International Journal of Advanced Research in Biological Sciences
ISSN: 2348-8069
www.ijarbs.com
(A Peer Reviewed, Referred, Indexed and Open Access Journal)
DOI: 10.22192/ijarbs Coden: IJARQG (USA) Volume 12, Issue 2-2025

Research Article

DOI: http://dx.doi.org/10.22192/ijarbs.2025.12.02.001

Acute and Sub-acute Oral Toxicity Study of *Pavala Vanka Chendhooram* - A Siddha Formulation

Vigneshwari S[1*], Singarajah Janani[2]

[1]* Assistant Medical Officer, Government Hospital, Tiruchendur, TamilNadu
[2] Senior Lecturer Gr II, Faculty of Siddha Medicine, Trincomalee Campus, Eastern University Sri Lanka
*Correspondence: S. Vigneshwari, Asst. Medical Officer, Government Hospital, Tiruchendur, Tamil Nadu, E-mail: *vigneshwarisrithar@gmail.com*

Abstract

Siddha System of Medicine is as old as mankind and dominated the civilization of the southern peninsula of India.Siddha drugs are prepared from herbs, metals, metalloids and minerals which has a different set of dosage formulations in solid, liquid, semisolid, and semiliquid forms. Nowadays the public expects the scientific evidences for the safety and efficacy of the drugs. Therefore the Quality control is important, which is a sign of trust, purity, efficacy, reliability, and effectiveness of the manufactured medicines. Also it ensures that each product meets the specified quality standards before reaching the market, safeguarding patient safety. This present study deals with the evaluation of the safety of *Pavala Vanka Chendhooram* (PVC) as per the Organization for Economic Co-operation and Development (OECD) Guidelines 423 and 407 inwistar albino rats.PVC is a one of the effective and excellent Siddha preparation mentioned in "*Agasthiyar chendhooram*– 300" which is especially useful to treat the penile cancer. Toxicity studies are vital to the drug discovery process. Through rigorous testing, researchers compile all the necessary data to understand a new drug's safety profile and advance it toward patient use. For the acute toxicity, the test drug PVC was administered orally with different doses (5, 50, 300, 2000 mg/kg body weight) and the results were recorded on day 0, with single oral dosing period of 14days. For the sub-acute toxicity, the test substance was orally administered daily in graduated doses to several groups of experimental animals, one dose level per group for a period of 28 days. Finally hematological parameters, biochemical parameters histopathological study were performed for all animals. The study concludes that on oral administration of different dose level did not produce the signs of toxicity, functional and behavioural changes, and mortality in the test groups as compared to the controls when observed during 14 days of the acute oral toxicity experimental period. Sub-acute toxicity is carried by repeated dose of test drug for 28 days. All the animals were free of intoxicating signs throughout the dosing period of 28days and all animals were survived up to study termination period. Hence the toxicological study of the test drug, PVC reveals the safety of the drug for long time administration.

Keywords: Siddha Medicine, *Pavala Vanka Chendhooram,* sub-acute toxicity, histopathological study

Introduction

There are so many medical systems in the world. India has the unique distribution of various recognized Indian indigenous systems of medicine. They are Siddha, Ayurveda, Unani and Homeopathy. Among them Siddha Medicine is one of the oldest system of Medicines which originates in South India. In classical Siddha literatures, Siddhars mentioned about the etiology, symptoms, preventive care and treatment of diseases, drugs used for preparing medicines and their properties, diet and habits to prevent diseases, dietary regimens for each diseases etc,It also includes *kaayakarpam* (rejuvenation and longivity), *yogasana*, *pranayamam*, *muppu* and *theetsai*. Siddha Medicines are classified into 32 types of internal medicines and 32 types of external medicines. They are prepared by using herbal drugs, metals, minerals and animal products. Each substance is made up of five elements. They have five properties such as *suvai* (taste), *gunam* (character), *veeriyam* (potency), *vibagam* (post absorptive changes) and *pirabavam* (specific action).[9]

The trial drug "*Pavalavanka chendhooram*" has been selected from the Classical Siddha literature "*Agasthiyar chendhooram*– 300. PVC is a very effective medicine for *Salakazhichchal* (Watery diarrhoea), *Kaduppu* (Dysuria), *Kuriyerippu* (Burning sensation in penis), *Lingapputtru* (Penile cancer), *Megaththinalezhunthathosham* (Sexually transmitted diseases)and *Megasalam*. It consisting *Karuvangam* (Lead), *Pavalam* (Coral), *Komoothirasilasathu* (Asphalt mineral pitch), *Ganthagam* (Sulphur), *Elumichaichaaru* (*Citrus aurantifolia*) and *Manjal Karisalaichaaru* (*Wedeliacalendulacea*).[1][7]

Toxicity testing of new compounds is essential for drug development process to evaluate the safety of potential drug candidates. This is accomplished using relevant animal models and validated procedures. [6][8]The aim of this Study is to evaluate the toxicological profile of the test drug "*Pavalavanka chendhooram*".

