhibition percentage (1%) was calculated following the formular recommended by Mahmood, *et al* (2010).

$$\text{Percentage Inhibition (1\%)} = \frac{UA - UA_{\text{treated}}}{UA_{\text{control}}} \times 100$$

The area of all lesions in the stomach. To obtain the Ulcer Area (UA), the formula as recommended by Mohamood *et al.*, (2011) was employed.

$$\text{Ulcer Area} = \text{Sum of small squares} \times 4 \times 1.8 \text{ (mm}^2\text{)}$$

**Table 2. Ulcer Scoring**

Observation on Stomach	Ulcer Score
Normal Coloured Stomach	0
Red Colouration	1
Spot Ulcer	2
Hemorrhagic Streaks	3
Number of Ulcer less than 5	4
Number of Ulcer equal or more than 5	5
Ulcer with Bleeding	6
Perforation of Gastric Wall	7

### Gastric Mucus Weight Determination

Segments of the stomach wall was removed, washed with normal saline, weighed and assessed to determine the gastric wall mucus of experimental animals. The segment of the stomach was immediately transferred into sodium acetate buffered sucrose solution and 1% Alcian blue solutions.

Magnesium chloride solution was used to rinse and remove the dye complex from the gastric wall mucus. Equal volumes diethyl ether and aliquot of the Alcian Blue extract was shaken together, then centrifuged and the absorbance of the aqueous layer was measured at 580nm. the amount of the Alcian Blue extracted per gram of tissue was then determined (Corne, 1974).

#### **Antioxidant Activity of Gastric Homogenate**

**Sample Preparation:** Gastric tissue homogenates for all analyzed groups were produced. These tissues were sliced and homogenized using Teflon homogenizer (Polytron, Heidolph RZRI, Germany) applying the appropriate buffer, then centrifuged at 10,000rpm for 15 minutes to obtain the supernatant (Yildirimet al., 2007).

#### **Estimation of Lipid Peroxidation (MDA)**

Lipid peroxidation in the mucus membrane was evaluated by determining the content of malodiablehyde (MDA) using the thiobarbituric acid reactive substances (TBARSs) assay Kit (Bio Assay System C.A., USA). The stomach segments were washed with phosphate buffered saline to reduce interference of haemoglobin with free radicals, the stomach was then homogenized. 100µl aliquot of the homogenate was mixed with 100µl of 10% trichloroacetate acid and incubated for 15 minutes on ice. The mixture was centrifuged at 12,000rpm for 10minutes at 4°C. 20µl of 0.6% thiobarbituric acid was mixed with the supernatant and incubated for 1hour at 100°C. When the mixture cooled, the absorbance was measured at 532nm. The results were expressed as µmol/MDA/mgprt (Ayala et al., 2014).

#### **Estimate of Reduced Glutathione (GSH)**

The estimate of reduced glutathione (GSH) was estimated using a GSH assay Kit (Cayman, Ann Arbor, MI, USA). This process involved an optimized enzymatic recycling method and Glutathione reductase. The Sulphdryl group of the glutathione reacts with 5, 5 – dithiobis – 2- nitrobenzonic acid (TNB). A mixture of disulfides, GSTNB was formed between GSH and TNB, which is reduced by GR to recycle GSH; releasing more TNB. The rate of production of TNB is directly proportional to the recycling reaction, which in turn is directly proportional to the GSH concentration in the sample. The absorbance of TNB was measured at 410nm and used to determine the value of GSH. The results were expressed as µmol/mg prt (Pizzorno, 2014).

#### **Statistical Analysis**

All values were reported as mean ± standard deviation (SD) of five experimental animals. Significant difference among the means was calculated at value of  $p \leq 0.05$  when compared with controls. The statistical significance of difference between groups was assessed using one-way ANOVA.

### **III. Results**

#### **Acute Toxicity Test**

Experimental rats treated with the different doses up to the maximum of 5000mg/kg were closely monitored. All animals remained alive and did not indicate any significant visible toxicity. With this result, it showed that aqueous extract of *Taraxacumofficinale* is safe up to the maximum dose of 5000mg/kg BW of animals; Histological examination of the mucosal walls showed normal architecture, thereby ruling out the fact that *Taraxacumofficinale* is an ulcerogenic agent.

