Zagazig J. Pharm. Sci., December, 2008 ISSN 1110-5089
Vol. 17, No. 2, pp. 25-37

STUDY ON THE QUALITY AND TOXICITY OF CAT'S CLAW CAPSULES

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ABSTRACT

The root, bark and leaves of Cat's claw are used medicinally, antibacterial, antimutagenic, antioxidant, antiinflammatory, antitumorous ,antiviral , cytostatic, depurative, diuretic, hypotensive, immunostimulat and vermifuge. Cat's claw was used to treat tumors, inflammations, rheumatism and gastric ulcers, gonorrhea, dysentery, diabetes, urinary tract cancer in women, cirrhosis, gastritis, rheumatism, inflammations and tumors. The elemental analysis results showed that Cat's claw capsules contained considerable amount of sodium, potassium, calcium, and magnesium while other tested elements such as iron, copper, chromium, manganese, lead, mercury, cadmium, and arsenic were not found. These results demonstrated that Cat's claw capsules were devoid of the toxic element.The experiments using GC-MS technique for the detection of any pesticide or insecticide residues in Cat's claw capsules revealed that the drug was devoid of any of such residual compounds. Furthermore, the mycotoxin contents were found to be within the allowable limits.

The acute, sub-acute and chronic toxicity studies were conducted in mice. The animals in the treatment groups were found to be normal and comparable to the control groups. All the animals were healthy and survived the observation period without any sign of toxicity. Throughout the experiment, none of the rat in any treatment group showed any Sign of abnormal toxicity and was found comparable to the control groups .

The results of present studies showed Cat's claw to possess relatively low toxicity. However, due to its known pharmacological activities Cat' claw was recommended to be used with caution with other drugs such as: lovastatin, krtoconazole, Ketoconazole, fexofenadine and triazolam.

INTRODUCTION

Herbal drugs are being used since ancient times for the treatment of a wide range of diseases. Their increasing use in the recent years is evidence of public interest in having some alternative for the conventional medicines. Medicinal plants played a key role in the world health [1,2].

In spite of the great advances observed in modern medicine, plants are still contributing in maintaining good health of people. Worldwide several programs, activities and projects are being conducted by governmental and non-governmental organizations regarding different aspects of herbal drug products [2-4].

The practice of traditional medicine is widespread throughout the world. For example, in Japan herbal medicinal preparations were found to be more in demand than mainstream pharmaceutical products[5]; while in Europe, some 1500 species of medicinal and aromatic plants are widely used. In China, 40% of the total medicinal consumption is attributed to herbal medicines[5].

Cat's claw [*Uncaria tomentosa* (Willd.) DC] Rubiaceae, is known with the common names cat's claw, Una de gate, Una de gavilan and Hawk's claw. The root, bark and leaves are used medicinally [6].

The following properties are Attributed to Cat's claw antibacterial, antimutagenic, antioxidant, antiinflammatory, Antitumorous ,antiviral , cytostatic, depurative, diuretic, hypotensive, immunostimulat and ,vermifuge [7-11]. Cat's claw is an officially accepted medicinal plant [12,13]. It is a large woody vine that is indigenous to the Amazon Rainforest and other Tropical areas of South and Central America including Peru, Columbia, Ecuador, Guyana, Trinidad; Venezuela, Suriname, Costa Rica, Guatemala and Panama. Its name was derived from the hook-like thrones that grow along the vine that resemble a claw of a cat. *Uncaria tomentosa* is a large woody vines about one hundred feet high with

claw-like thorns and small yellowish-white flowers. It has been used medicinally by the Aguaruna, Ashaninka, Coshibo, Conibo and Shipibo tribe of Peru for at least two thousand years [14].

Indigenous tribes also use Cat's claw to treat tumors, inflammations, rheumatism and gastric ulcers, gonorrhea and dysentery. Some tribes use cat's claw to treat diabetes, urinary tract cancer in women, cirrhosis, gastritis, rheumatism, inflammations and tumors. Some people in Peru believes that *Uncaria tomentosa* normalizes the body and have used it since ancient times to treat fever, abscesses and cleanse the systems.

