Research Article **ISSN: 2394 – 7403**

International Journal of Medicine and Health Profession Research

Journal home page: www.ijmhpr.com

THE EFFECTS OF AQUEOUS LEAF EXTRACT OF SYMPHYTUM OFFICINALE (COMFREY) ON THE KIDNEYS OF ADULT WISTAR RATS

D. N. Ezejindu[*1], I. E.Chukwujekwu[1], A. J. Akingboye[2], A. C. Ihim[3], G. U. Ndukwe[4]

[1*]Department of Anatomy, Faculty of Basic Medical Sciences, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria.

[2]Department of Microbiology, Faculty of Biological Sciences, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria.

[3]Department of Medical Laboratory Science, Faculty of Health Sciences and Technology, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria.

[4]Department of Anatomy, Faculty of Basic Medical Sciences, Abia State University, Uturu, Abia State, Nigeria.

ABSTRACT

The present study is amid at studying the histological changes that might occur at the kidneys as a result of consumption of comfrey plants. Twenty adult wistar rats weighing180-200g were used for the study and were allocated into four (4) groups of five animals each. Group a served as the control and received 0.3ml of distilled water orally; the experimental groups B, C, D orally received 0.2ml, 0.4ml and 0.6ml of aqueous leaf extract of *Symphytum officinale* respectively for twenty eight days (28). Twenty four hours after the last administration, animals were weighed, sacrificed under the influence of chloroform vapour and dissected. Kidney tissues were harvested, weighed and trimmed down to a size of 3mm×3mm thick and fixed in 10% formalin for histological studies. The final body weight result showed significantly decrease in groups C and D when compared with the experimental control group A while group B increased significantly relative to the control group A. The relative organ weight result showed that groups C and D animals had elevated weight when compared with the control group. The present study therefore suggests that consumption of aqueous leaf extract of *Symphytum officinale* could cause histopathological leision in kidney cells.

KEYWORDS

Symphylum officinale, Body Weight, Kidney, Distilled Water and Wistar Rats.

Author for Correspondence:
Ezejindu D N,
Department of Anatomy,
Faculty of Basic Medical Sciences,
Nnamdi Azikiwe University,
Nnewi Campus, Anambra State, Nigeria.

Email: damianezejindu@gmail.com

INTRODUCTION

The use of plants as medicines predates written human history. Ethnobotany (the study of traditional human uses of plants) is recognized as an effective way to discover future medicines. In 200l, researchers identified 122 compounds used in modern medicine which were derived from "ethnomedical" plant sources ; 80% of these have had an" ethnomedical" use identical or related to the

current use of the active elements of the plants[1]. Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including aspirin, digitalis, quinine and opium[2].

Some secondary metabolites are toxins used to deter predation and others are pheromones used to attract insects for pollination. It is these secondary metabolite and pigments that can be refined to produce drugs - examples are inulin from the rots of dahlias, quinine from the cinchona, morphine and codeine from the poppy, and digoxin from the foxglove[3]. Toxic plants even have use in pharmaceutical development[4]. Plants synthesize a bewildering variety of phytochemicals but most are derivatives of a few biochemical motifs[5].

The common name 'confrey' is derived from the latin 'confirina' alluding to this plants purported use of knitting bone back together , and the greek word 'symphyo' which is the root of the generic name , *Symphytum* also meaning to unite[6]. It is native to much of Europe and various regions in Asia such as the Caucasus, Kazaklistan, Siberia, and Turkey and commonly found as a weed in temperate northern latitudes[7].

It has been reported that comfrey leaf certain allantoin, rosmarinic acid[8] and varying degrees of pyrrolizidine alkaloids depending on species and time of harvest[9,10].

In 2001, the United States food and drug administration issued a bam of comfrey products marketed for internal use and a warning label for those intended for external use[11,12].

MATERIAL AND METHOD

Breeding of Animals

Twenty (20) adult wistar rats weighing between 180-200 were purchased from animal house of Anatomy Department, Nnamdi Azikiwe University Nnewi Campus Anambra State, Nigeria. They were allowed for week (seven days) acclimatization under normal temperature (27℃-30℃) and fed ad libitum with water and guinea feed pullets from Agro Feed Mill Nigeria Ltd.