#### **Phytochemical Screening**

Preliminary screening of *Taraxacumofficinale* revealed the presence of secondary metabolites such as phenolic acid, alkaloids, tannins, glycosides, flavonoid and saponins (Table 3). The quantitative result showed that flavonoid is more followed by tannins, with glycosides recording the least value of 44.51mg/100g (Table 4).

**Table 3: Qualitative Phytochemical constituents present in aqueous extract of *Taraxacumofficinale*leaves.**

<b>Chemical Constituents</b>	<b>Aqueous Extract</b>
Phenolic acid	+
Alkaloids	+
Tannins	+
Glycosides	+
Saponins	+
Flavonoids	+

**Table 4: Quantitative phytochemical analysis of aqueous extract of *Taraxacumofficinale*.**

Chemical Constituents	Total value in aqueous extract (mg/100g)
Phenolic acid	61.10
Alkaloids	339.15
Tannins	418.73
Glycosides	44.51
Saponins	62.84
Flavonoids	559.19

**Confirmation of Ulcer:**

Results for the confirmation of ulceration in experimental rats is presented in Table 5. The result compares the values of the normal control group and the NSAID treated ulcer group. Treatment with the NSAID drug significantly ( $p < 0.05$ ) increased the ulcer index, ulcer area ( $\text{mm}^2$ ) and the lipid peroxidation value to  $22.26 \pm 0.03 \mu\text{mol/mg prt}$ ; while the mucus weight and glutathione values were reduced ( $p < 0.05$ ) to  $41.70 \pm 1.49\text{mg}$  and  $28.63 \pm 0.26 \mu\text{mol/mg prt}$  respectively.

Table 6 presents the results on the effect of *Taraxacumofficinale* extracts on ulcer area. Analysis of the data showed a significant decrease ( $p < 0.05$ ) in the ulcer area after 14 days of oral administration of 500mg/kg the plant extract compared from Day 1 of experiment. This trend was also observed with the reference drug Omeprazole (20mg/jg) that recorded  $8.83 \pm 0.30\text{mm}^2$  on Day 14.

**Table 5: Result for Confirmation of ulceration in wistarrats on Day 1**

Parameters	Normal Control	NSAID Treatment (Ulcer Control)
Ulcer Index	0	5
Ulcer Area ( $\text{mm}^2$ )	0	67
Mucus Weight (Mg)	$177.50 \pm 2.10$	$41.70 \pm 1.49$
MDA ( $\mu\text{mol/mg prt}$ )	$10.53 \pm 0.15$	$22.26 \pm 0.30$
GSH ( $\mu\text{mol/mg prt}$ )	$53.87 \pm 1.06$	$28.63 \pm 0.26$

**Table 6: Effect of aqueous extract of *Taraxacumofficinale* on Ulcer Area ( $\text{mm}^2$ ) in wistarrats.**

Group	Treatment	Day 1	Day 7	Day 14
1.	Normal /Control	0.00 <sup>b</sup>	0.00 <sup>b</sup>	0.00 <sup>b</sup>
2.	NSAID Only	$67.26 \pm 2.15^a$	$71.07 \pm 0.20^a$	$69.83 \pm 0.15^a$
3.	NSAID + Omeprazole (20mg/kg)	$16.93 \pm 0.70^b$	$10.76 \pm 0.35^{ab}$	$8.83 \pm 0.30^{ab}$
4.	NSAID + 250mg/kg TOE	$26.77 \pm 0.25^{ab}$	$18.17 \pm 0.25^{ab}$	$11.93 \pm 0.20^{ab}$
5.	NSAID + 500mg/kg TOE	$21.16 \pm 0.25^{ab}$	$13.03 \pm 0.15^{ab}$	$10.73 \pm 0.25$