Other documented indigenous uses Peru include using the important vine for hemorrhages, impurities of the skin, as a blood cleanser, and for irregularity of the menstrual cycle [15-18]. Cat' claw (*Uncaria tomentosa*) water extract, free from oxindole alkaloids, induced DNA repair and anti-inflammatory properties (Mammone et al. 2006; Sandoval et al. 2002). *Uncaria tomentosa* and *Uncaria guianesis* were found to be effective antioxidants, and both these plants induced anti-inflammatory activity and were used against arthritis, gastritis and osteoarthritis. Their anti-inflammatory properties were the result of their ability to inhibit TNF alpha and antioxidant [19,20].

Several biologically active natural compounds were isolated from Cat's claw such as 3 β, 6 β , 7-Acetodihdronomiline, 19α-trihydroxy-urs-12-en-28-oic-acid, 5α-carboxystrictosidine, acetyluncaric acid, adipic acid, alloisopteropodine, allopteropodine, ,angustine, campesterol, carboxystrictosidine, catechol BRAYL, D-catechin, DL-catechol, catechutannic acid, β-sitosterol, corynantheine, corynoxeine, dihydrocorynantheine, dihydrocarynanthine-N-oxide, dihydrogambirtannine. proanthocyanidins; ellagic acid , L-epicathechol, (-)-epicathechin, gallic acid, hanadamine, hirsutine, hirsuteine-N-oxide, hyperin, 3-iso-19-epi-ajmalicine, isocorynozeine, isomitraphylline, isopteropodine, isorhynchophylline, isorhynchophylline-N-oxide, isorotundifoline, ketouncaric acid, mitraphylline, I 11-methoxyhimbine, oleanolic acid, ourouparin, oxogambirtannine, pteropodine, quinovic acid-3β-0-β-d-glucopyranosyl-(1->3)β-d-fucopyranoside, quinovic acid-3 β-O-β-d-fucopyranosyl-(27->I) β-d-glucopyranosylester, quinovic acid3 β-0- β-d-quinovopyranoside; rhynckphylline, rotundifoline, speciophylline, stigmasterol, uncarine, uncarine-f, quinic acid and ursolic acid. The isolation and characterization of the alkaloids and other constituents of Cat's claw was reported by several researchers [21-24]. Proanthocyanidins isolated from Cat's claw showed significant antioxidant and radical scavenging activities, these properties were Considered responsible for its anti-inflammatory potential [8,25]. An improved HPLC method was successfully used for the determination of Cat's claw alkaloids [22].

MATERIALS AND METHODS

Sampling

The drug samples were withdrawn from all the specified storage conditions and were subjected to physical, chemical and microbiological analysis. The samples were collected with an interval of 6 months, starting from Zero time till the end of shelf life of the product. Samples were analyzed for the presence of any toxic heavy metal, pesticides residue, and mycotoxicns. Samples were subjected to acute, sub-acute, and chronic toxicity studies. During acute and sub-acute toxicity studies two animal models comprising of: (i) male and female mice, and (ii) female rats were used. Chronic toxicity studies were conducted only in male and female mice.

Stabllity studies

physical tests

Determination of density:

The test was carried out according to the official method as follows: British Pharmacopeioa 2002, Appendix VG A175.

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ISSN 1110-5089

Determination of Specific gravity

The test was performed according to the following official method: United States Pharmacopeioa, USP25th, Chapter <841>.

Determination of Refractive index:

The test was conducted according to the following official method: European pharmacopeioa method 2.2.6. using universal refractometer, Abbe type. Dual sacle model , ranges nD 1.30 to 1.70:0.001 (estimation to 0.0001), and 0 to 95: 0.5% sugar by weight.

Disintegration time of capsules:

The disintegration test determine whether capsules disintegrate within the prescribed time when placed in a liquid medium under the experimental conditions given by USP 25th Edition (Nutritional Supplements Official Monographs, Disintegration and Dissolution of Nutritional Supplements).