Drug Preparation

Common comfrey (*Symphytum officinale*) leafs were plucked from Okitipupa in Ondo State. It was identified at herbarium unit, Botany Department, Nnamdi Azikiwe University, Anambra State. It was sun-dried and then milled to a powder. 300mg/kg body weight was dissolved in 10mls of distilled water and administered to the animals.

Experimental Protocols

Twenty (20) apparently healthy adult wistar rats were weighed and assigned into four (4) groups of five animals each. Group A serve as the experimental control and were orally administered 0.3ml of distilled water; the experimental groups B, C and D were orally administered 0.2ml, 0.4ml and 0.6ml of aqueous leaf extract of *Symphytum officinale* for twenty eight (28) days respectively. Twenty four hours after the last administration, the animals were weighed and weights were recorded. They were anaesthetized using chloroform vapour inhalation method and dissected, kidneys tissues were removed, weighed and trimmed down to a size of .3mm×mm thick and fixed in zenkers fluid for four hours for histological studies.

Tissues Processing

For easy study of sections under the light microscope, the kidney tissues passed via several processes of fixation, dehydration, clearing, infiltration, embedding, sectioning and staining. Fixation was carried out in 10% formalin .The tissues were washed overnight in running tap water after four hours in 10% formaldehyde. Dehydration of the fixed tissues were carried out in different percentage of alcohol 50%, and 90% absolute. The tissues were then cleared in xylene and embedded in paraffin wax. Several sections of 5micron thick are obtained using a rotator microtone. The tissue sections were deparaffined hydrated and stained using the routine haematoxylin and eosin method. The stained sections were then examined under the light microscope.

DISCUSSION

Herbalists tend to use extracts from parts of plants, such as the root or leaves but not isolate particular phytochemicals[13].

Pharmaceutical medicine prefer single ingredient on the grounds that dosage can be more easily quantified. It is also possible to patent single compounds, and therefore generate income. Herbalist often reject the notion of a single active ingredient arguing that the different phytochemicals present in many herbs will interact to enhance the therapeutic effects of the herb and dilute toxicity[14]. Furthermore, they argue that a single ingredient may contribute to multiple effects. Herbalists deny that herbal synergism can be duplicated with synthetic chemicals; they argue that phytochemical interactions and trace components may alter the drug response in ways that cannot currently be replicated with a combination of a few potential active ingredients[15,16].

Pharmaceutical researchers recognize the concept of drug synergism but note that clinical trials may be used to investigate the efficacy of a particular herbal preparation, provided the formulation of that herb is consistent[17].

Comfrey's attribute were mentioned by many of the herbalist-alchemists of old such as Dioscorides (a Greek physician pharmacologist and botanist, practicing in 1st Century Rome) and Paracelus (a 15th Century Swiss Renaissance Physician, botanist, alchemist, and astrologer)[18]. Traditionally in Europe, the root and leaf were used in cases of Sprains or strains or broken bones. Due to the roots high mucilage cntent, it was often utilized in the same way as marshallow root (*Althaea officinalis*)[19].

Comfrey root is a source of the constituent, allantoin, which is a cell proliferant used in many cosmetic and dermatological preparations, although allantoin can also be derived from several other natural sources (including mammal urine) and is made synthetically as well[19,20].

Studies associating comfrey with veno-occlusive disease (VOD) do not differentiate between Russian and common comfrey, plants with very different levels of PAS, VOD can in turn lead to liver failure, and comfrey has been implicated in at least one death, though the type of comfrey being consumed, and other dietary physiological and pharmacodynamic factors were not accounted for[21].

From the result, the final body weight of groups C and D decrease significantly when compare with the control group a while group B is statistically similar with the control group A.

The relative organ weight of groups C and D increased significantly ($P<0.001$) when compare with the control while group B is statistically similar with the control group A.

The histopathological findings revealed peri-capsular inflammation with tubular dilation of the kidney tissues of animals in group C and D while group B revealed normal architecture of the kidney cells.