The effect of *Taraxacumofficinale* extract on ulcer index is presented in Table 7. The ulcer index was significantly reduced from  $5.77 \pm 0.05$  on the Day 1 of the NSAID group (Ulcer Control) to  $1.86 \pm 0.05$  for Omeprazole (20mg/kg) treated rats and  $3.03 \pm 0.05$  for 500mg/kg of extract after 14 Days of administration. Data of mucus weight is as shown in Table 8; this revealed an increase, as the days of the experiment is increased. Results showed up to  $18.50 \pm 2.05(\text{mg})$  while that of the extract (500mg/kg) was  $149.47 \pm 1.00\text{mg}$  compared to the ulcer control group that recorded  $54.46 \pm 1.01\text{mg}$ . This increased trend was also observed in the Percentage inhibition with values as high as  $88.41 \pm 0.58\%$  for Omeprazole group while the 500mg/kg plant extract recorded  $85.92 \pm 0.05\%$  on Day 14. There was a significant increase ( $p < 0.05$ ) compared with the ulcer control group with value of  $8.45 \pm 1.33\%$ . (Table 9).

**Table 7. Effect of Aqueous Extract of *Taraxacumofficinale* on Ulcer Index in wistarrats.**

Group	Treatment	Day 1	Day 7	Day 14
1.	Normal /Control	0.00 <sup>b</sup>	0.00 <sup>b</sup>	0.00 <sup>b</sup>
2.	NSAID Only(Ulcer Control)	$5.77 \pm 0.05^a$	$5.16 \pm 0.11^a$	$4.93 \pm 0.05^a$
3.	NSAID + Omeprazole (20mg/kg)	$2.33 \pm 0.05^{ab}$	$2.00 \pm 0.00^{ab}$	$1.86 \pm 0.15^{ab}$
4.	NSAID + 250mg/kg TOE	$4.77 \pm 0.05^{ab}$	$4.00 \pm 0.11^{ab}$	$3.73 \pm 0.05^{ab}$
5.	NSAID + 500mg/kg TOE	$3.86 \pm 0.05^{ab}$	$3.13 \pm 0.15^{ab}$	$3.03 \pm 0.05^{ab}$

**Table 8. Effect of Aqueous Extract of *Taraxacumofficinale* on Mucus Weight (mg) in wistarrats.**

Group	Treatment	Day 1	Day 7	Day 14
1.	Normal /Control	$177.50 \pm 2.10^b$	$181.10 \pm 0.88^b$	$195.67 \pm 0.06^b$
2.	NSAID Only (Ulcer Control)	$41.70 \pm 1.49^a$	$46.90 \pm 1.30^a$	$54.46 \pm 1.01^a$
3.	NSAID + Omeprazole (20mg/kg)	$153.06 \pm 2.77^{ab}$	$171.23 \pm 0.75^{ab}$	$182.50 \pm 2.05^{ab}$
4.	NSAID + 250mg/kg TOE	$117.13 \pm 1.32^{ab}$	$119.90 \pm 0.45^{ab}$	$124.43 \pm 2.15^{ab}$
5.	NSAID + 500mg/kg TOE	$123.73 \pm 2.21^{ab}$	$132.43 \pm 1.11^{ab}$	$149.47 \pm 1.00^{ab}$

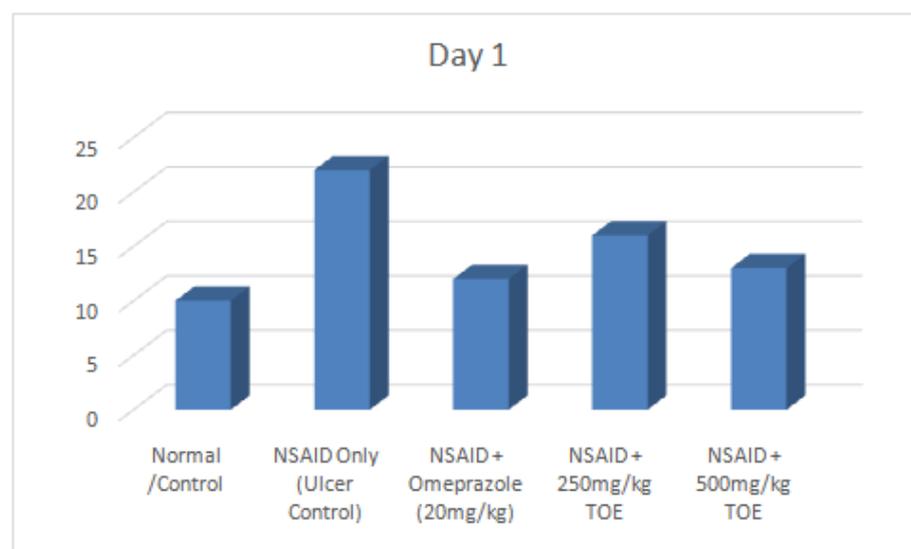
**Table 9: Effect of Aqueous Extract of *Taraxacumofficinale* on Percentage Inhibition in Wistarrats.**