Loss on drying:

Loss on drying is the loss of mass expressed as percent (m/m). It is carried out by placing the manufacturer's described quantity of the sample in a weighing watch glass previously dried under the conditions prescribed for the drug to be examined.

The sample was dried for 3 hours in oven at 100°C±5°C After cooling, the weight of the watch glass with sample was recorded and the loss on drying was determined.

potentiometric determination (pH):

The pH was measured at the time of testing, by direct inserting the electrode of previously calibrated pH meter (Microprocessor pH 211 HANNA Instruments) into the sample which was prepared according to the conditions described for the drug under examination.

Chemical analysis:

All chemical tests and assays were carried out according to the manufacturer's files and/or the methods specified in: Eu. P. 3d Edition [26].

Elemental analysis:

Accurately weighed 1 g of the sample was transferred to an ashing crucible, it was then placed inside a muffle furnace till ashing was completed. The ash was dissolved in 10 ml of 50% aqueous solution of nitric acid with slight heating on a small flame. The contents of the crucible were filtered through micro membrane filter into a 100 ml volumetric flask. The crucible was washed with distilled water and the washing was transferred into the same flask and the volume was completed with distilled water and mixed well. The concentrations of different elements in the solution were determined by using GBC-906 Atomic absorption Spectrophotometer. The level of each element was calculated by using previously plotted calibratioon curve and recorded as ppm (μg/g) on dry weight of the examined samples [27].

Specific tests:

Assays of some of the active components in the drug products under current investigation were performed following the procedure given in the registration files of the products or following the official protocol: Eu. P. 3rdEdition [26].

The following instruments were used for high performance liquid chromatography, gas chromatography and GC-MS studies:

HPLC: Shimadzu LC-IOADvp Pump, DGU-14A Degasser, STO-10 Asvp Column oven, SCL-Avp System Controller, SPD-IOAvp Diode Array Detector, SIL-I OADvp Auto- injector.

GC: HP5890, Hewlett Packard, Series 11.

GC-MS: Shimadzu GC-MS-QP5050-EL mode, CG-17A gas chromatograph, AOC 20, Auto-injector, AOC-20s Auto-sampler.

Detection of pesticides residue:

The drugs were tested for the pesticides residues. Different isomers were also checked: DDT, BHC, Lindan, Heptachlor, Methoxychlor, Chlorolane,

Toxaphene, Endosulfan, TDE, Dieldrin and Endrin as described by [27-30].

Mycotoxins determination:

The drug in the present study was tested in duplicate for the aflatoxins which are naturally occurring mycotoxins. A quantitative evaluation of aflatoxin were carried out through antigen antibody reaction using ELISA (Enzyme linked immunosorbent assay) technique on minilyser (fully automated system), modified Tecan RSP 5051 by Tecan company using RIDASCREEN & toxin total screening kit (Art. No . 470), manufactured by R-Biopharm AG, Damstadt, Germany.

Type of toxicity:

The toxicity studies were performed drugs according to WHO Techical Report No. 872[31], and Eu.P. 3rd Edition method 2.6.9.[26]. Animals were observed for any abnormal signs during the acute, Sub-acute, and chronic toxicity treatments in male and female mice; and female rats. The animals were observed at: 5, 15, and 30 min., 1, 2, and 4 hours on day 1; then once a day throughout the observation period. The results were evaluated by comparing the treated with the control one. Animals died within the first 24 hrs were discarded.

Design of study and experimental animals

The study was conducted on laboratory bred Swiss albino mice. In each of the toxicity treatments, sixty mice (30 male and 30 female mice kept separately) were randomly assigned to the control and treatment groups. Animals were chosen to be between 6-7 weeks of age and body weight ranged from 18-22 g. Mice were kept in the standard laboratory conditions (12 hrs dark/12 hrs light cycle) as regards their feeding, lighting, temperature, humidity, etc., and not more than five animals per cage.