RESULTS

Morphometric Analysis of Body Weight

Table No.1: Comparison of Mean initial body weight, final body weight and weight change in all the groups (A, B, C and D)

(Mean±SEM given for each measurement)

S.No	Groups	Initial Body Weight	Final Body Weight	Weight Change
1	Group A	183.50±5.40	200.40±7.30	16.90±1.90
2	Group B	185.70±3.40	194.90±4.40	12.20±1.00
3	Group C	187.50±4.10	175.30±3.70	-12.20±0.40
4	Group D	191.70±2.30	170.10±1.40	-21.60±0.90
5	F-Ratio	50.120	30.470	9.310
6	Prob of Sig	<0.001	<0.001	<0.001

Morphometric Analysis of Kidney Weight

Table No.2: Comparison of the Mean relative kidney weights of all the groups (A, B, C and D)
(Mean ±SEM given for each measurement)

S.No	Groups	kidney Weight
1	Group A	4.10±0.110
2	Group B	4.17±0.300
3	Group C	4.49±0.460
4	Group D	4.61±0.140
5	F-Ratio	43.10
6	Prob of Sig	<0.001

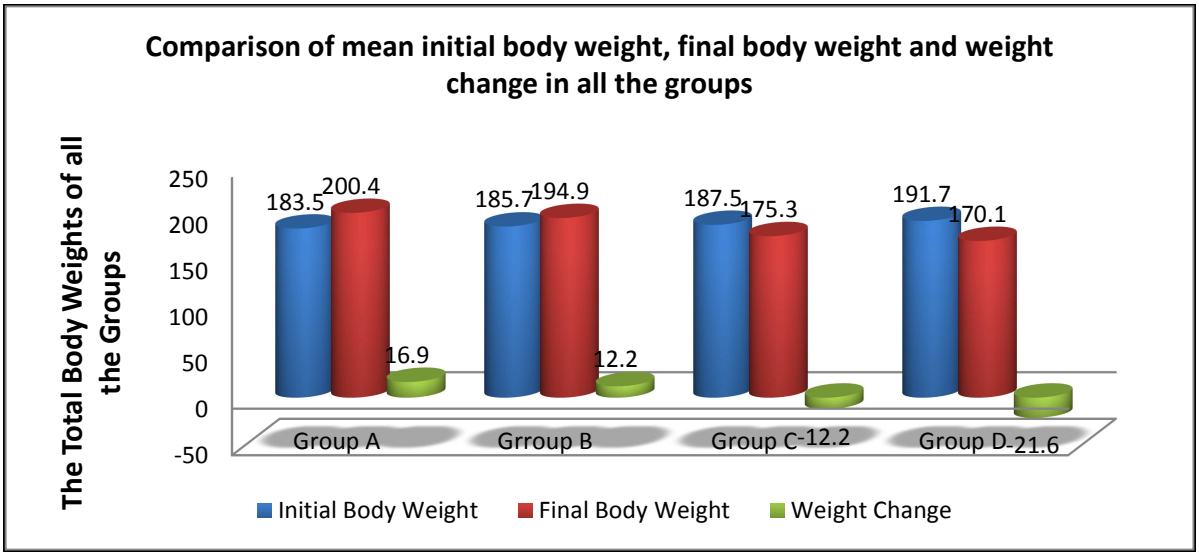


Figure No.1: Bar chart showing the comparison of mean initial body weight, final body weight and weight change in all the groups