Group	Treatment	Day 1	Day 7	Day 14
1.	Normal /Control	-	-	-
2.	NSAID Only (Ulcer Control)	18.53 ± 2.65 <sup>a</sup>	11.40 ± 1.12 <sup>a</sup>	8.45 ± 1.33 <sup>a</sup>
3.	NSAID + Omeprazole (20mg/kg)	79.50 ± 0.30 <sup>ab</sup>	86.49 ± 0.54 <sup>ab</sup>	88.41 ± 0.58 <sup>ab</sup>
4.	NSAID + 250mg/kg TOE	67.57 ± 0.63 <sup>ab</sup>	77.25 ± 0.35 <sup>ab</sup>	84.35 ± 0.51 <sup>ab</sup>
5.	NSAID + 500mg/kg TOE	74.35 ± 0.95 <sup>ab</sup>	85.63 ± 3.71 <sup>ab</sup>	85.92 ± 0.50 <sup>ab</sup>

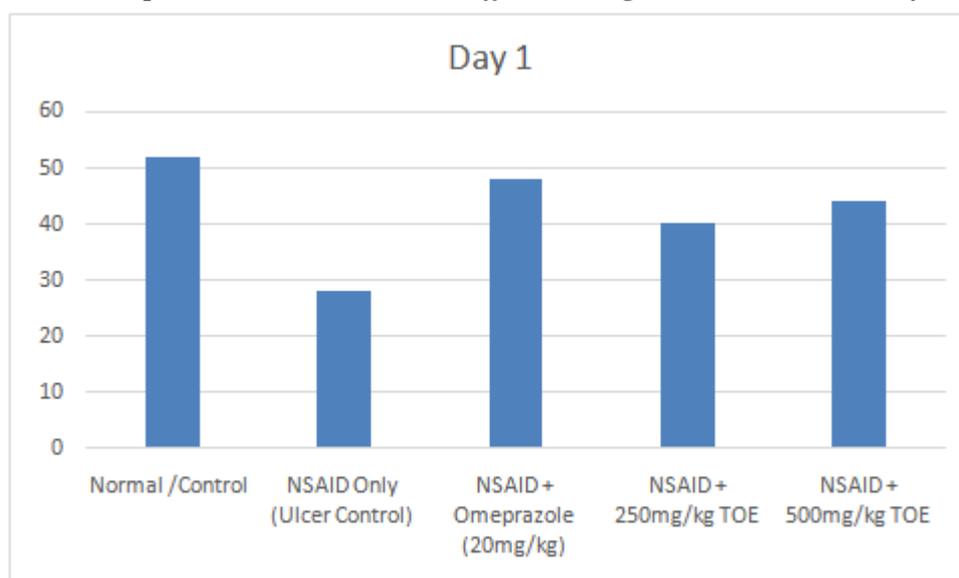
Values are mean ± SD of triplicate determination. Value with the same column with superscripts (a, b) are significantly different at  $p \leq 0.05$  when group 1 and 2 are compared with other groups respectively.

The effect of *Taraxacumofficinale* extract on lipid peroxidation (MDA) is shown in Figure 1. The MDA was increased in the ulcer control group ( $22.26 \pm 0.30 \mu\text{mol/mg prt}$ ) and was significantly reduced ( $p < 0.05$ ) with the oral administration of the plant extract as well as the reference drug Omeprazole. Figure 2 illustrate the effect of *Taraxacumofficinale* aqueous extract on Glutathione activity in experimental rats. There was an initial decrease as recorded in the ulcer control group ( $28.63 \pm 0.15 \mu\text{mol/mg prt}$ ) which increased ( $p < 0.05$ ) on treatment with the plant extract.