For using different animal model to study the acute and sub-acute toxicity, Sprague- Dawley female rats were selected as a second animal model. Ten female rats were used for each product and for control during this study. In order to eliminate the sex variation, only female rats were used throughout the acute and sub-acute toxicity studies.

The drug products under study were dispersed in 0.1% CMC (carboxy methyl cellulose) solution. The prepared fluids were delivered orally using high dose (acute), repeated dose toxicity levels (sub-acute) and recommended repeated dose (chronic) for six months. As the body weight and distilled water intake increased by time, the daily dose was adjusted weekly compared to the initial dose. Accordingly, each animal received the right dose during the chronic study period. The daily dose was calculated from the therapeutic dose specified by the manufacturers. The control group animals received only 0.1% CMC in the same dose. The food supply for the experimental animals was from: Grain Soils and Flour Mills Organization, Riyadh Branch.

The acute, sub-acute, and chronic toxicity studies were performed using the recommended feeding needles (sea and tube style constructed of stainless steel tubing and balls , 20 mm gauge , 25 mm length and 2.2 mm ball diameter for mice and 18 mm 76 mm length and 2.25 mm ball diameter for rats).

Statistical analysis

The data were expressed as mean ± SEM. Student's t-test was used to determine-the statistical significance of data. $P< 0.05$ was regarded as significant; $P< 0.01$ highly significant, and $P> 0.05$ as non-significant.

RESULTS AND DISCUSSION:

Cat's claw capsules were stored under the specified conditions for twenty-four months and the samples were withdrawn after each six months for analysis. All the samples stored under different conditions were analyzed for any physical changes according to the set parameters, there were no appreciable physical changes observed in appearance, color, odor and disintegration time of the capsules and the results are depicted in table 3. During the HPLC analysis of Cat's claw-capsules stored under different conditions, all peaks were properly resolved and there

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Vol. 17, No. 2, pp. 25-37

ISSN 1110-5089

was no significant decline in the selected target compounds in the chromatogram throughout the study period. The results of the microbiological analysis revealed very low counts of both viable aerobic bacteria and fungi. Furthermore, no primary pathogens were found in any of the tested samples of Cat's claw capsules during the study period thus confirming the drug to be microbiologically stable.

The elemental analysis results showed that Cat's claw capsules contained considerable amount of sodium, potassium, calcium, and magnesium while other tested elements such as iron, copper, chromium, manganese, lead, mercury, cadmium, and arsenic were not found. These results demonstrated that Cat's claw capsules were devoid of the toxic elements tested and the results are presented in table 1.

The experiments using GC-MS technique for the detection of any pesticide or insecticide residues in Cat's claw capsules revealed that the drug was devoid of any of such residual compounds. Furthermore, the mycotoxin contents were found to be within the allowable limits (Table 2).

The acute, sub-acute and chronic toxicity studies were conducted in mice. The animals in the treatment groups were found to be normal and comparable to the control groups. All the animals were healthy and survived the observation period without any sign of toxicity.

Throughout the experiment, none of the rat in any treatment group showed any Sign of abnormal toxicity and was found comparable to the control groups.

The body weight data showed significant increase in the body weight of mice and rats in different treatment groups which was similar and comparable to the control animals The water intake by the tread mice after chronic toxicity studies was normal and comparable to the control. The increase in water intake by the animals was also comparable to the mice in the control groups (Table 4) .At the end of the treatment, visceral condition of the different groups was found normal and comparable to the control animals.

Acute and sub-acute treatment was also conducted by using female rats experiment in female rats also showed no toxicity and the visceral conditions of the treated rats were similar and comparable to the rats in the respective groups (Table 3 and 4).

The gross and histopathological finding of selected vital organs and bone marrow no changes and were found normal as compared to the control These findings were in agreement with earlier reports where Cat's claw treatment was found not to induce any liver damage [32].

Biochemical parameters after acute, sub-acute and chronic treatment, remain within the normal range and comparable to the controls. However, the level of ALT significantly increased ($P< 0.05$) in all the animals after acute treatment as compared to the control. During sub-acute treatment, the ALT levels were significantly raised ($P<0.01$) as compared to the respective controls.