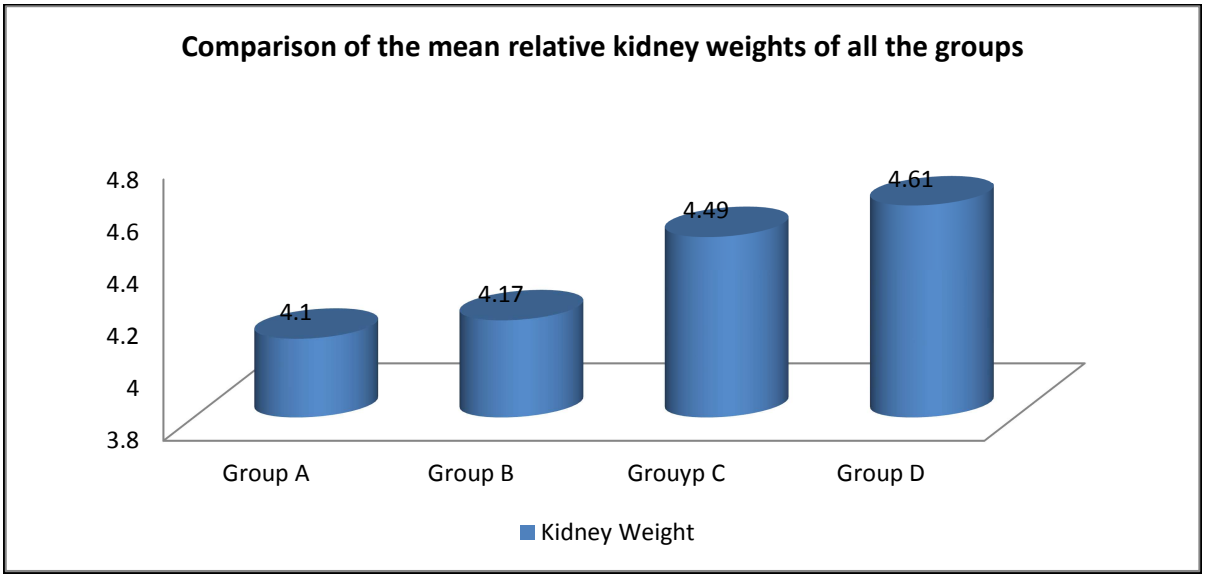
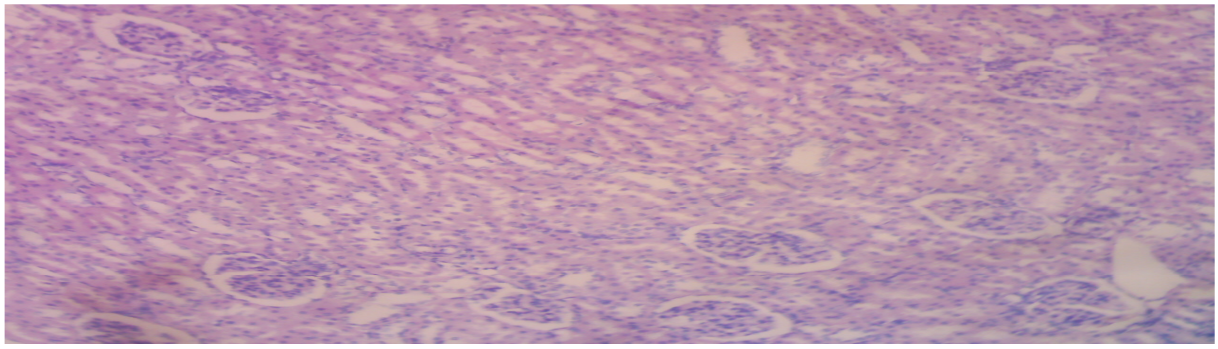
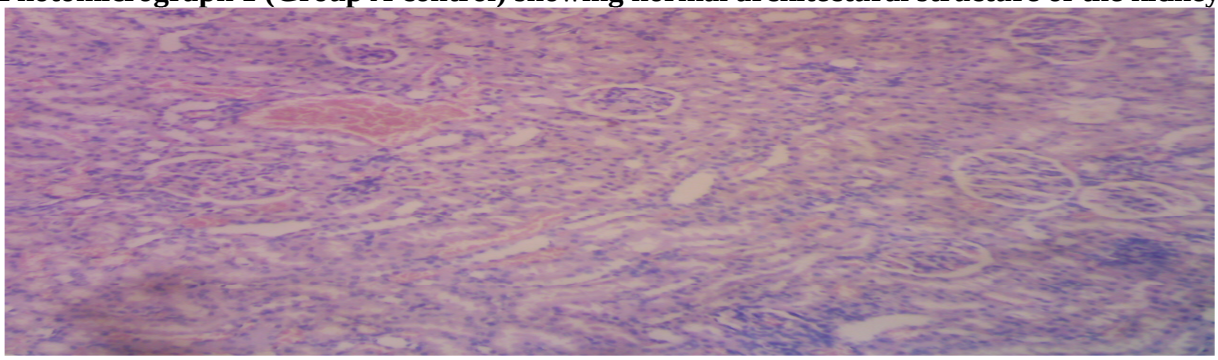