**Figure 1: Effect of Aqueous Extract of *Taraxacumofficinale* on Lipid Peroxidation (MDA) activity in wistarrats.**



**Figure 2: Effect of Aqueous Extract of *Taraxacumofficinale* on glutathione (GSH) activity in wistarrats.**



#### IV. Discussion

Medical plants are known to contain phytochemicals such as flavonoids, phenols, saponins, tannins, alkaloids and Glycosides. Earlier studies have shown that *Taraxacumofficinale* also contain these secondary metabolism (Grieve, 2008 and Dale Thomas, 2000). Flavonoids are important in increasing the synthesis of prostaglandin and decarboxylase (Bovrelli and Izzo, 2000). Tannins have been reported to prevent ulcer by improving vasoconstriction effects (Aguwa and Nwako, 1998). They had reported the antimicrobial and usefulness of this plant. This present study have shown that the aqueous extract of *Taraxacumofficinale* do contain these phytochemicals and are believed to be strongly linked to the anti-ulcer benefits.

The results of the acute toxicity test (LD<sub>50</sub>) of *Taraxacumofficinale* aqueous extract revealed that the plant extracts are tolerable as no rat suffered any visible toxicity when administered the maximum dose of 5000mg/kgbw.

Non-steroidal Anti Inflammatory Drug (NSAID) like Ibuprofen administered at high dose (20mg/kgbw) are capable of inducing gastric ulcer. Ibuprofen is a potent inhibitor of the biosynthesis of prostaglandin (Vane, 1971). Prostaglandin are known to be actively involved in maintaining the integrity of the gastric mucosa. Prostaglandin are produced by two enzymes, cyclooxygenase (COX); COX-1 and COX -2. NSAID's are COX inhibitors, they work by decreasing the production of prostaglandin which is meant to protect the lining of the stomach and intestines from the damaging effects of acids, stimulate mucus and bicarbonate output (Hogan et al., 1994) and promote blood Clotting by activating platelets (Gaskilet *al.*, 1982, Goulart *al.*, 2005). Though this study did not evaluate the effect of the plant extract on the biosynthesis of prostaglandin but the necrotizing effect of Ibuprofen (NSAID) was recorded as shown in the results obtained in the ulcer area mucus weight and percentage inhibition of the ulcer control group animals.

The resultant decrease in the values of the ulcer index and ulcer area with an increase in the mucus weight and percentage inhibition on rats treated with aqueous extracts of *Taraxacumofficinale* may be attributed to the ameliorating effect of the extract by maintaining the mucosa integrity.

Analysis of the data showed that Ibuprofen (NSAID) increased the lipid peroxidation (MDA) activity in rat serum of the ulcer control group. Increase in the MDA enzyme activity showed stress that is associated in tissue necrosis associated in gastrointestinal ulceration (Ferguson and Staling, 1972, Al Rashidiet *al.*, (2012).

Oxidative stress is a vital aspect in the pathogenesis of several diseases including ulcer. Antioxidants have been reported to take effects of necrotic agents against gastric mucosa. They help to enhance the body defense system by inhibiting the injury that can be caused to the stomach (Satichet *al.*, 2011). *Taraxacumofficinale* aqueous extract have been shown to contain antioxidants and it is likely to have imparted this ameliorating effect on injury accessioned by the NSAID.

#### V. Conclusion

Based on results obtained as presented in this present study, it can be inferred that the aqueous extracts of *Taraxacumofficinale* leaves are endowed with anti-ulcer and antiulcer genic properties. The antioxidants present in the plant extracts may be responsible for the ameliorating effect on the gastric mucosa due to the increase in the gastric wall mucus weight increase in the percentage inhibition by its ability to inhibit acid secretion. A reduction of the ulcer areas in the gastric wall as well as inhibition of leucocyte infiltration of the mucosal layers thus lead to the improvement in the ulcer healing process which was seen to be effective at higher dosage of 500mg/kgbw and time dependent.

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