During hematological studies all parameters remain within the normal range and comparable to the control, except a significant increase ($P<0.05$) in WBC levels as compared to the control in both animal models after acute and sub-acute treatment (Table 4) It is worth mentioning that WBC levels the chronic treatment groups remained within the normal range and comparable to the male and female control animals. This shift may be attributed to the extended period of drug administration in the recommended therapeutic dose chronic treatment studies. Furthermore, the pentacyclic oxindole alkaloids of Cat's claw are known to a lymphocyte-proliferation-regulatory factor, which normalizes the lymphocyte count without altering the total leukocytes number [33].

The effects of Cat's claw acute, sub-acute and chronic treatment, on male mice fertility revealed that sperm count, motility and sperm viability were

comparable to the untreated control mice; which were found to be ≥ 14 x 10^6 /ml ; ≥50% and ≥50% respectively It was confirmed that Cat's claw treatment was devoid of spermatotoxic effects.

During acute and sub-acute toxicity studies conducted in female rats (the second animal model), the biochemical studies showed a significant (P<O.05) rise in the levels of AST, ALT and ALP of Cat's claw treated animals as compared to the control as shown in Table 6. The significant elevation observed in the liver enzymes caused by Cat's claw during the current acute and sub-acute toxicity studies may be attributed to some the chemical constituents of Cat's claw inducing hepatic cellular activity without causing hepatic damage in female rats [32].

Our results were supported by the earlier reports on Speciophylline, an active compound of Cat's claw and some other plants [32]. Speciophylline, in the previous experiments induced significant hepatic cellular activity without causing any cellular necrosis [32].

Gross and stopathologic studies on different organs of Cat's claw treated female rats showed normal appearance of liver except mild congestion. These results are in agreement with the observed rise in liver enzymes of treated rats. Cat's claw alkaloids rhynchophylline, hirsutine and mitrophylline have been reported to posses vasodilating properties which may explain the observed congestion in liver. It is worth mentioning that there was no necrotic change in the liver of treated animals as confirmed by histopathological investigations. These findings are also in agreement with earlier observations where Cat's claw alkaloids were found not to cause hepatic damage [32]. Cat's claw acute and subacute treatment induced almost similar changes, such as rise in liver enzymes and WBC levels, in mice as well as in female rats.

From the fore mentioned results of the present study it is possible to conclude that, acute, subacute and chronic toxicity studies by oral administration of Cat's claw capsule Content with the selected doses, did not induce any remarkable signs of toxicity in mice. The same findings were observed in female rats after acute and subacute treatment with claw capsule contents.

Earlier Cat's claw was reported to be possess relatively low toxicity [14,34], However, based on the results of current study showing increase in the levels of AST, ALT and AL,P by cat's claw treatment, it is Suggested that it should be used with caution[35], and necessitate the use of this herbal product at the recommended dose by patients with liver problems. The results of present toxicity studies provided basic information about the toxicity of Cat's claw which may support any of the future studies in human beings.

Physicians and other healthcare providers should be aware of potential herb-drug interactions. It is therefore, very important that the healers and /or physicians should ask, their patients, if they were using any alternate medicine and give them information about their prescription accordingly.

The results of present studies showed Cat's claw to possess relatively low toxicity. However, due to its known pharmacological activities Cat' claw was recommended to be used with caution with other drugs such as: lovastatin, krtoconazole, Ketoconazole, fexofenadine and triazolam [36,37].