Figure No.2: Bar chart showing the relative organ weights of all the groups

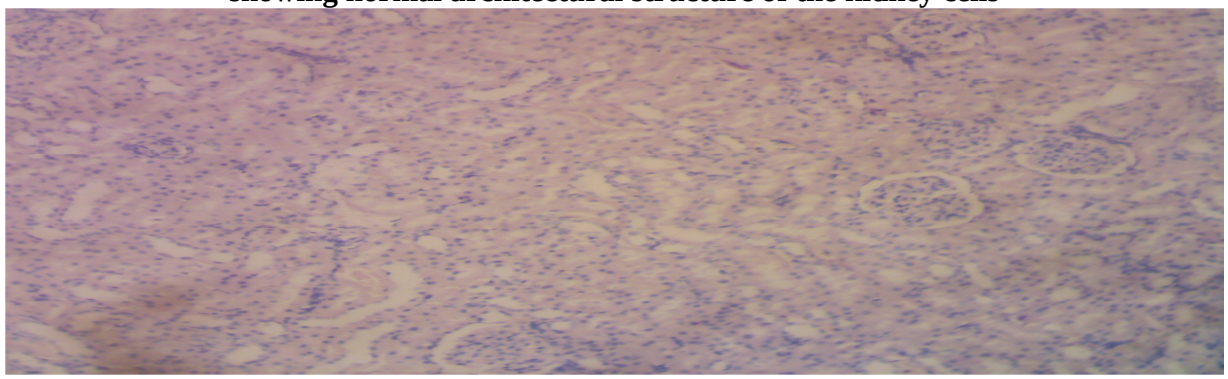
Histological Findings



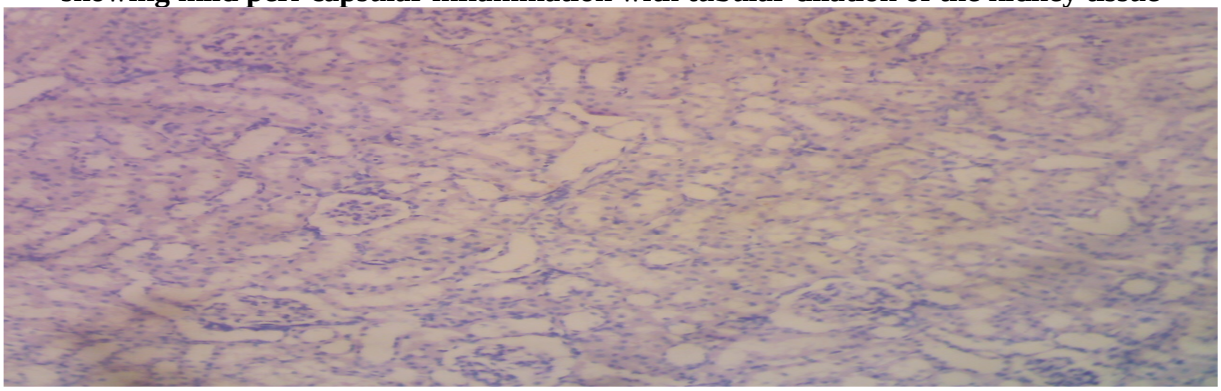
Photomicrograph 1 (Group A control) showing normal architectural structure of the kidney



Photomicrograph 2 (Group B treated with 0.2ml of aqueous leaf extract of *Symphytum officinale*) showing normal architectural structure of the kidney cells



Photomicrograph 3 (Group C treated with 0.4ml of aqueous leaf extract of *Symphytum officinale*) showing mild peri-capsular inflammation with tubular dilation of the kidney tissue



Photomicrograph 4 (Group D treated with 0.6ml of aqueous leaf extract of *Symphytum officinale)* showing severe peri-capsular inflammation with tubular dilation of the kidney tissue

CONCLUSION

From the result, we observed that consumption of aqueous leaf extract of *Symphytum officinale* in high doses could cause damage to the kidney cells.

