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A Review on – Anti-inflammatory

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ABSTRACT
Herbs have been used as food and for medicinal purposes for centuries. In recent years, natural compounds such as phenolic acids, Phenolic diterpenes and triterpenes, present in various plants, have been the subject of intense research due to their potential benefits for human health. It has been demonstrated that the antioxidant and radical scavenge activities are the main properties of these compounds. The main difficulties in using natural products as a source for pharmaceutical lead compounds involve separating the compounds from the original extract, as well as the cost of time and money invested in an activity that may not yield a novel compound. Herbal remedies that treat many inflammation-related disorders are typically based on plant bioactive water extracts have shown that active anti-inflammatory ingredients in water extracts include many natural chemicals such as phenols, alkaloids, glycosides and carbohydrates. In this paper, data on different plant species having anti- inflammatory activity are presented as well as their chemical constituents involved in this action.

Keywords: Anti-inflammatory, Antimicrobial, Antioxidant, Centaurea tougourensis (Neuro protective).

I. INTRODUCTION

Maintaining body homeostasis is crucial to ensure optimal body's function .the regulation of homeostasis is or chestrated by nervous and negative and endocrine systems via positive and negative feedback processes (Ramsay and woods, 2014)

Oxidative stress may also lead to DNA damage especially that of a key organelle called mitochondria with generally results in energy loss or cell death (Gonzalez Hunt et al: 2018)

Recently the COVID 19 Which is caused by a new type of corona virus, proved that the scientific community approaches face pathogenic microorganisms should be revised to confront a comparable pandemic situation, especially to prevent or the colonization pathogenic microorganisms strains. The richness of plants key elements like polyphenols, saponins, tannins may explain their remarkable pharmacological properties.

Human health has always been the source of concern for the scientific community which now a days is facing many challenges. Since Antiquity, humans had to Face and adapt to new environmental conditions and overcome many challenges. But unfortunately, our approach to treat illness must improve since many conditions related to healthcare are threatening human prosperity suggesting used to become more realistic and look for better solutions.

The inflammatory response is a complex process that involves key coordination mediators such as prostaglandins (PGs), Nitric oxide,(NO), tumor necrosis factor –α (TNF-α) , interferon γ (IFNγ),interleukin -1 (IL-1) and IL- 6. These factor good response and the of internal homeostasis, especially against infections and microbial pathologies which are responsible for some serious chronic inflammations.

The inflammatory response which involve pro inflammatory mediator called cytokines is considered crucial for the organisms defense system but may lead when deregulated to hazardous and sometimes irreversible complications especially those linked to cardiovascular system which may generated in long term some complex chronic pathologies like rheumatoid arthritis , diabetes ,heart disease and even cancer. The scientific community is aware about the side effect of using non steroidal anti inflammatory drugs (NSAIDs) even if it remains the best alternative to effectively treat inflammatory illness.

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II. MATEREAL AND METHODS

CHEMICAL AND REAGENT

- Thisincludes 2,2-azino-bis (3-ethyl-benzothiazoline-6- sulfonicaciz**(ABTS), acetylchotocopherol, ascorbicacid, butyrylcholinesterase (BCHEbutylated** hydroxyanisole (BHA), butylated hydroxytoluene(BHT), diclofenac sodium, dimethyl sulfoxide(DMSO), ethanol, ethyl acetate(EA), ferrouscation(Fe^{2+}), ferric cation(Fe^{3+})ferric chloride($fecl_3$), galantamine, galvinoxyl radical(GOR), gentamicin, methanol, peniciliin, phenathroline, potassium ferricyanide ($k_3Fe(CN)_6$,n-butanol(n-BuOH), tannic acid, trichloroacetic acid (TCA).
- This includes; acetone(C_3H_6O), brewer's test, croton oil, eosin($C_{20}H_6Br_4Na_2O_5$), ethyl acetate, ethanol, formaldehyde(CH_2O), hematoxylin($C_{16}H_{14}O_6$), indomethacin.

Plant material

Centaurea tougourensis was collected in spring 2019 at belezma national park in the municipality of fesdis latitude longitude and was idendified by expert in the field form the agronomic department of the Batna-1 Univarsity and a voucher specimen under the code was deposited at the laboratory of Improvement of the phytosanitary protection Techniques in Mountainous Agrosystems Agronomy Departm Veterinary and Agricultural sciences, University of Batna 1 ,Batna, Algeria.