ISSN 1110-5089

Table 1: Stability studies on Cat's claw capsules

Tests	Specifications	TIME INTERVALS & LOCATIONS																
		0 time	0 + 6 Months				0+ 12 Months				0+18 Months				0+ 24Months			
			R	J	CH1	CH2	R	J	CH1	CH2	R	J	CH1	CH2	R	J	CH1	CH2
PHYSICAL																		
Characters	Transparent, colorless capsules	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Content description	Brown powder with no distinctive odor	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Disintegration	<30min	4	4	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4
CHEMICAL																		
Identification	Positive	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Assay of alkaloids	315-385 mg/cap	326	320	325	327	310	311	325	332	305	325	328	329	320	320	327	319	316
MICROBIOLOGY																		
Bacterial counts	$\leq 5x10^4$(c.f.u./g)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Yeast & mold counts	$\leq 5x10^4$(c.f.u./g)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
S. aureus	Nil/g	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
E. coli	Nil/g	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Ps. Aeruginosa	Nil/g	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Salmonella	Nil/10g	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Table 2: The effect of different dose treatments with Cat's claw capsules on water intake & body weight of tested animals.

Indices	Treatment	Animal group	Male Mice			Female Mice			Female Rat	
			Acute	Sub acute	Chronic	Acute	Sub acute	Chronic	Acute	Sub acute
Body weight/gm	Before	Control	20.4±1.4	20.5±1.0	20.2±0.8	19.8±0.7	20.4±0.7	20.6±0.9	259±6.5	258±4.5
		Treated	21.2±1.0	19.5±0.8	20.7±0.9	19.6±0.8	19.5±0.6	20.3±0.9	264±9.0	263±9.0
	After	Control	22.9±1.2	24.7±0.8	39.0±1.2	21.9±1.0	24.2±0.6	36.3±0.9	265±6.5	274±5.0
		Treated	22.8±1.0	24.3±0.5	38.3±0.7	21.0±1.0	23.2±0.5	35.0±1.7	271±8.5	277±9.0
Water intake/ml	Before	Control	NR	NR	3.9±0.1	NR	NR	3.8±0.1	NR	NR
		Treated	NR	NR	3.9±0.1	NR	NR	3.7±0.1	NR	NR
	After	Control	NR	NR	5.6±0.1	NR	NR	4.8±0.1	NR	NR
		Treated	NR	NR	5.7±0.04	NR	NR	4.7±0.1	NR	NR

Results are expressed as mean ± SEM.
P>0.05: (non-significant), *P<0.05: (Significant), **P<0.01: (highly Significant), compared with the control groups using paired student's t-test.

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ISSN 1110-5089

Table 3: The effect of different dose treatments with Cat's claw capsules on the average weight of vital organs/ 100g body weight of tested animals.

Organ	Animal group	Male Mice			Female Mice			Female Rat	
		Acute	Sub acute	Chronic	Acute	Sub acute	Chronic	Acute	Sub acute
Heart	Control	0.71±0.01		0.80±0.01	0.70±0.01		0.75±0.01	1.1±0.07	
	Treated	0.70±0.01	0.71±0.01	0.79±0.01	0.69±0.01	0.69±0.01	0.74±0.01	1.1±0.09	1.0±0.04
Lungs	Control	0.92±0.02		1.60±0.1	0.91±0.02		1.30±0.1	1.94±0.08	
	Treated	0.90±0.01	0.92±0.01	1.4±0.1	0.89±0.01	0.91±0.01	1.2±0.1	1.94±0.05	1.96±0.04
Liver	Control	6.1±0.1		8.7±0.2	5.7±0.1		7.5±0.2	8.3±0.2	
	Treated	6.0±0.1	6.1±0.3	8.7±0.2	5.8±0.1	5.8±0.1	7.7±0.4	8.2±0.2	8.2±0.1
Kidneys	Control	1.21±0.02		2.70±0.10	1.21±0.02		2.17±0.05	2.0±0.06	
	Treated	1.21±0.01	1.21±0.01	2.60±0.14	1.22±0.01	1.21±0.01	2.02±0.05	1.96±0.04	1.95±0.04
Spleen	Control	0.55±0.01		0.75±0.02	0.55±0.01		0.72±0.01	0.57±0.02	
	Treated	0.55±0.01	0.55±0.01	0.74±0.01	0.54±0.01	0.54±0.02	0.71±0.01	0.57±0.01	0.57±0.01
Testes	Control	0.77±0.01		1.35±0.06	NR	NR	NR	NR	NR
	Treated	0.77±0.01	0.77±0.01	1.40±0.15	NR	NR	NR	NR	NR
Ovaries	Control	NR	NR	NR	0.11±0.01		0.12±0.01	0.78±0.02	
	Treated	NR	NR	NR	0.10±0.01	0.10±0.01	0.12±0.01	0.77±0.02	0.78±0.01