ACKNOWLEDGEMENT

The authors are sincerely thankful to Department of Anatomy, Faculty of Basic Medical Sciences, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria for providing the facilities to carry out this research work.

CONFLICT OF INTEREST

We declare that we have no conflict of interest

BIBLIOGRAPHY

1. Fabricant D S, Farnsworth N R. The value of plants useds in traditional medicine for drug discovery", Environ, *Health Perspect*, 109 suppl 1 (suppl 1), 2001, 69-75.
2. Swain, Tony, Ed. Plants in the development of modern medicine, *Harvard University Press*, 1986.
3. Meskin, Mark S. Phytochemicals in Nutrition and Health, *CRC Press*, 123, 2002,
4. Angiosperm. Division Magnoliophyta, General features", *Encyclopedia Britannica*, 13(15), 1993, 609.
5. Springbob, Karen, Kutchan, Toni M. Introduction to the different class of natural products", In Lanzotti, Virginia. *Plant-derived Natural Products*, Synthesis function and application, Springer, London, 2009, 3.
6. Grieve M A, Modern Herbal. New York, Dover publications, Inc, Accessed at http://botanical.com/botanical, 2014, 23.
7. United State Department of Agriculture. Agricultural Research Service, Beltsville Area Germplasm Research information Network (GRIN), Accessed at http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?, 2014, 29.
8. Duke J A. Phytochemical and Ethnobotanical Databases, Accessed at http://www.ars-grin.gov/duke/, 2014, 31.
9. Foster, S. Herbal Renaissance, *Utal peregin Smith Books*, 1984, 607-611.
10. Mills S, Bone K. Principles and practices of phytotherapy, *Modern Herbal Medicine*, Edinburgh, Churchill Livingstone, 2000, 305-309
11. FDA/CFSAN-FDA Advises Dietary Supplement Manufacturer to Remove Comfrey products from the Market, *Retrieved*, 2007, 389.
12. Koll R, Klingenburg S. "Therapeutic Characteristance and tolerance of topical comfrey preparations, Result of an observational study of patients" *Fortschr Med orig*, 120(1), 2002, 1-9.
13. Vickers A, Zollman C. "Herbal Medicine, *British Medical Journal*, 319, 1999, 1050-3.
14. What is herb standardization
15. Challem, Jack. "The problem with Herbs", *Natural Health*, 1999, 311-313.
16. Williamsonm E. "Synergy and other interaction in phytomedicines, Phytomedicie, 8(5), 2001, 401-409.
17. Goldman, Peter. "Herbal Medicine Today and Roots of Moder5n Pharmacolgy", *Annals of internal Medicine*, 135(81), 2001, 594-600.
18. Gladstar. RHerbal Healing for woman, New York, *Fireside publishing*, 1993, 904-908.
19. Grieve M A, Modern Herbal. New York, Dover Publications, Inc. Accessed at http://botanical.com/botanical, 2014, 11-15.
20. Wikipedia the free Encyclopedia accessed at, http://en.wikipedia.org/wiki/Allantoin#cite-note-5, 2014, 567-569.
21. Yeong M L, Swinburn, Boyd, Kennedy, Mark, Nicholson, Gordon."Hepatic veno-occlusive disease associated with comfrey ingestion" Journal of Gastroenterology and Hepatology, 5(2), 1990, 211-214.

Please cite this article in press as: *Ezejindu D N et al.*, The effects of aqueous leaf extract of *symphytum officinale* (comfrey) on the kidneys of adult wistar rats, International *Journal of Medicine and Health Profession Research*, 2(2), 2015, 37 - 42.