Preparation of plant extract

The aerial part of centaurea tougurensis were dried in a dry, ventilated place away form the suns rays and then ground to obtain (300g) of fine powder Maceration was carried out three times with 3 L EtOH-H_2O(70:30) at room temperature for 3 days. After liquid–liquid extraction with solvents and ethyl acetate, and n-butanol (n-BuOH) ethyl acetate and of n- hexane as extracts yields

Experimental Animals:

Femal Swiss Albino mice (25-30) were purched form Pasteur Institute (Algiers) and maintained at ambient at ambient temperature 12h light\dark cycle with free access to food and water for two weeks to acclimatize with laboratory conditions.

Activity Of Centaure Tougourensis

The plants activities Antioxidant, Anti-infalammatory, neuroprotective and Antimicrobial, Antidiabetic, Hepatoprotective, Anti-inflammatory, and Antipyretic, Anti-hyperglycemic Activity, Anti- ulcer, Haemostatic, photoprotective properties, centaurea tougourensis Boss. and Reut.

Anti-inflammatory

Heat-induced hemolysis assay

This was performed according to gandhidasan et al,(1991) method with slight modifications. Various concentration of n-BuoH and EA extracts of C.tougourensis were prepared in diffirent concentration levels (50, 100, 200, 400, and 800**µg/ml)** with diclofinac sodium as refrence standard drug a value of 50µL of erythrocyte suspension was added to all tubes of each series, and the tubes were then incubated in a water bath at 54˚c for 20 min, while the other pair was maintained at 0˚c for 20 min. The mixtures were then centrifuged at 5000 rpm for 5min, and the absorbance of the supernatants was measured at 560 nm. The experiment was repeated three times. The median effective concentration was also calculated, and the inhibition percentage of hemolysis was .

Neuroproctive active

In this assay, the evaluation of the acetylcholinesteras inhibitory activites was conducted as previously described by Ellman et al(1961). A volume of 150 µL of sodium phoat buffer (100Mm; Ph 8.0) was added to 10µL of extract solution dissolved in ethanol at different concentrations. The, 20µL of solution was added to the mixture and incubated at 250˚C for 15 min. A volume of 10µL of DTNB (0.5 Mm) and 10µL of acetylthiocholine iodide (0.71 Mm) of butyrylthiocholine chloride were added to the previous mixture. The absorbance was made at 412 nm, and galantamine was used as a reference drug and tested at the same concentration range of extracts the IC value was also calculated.

Anti-microbial test

The anti–microbial effect of n-BuOH and EA extracts of C.tougourensis was determined using the micro-dilution method. six bacterial strains were used for this evaluation, namely Escherichia coli, pathogenic aeruginosa addition the possible anti-microbial effect of C .tougourensis against the yeast candida albicans was also investiged. Negative control consisted of

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dics impregnated with dimethy sulfoxide (DMSO). pencillin and gentamicin were used as positive controls. The bacteria were then incubated at 37˚C for 24 h, While the fungal strain was also incubated at temperature but for 48 h. These were performed in triplicate and the at the end of the experiment. The minimum concentrations were calculated.

Statistical analysis

Data obtained from this study were expressed as men SD, and the statistical analysis were performed by one-way ANOVA using Graph pad prism version 8. Results were considered highly significant at .

Evalution of anti-hyperglycemic activity:

Oral Glucose Tolerance Test:

For this test we used the procedure previously described by Female Swiss Albino mice (25-30 g) were divided into three groups (n=6); and the groups were pre-treated orally as follows; Group 1; served as negative control and received isotonic saline solution (10 mg|kg) Blood samples were obtained from the tail vein and were measured before and 30min, 60min, 90min, and 120min after glucose administration the blood glucose level was determined by a glucometer using glucostrips .

The following equation was used to calculate the inhibition percentage of hyperglycemia; Inhibition = (1-We\Wc) × 100

Where,

We = represents the blood glucose concentration in glibenclamide or C.tougourensis administered to mice at a given time

Wc = represents the blood glucose concentration in control group at a given time.

Anti-pyretic activity study

Anti-pyuretic activity on albino rat was studied with fever induced by 15%brewer's yeast . healthy wister strain albino rats weighing about 120-150 g were fasted overnight with water ad libitum befor indusing pyrexia and just before inducing pyrexia anials were allowed to quiet in age for some time after that their basal rectal temperature were measured by using a clinical digital thermometer by insertion of thermometer to a depth of one inch into the rectum .After taking the temperature , pyrexia was indused by injecting subcutaneously 15% W/V suspension of brewer's yeast in a distilled water at a dose of 10ml/kg body weight in the back below the nape of neck. The site of injection was massaged in order to spread the suspension beneath the skin and rats were returned to their cage and allowed to feed .after 18hr of brewer's yeast injection the rise in rectal temperature was recorded .Only rats which were shown an increase in temperature of at least 0.6˚C were used for further experiment. The animals were divided into 5 groups, each groups contains 6 animals. Group I [control] recived 1% Tween 80 in normal saline [10ml/kg]. Group II [positive conrol] recived 100mg/kg body weight paracetamol orally . Group III, IV and V received ethanolic crude extract, petroleum ether fraction and ethyl acetate fraction respectively P.O.