Results are expressed as mean ± SEM.P>0.05: (non-significant), *P<0.05: (Significant), **P<0.01: (highly Significant), compared with the control groups using paired student's t-test. NR = not required.

Table 3: The effect of different dose treatments with Cat's claw capsules on the average weight of vital organs/ 100g body weight of tested animals.

Indices		Male Mice				Female Mice				Female Rat		
		Control	Acute	Sub acute	Chronic	Control	Acute	Sub acute	Chronic	Control	Acute	Sub acute
Biochemical	Glucose Mmol/l	5.4±0.3	5.2±0.2	5.2±0.1	5.1± 0.2	5.1±0.3	4.9±0.2	4.9±0.1	5.0±0.2	6.3±0.6	6.5±0.1	6.1±0.4
	Urea Mmol/l	6.1±0.4	6.8± 0.7	6.6±0.3	6.8±0.2	6.0±0.3	6.7±0.5	6.3±0.1	6.3±0.3	7.5±.5	7.8±0.3	7.7±0.1
	Creatinin e µmol/l	28.7±2.0	30.6±1.2	28.9±0.5	29.7± 1.7	26.8±1.3	27.1±0.5	28.0±0.4	26.6±1.7	62.0±2.0	63±3.2	64.4±2.7
	Uric acid µmol/l	62±6.0	61± 8.0	60±7.0	69± 10.0	59±3.0	55±2.0	54±6.0	59.9±9.0	118±10.0	116±4.0	117±9.0
	Calcium Mmol/l	1.92±0.10	1.80± 0.10	1.82±0.10	1.88± 0.10	1.86±0.1	1.82±0.10	1.80±0.10	1.84±0.10	2.7±0.1	2.5±0.3	2.76±0.1
	AST U/L	100±14.0	113±14.0	115±16.0	99±21.0	100±12.0	106±14.0	105±20.0	110±17.0	85±7.0	93±2.0*	121±24.0*
	ALT U/L	56±7.0	77±13.5*	87±13.0**	56± 8.0	54±7.0	85±13.0*	80±7.0**	57±8.0	55±5.0	66±4.0*	79±9.0**
	ALP U/L	93±8.0	95±9.0	98± 6.0	95± 9.0	91±12.0	94±14.0	94±6.0	95±8.0	91±8.0	112±10.0*	109±2.0*
Hematological	WBC $X10^3/L$	5.6±0.4	6.6± 0.5*	6.5± 0.3*	5.9± 0.5	5.2±0.3	5.9±0.3*	5.8±0.1*	5.6±0.5	10.6±1.1	13.0±0.7*	12.8±0.6*
	RBC $X10^{12}/L$	6.4±0.5	6.4± 0.4	6.8±0.4	6.9±0.3	6.5±0.4	6.4±0.4	6.6±0.4	6.8±0.4	7.7±0.4	7.3±0.3	7.3±0.5
	Hg g/dL	12.9±0.5	13.2± 0.4	13.6± 0.3	13.3± 0.6	12.7±0.5	12.8±0.5	13.0±0.3	13.0±0.6	13.5±0.6	13.3±0.5	13.3±0.6
	Platelets $X10^9/L$	503±17.0	508± 29.0	521± 39.0	533± 30.0	485±24.0	491±7.0	479±26.0	501±21.0	630±53.0	613±5.0	606±90.5
	MCV fL	51.7±1.1	52.2± 0.9	52.4± 0.7	52.4±0.6	51.1±0.7	51.4±0.6	51.1±0.4	52.2±0.5	55.0±1.2	55.6±2.5	55.8±1.9
	HCT %	38.7±0.7	39.0±0.3	39.2± 0.4	39.6± 0.5	38.8±1.0	38.8±0.4	38.6±0.3	39.0±0.9	40.6±1.6	40.4±1.6	39.8±1.2

Results are expressed as mean ± SEM.P>0.05: (non-significant), *P<0.05: (Significant), **P<0.01: (highly Significant), compared with the control groups using paired student's t-test. NR = not required.

ISSN 1110-5089

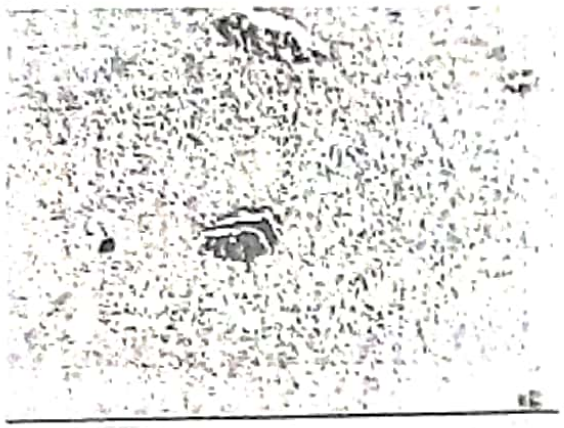

Fig 1: Liver of female rat with congestion after acute treatment with Cat's claw capsules. (Hematoxylin and Eosin)

Fig 2: Liver of female rat with mild congestion after sub-acute treatment with Cat's claw capsules. (Hematoxylin and Eosin)

ACKNOWLEDGMENT

Acknowledgment and extreme gratefulness of the principle and Co- investigators of the project No. AT-18-35, are due to King Abdulaziz City for science and technology, General Directorate of Research Grants Programs, for its generous grant and continuous support.

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Received: July 14, 2008
Accepted: Sept. 10, 2008

Zagazig J. Pharm. Sci., December, 2008
Vol. 17, No. 2, pp. 25-37

ISSN 1110-5089

دراسة على جودة وسمية كبسولات نبات مخلب القط

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الملخص

تستخدم جذور و قلف و أوراق نبات مخلب القط في الأغراض الطبية ، حيث أن لهذا النبات تأثير مضاد للبكتيريا ومضاد للطفرات الجينية ومضاد للأكسدة ومضاد للإلتهاب ومضاد للأورام ومضاد للفيروسات ومطهر ومدر للبول وخافض لضغط الدم المرتفع ومحفز للجهاز المناعي وطارد للديدان. كما تستخدم مستخلصات هذا النبات في علاج الأورام والإلتهابات والرماتيزم وقرحة المعدة والسيلان والدوسنتاريا والسكري وعلاج سرطان القناة البولية في النساء وتليف الكبد.

وقد أظهرت تحاليل العناصر أن كبسولات مخلب القط تحتوي على كمية من الصوديوم والبوتاسيوم والكالسيوم والماغنسيوم بينما أظهرت التحاليل عدم وجود الحديد والنحاس والكروم والمنجنيز والرصاص والزنبق والكادميوم والزرنيخ مما يعني خلو كبسولات مخلب القط من العناصر السامة ، كما أظهرت الدراسة خلو العقار من بقايا المبيدات الحشرية ومبيدات الآفات وأيضا خلوه من السموم الفطرية.

كذلك أظهرت الدراسة التي أجريت على ذكور وإناث الفئران وإناث الجرذان عدم ظهور أي أعراض للسمية على جميع الحيوانات المستخدمة سواءا في الجرعات المزمنة أو الحادة.

توضح نتائج هذه الدراسة أن كبسولات مستخلص نبات مخلب القط ذو سمية منخفضة ، ونظرا للنشاط الصيدلانى لمخلب القط فإنه ينصح بالإحتاط عند استعماله مع الأدوية الأخرى مثل لوفاستاتين وكرتوكونازول وفيكسوفينادين وتراى زولام.