At the dose of 300mg/kg body weight. After the drug was administered, the temperature of all the rats in each group was recorded at 1,2,3 and 4 h. The mean temperature was calculated for each group and compared with the value of standard drug Paracetamol.

In vivo anti-inflamation test

This test was performed to evaluate anti-inflammatory potential of plant exctract. The mice were divded into four groups [N=6], and pretreated orally as follows ; group 1 [negative control] recived 0.9% Nacl at a dose of 10ml/kg , P.O ;group 2 [reference] was given indomethacin at a dose 20mg/kg ,i.p.,while groups 3 and 4 recevied n-butanol extract of centaurensis tougourensis at dose of 200 and 400mg/kg , respectively , p.o. After 30 min of the pretreatment, right hind paw edema was indused in each mouse using sub – planter injection of 0.1 ml of 1%carrageenan. The diameter of the edema was measured using a digital caliper before, and at 1,2,3,4,5, and 6 and 24 h after the injection of carrageenan [10]. In addition ,the percentage inhibition of inflammation was calculated using Eq 1

Inhibition[%]

{(VC-VT)}/VC]x100…..[1]

Where VC represents the men edema volume in the control group at a given , while VT is the mean edema volume in the group treated with the or extracted at .

Anti-bacterial activity:

The microorganisms used incaureus, Methicillin resistant Staphylococcus aureus (MRSA), Bacillus subtilis, Vancomycin resistant enterococci (VRE) and gram negative bacteria: Shigella dysenteriae, Salmonella typhi and Escherichia coli were obtained at the Department of Microbiology, Ahmadu Bello University Teaching Hospital, Shika, Zaria. The isolates were purified on nutrient agar (OXOID) plates and

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characterized using standard microbiological and biochemical procedures (Cowan and Steel, 1974; McFaddin, 1977). The antimicrobial screening of the extract was carried out using agar well diffusion method. Sterile Mueller Hinton's agar plates were flooded with 0.1 ml of the standardized bacterial suspensions. These were streaked uniformly on the surface of the culture media. Wells of 6 mm diameter were punched on each plate with sterile cork borer. The compound was dissolved in dimethyl sulfoxide (DMSO). About 0.1 ml of the extract and fractions at 200 mgml-1 was added to each well and allowed to stay for about 1hr to enhance diffusion through the media. The plates were incubated (inverted) aerobically at 37°C for about 18-24 hr. At the end of the incubation period, the diameters of the zones of inhibition of growth were measured using a transparent ruler and recorded. The compounds were tested in duplicates and mean zones of inhibition were calculated (Ake Antibacterial activity determination: The microorganisms used include gram-positive: Staphylococcus aureus, Methicillin resistant Staphylococcus aureus (MRSA), Bacillus subtilis, Vancomycin resistant enterococci (VRE) and gram negative bacteria: Shigella dysenteriae, Salmonella typhi and Escherichia coli were obtained at the Department of Microbiology, Ahmadu Bello University Teaching Hospital, Shika, Zaria. The isolates were purified on nutrient agar (OXOID) plates and characterized using standard microbiological and biochemical procedures (Cowan and Steel, 1974; Mc Faddin, 1977). The antimicrobial screening of the extract was carried out using agar well diffusion method. Sterile Mueller Hinton's agar plates were flooded with 0.1 ml of the standardized bacterial suspensions. These were streaked uniformly on the surface of the culture media. Wells of 6 mm diameter were punched on each plate with sterile cork borer. The compound was dissolved in dimethyl sulfoxide (DMSO). About 0.1 ml of the extract and fractions at 200 mgml-1 was added to each well and allowed to stay for about 1hr to enhance diffusion through the media. The plates were incubated (inverted) aerobically at 37°C for about 18-24 hr. At the end of the in ncubation period, the diameters of the zones of inhibition of growth were measured using a transparent ruler and recorded. The compounds were tested in duplicates and mean z

Antipyretic assay

The possible antipyretic of c.tougourensis was evaluated using yeast –induced hyperthermia model. The normal body temperature of each mouse was recorded using digital thermometer and the pyrexia was indused in all mice by dorsoleteral injection

III. CONCLUSIONS

This study aimed to research some biological activites of C.tougouriensis, Which have not been studided before. The study showed that C. tougourensis has singnificant antioxidant, anti – infiammatory ,anti-microbial activities as well as eneuroprotectiv effects. However, further investigations are needed on its chemical composition in bioactive molecules to highlight the pharmacological mechanism and the full potential of this species.

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