Materials and Methods

Ingredients of the Drug:

1. *Karuvangam* (Lead) - 1 *palam* (35 g)
2. *Pavalam* (Coral) - 1 *palam* (35 g)
3. *Komoothirasilasathu* (Asphalt mineralpitch) - 1 *palam* (35 g)
4. *Ganthagam* (Sulphur) - Q.S
5. *Elumichaichaaru* (*Citrus aurantifolia*) - Q.S
6. *Manjal Karisalaichaaru* (*Wedeliacalendulacea*) - Q.S

Collection of the raw materials:

Lead, coral and sulphur were purchased from Sivasakthi pharmaceuticals, Coimbatore. The asphaltum was purchased from Rajendra herbals, Thakkalai, Nagercoil. Lime and Traillingeclipta were purchased from Palayamkottai market, Tirunelveli.

Identification and Authentication:

All raw drugs were identified and authenticated by the Department of Gunapadam (Pharmacology) in Government Siddha Medical College Palayamkottai, Tirunelveli. The specimen samples of the identified raw drugs were stored in the laboratory of PG Gunapadam for future references.

Purification of Raw Drugs:

Karuvangam, Pavalam, Komoothira Silasathu and *Gandhagam* were purified properly according to the methods which mentioned in Siddha texts.

Method of Preparation:

Karuvangam (35g), *Pavalam* (35g) and *Komoothirasilasathu* (35g) were placed in a stone mortar and ground with lime juice for about 6 hours in morning and evening. This process was repeated for 3 days and made into small cakes and dried. These cakes were placed in a mud flask and covered with a mud plate and shield with clay

cloth and then dried. Then it was subjected to incineration process. After cooling, the cakes were removed from the mud flask and weighed. These cakes were placed in a stone mortar and 1/4th of *Ganthagam* was added and rubbed with trailing eclipta juice. This paste was made into small cakes and dried. These cakes were placed in a mud flask and covered with a mud plate and shield with clay cloth and then dried then it was subjected into incineration process with 50 cow dung cakes.

After cooling the processed medicine was taken from the mud flask, groundinto fine powder and stored in an air tight glass container.[1][2]

Acute Oral Toxicity Study (14 Days) of *Pavala Vanka Chendhooram* in Female Wistar Albino Rats (OECD Guideline–423)

Aim: The aim of this Study is to evaluate the acute toxicity of the test drug *Pavalavanka chendhooram*, when administered orally to Female Wistar Albino Rats with different doses, so as to provide a rational base for the evaluation of the toxicological risk to man.

Study Design and Controls:

1. Female Wister Rats in controlled age and body weight were selected.
2. The test drug PVC was administered at 5 mg/kg, 50 mg/kg, 300 mg/k, 2000mg/kg body weight of animal as suspension along with water.
3. The results were recorded on day 0, with single oral dosing period of 14days.

Experimental Procedure

1. Animals:

1.1. Supply:

A total of 15 Female Wister Rats with an approximate age of 6 weeks are purchased from CAP LABS Nagercoil. On their arrival a sample of animals was chosen at random and weighed to ensure compliance with the age requested.

The mean weights of Female Wister Rats were 100-150 g respectively. The animals were housed in metabolic cages (55 x 32.7 x 19 cm), with sawdust litter, in such a way that each cage contained a maximum of 3 animals of the same sex.

All animals underwent a period of 20 days of observation and acclimatization between the date of arrival and the start of treatment. During the course of this period, the animals were inspected by a veterinary surgeon to ensure that they fulfilled the health requirements necessary for initiation of the Study. The studies were conducted in the animal house of A.K college of Pharmacy, Krishnankoil, Srivilliputtur

1.2. Housing:

The Female Wister Rats were housed in metabolic cages (55 x 32.7 x 19 cm), placed on racks. From the week before initiation of the treatment, each cage contained a maximum of 3 rats of the same sex and treatment group.

Each cage was identified by a card, color coded according to the dose level. This card stated the cage number, number and sex of the animals it contained, Study number, test substance code, administration route, dose level, Study Director's name, date of the arrival of the animals and initiation of treatment.

The temperature and relative humidity were continuously monitored. Lighting was controlled to supply 12 hours of light (7:00 to 19:00 hours) and 12 hours of dark for each 24-hours period.

The cages corresponding to each experimental group were distributed on racks in such a manner that external factors, such as environmental conditions, were balanced as far as possible.

2. Diet:

All the rats had free access to a pelleted rat diet. The diet was analyzed by the manufacturer to check its composition and to detect possible contaminants.

2.1. Water:

The water was offered ad libitum in bottles.

3. Numbering and Identification:

The animals were marked on body with picric acid solution prepared in water.

The marking within the cage was as below.

Table 1: Numbering, identification and dose in Acute Toxicity Study

Cage No	Group	Dose (mg/kg/day)	Animal Marking	Sex	No. Of Animals
1	I	CONTROL	H,B,T	Female	3
2	II	PVC 5 mg/kg	H,B,T	Female	3
3	III	PVC 50 mg/kg	H,B,T	Female	3
4	IV	PVC 300 mg/kg	H,B,T	Female	3
5	V	PVC 2000 mg/kg	H,B,T	Female	3

H – Head, B – Body, T – Tail

The group no., cage no., sex of the animal and animal no. were identified using cage label and body marking on the animals

4. Preparation for Acute Toxicity Studies:

Rats were deprived of food overnight (but not water 16-18 h) prior to administration of the, *Pavala Vanka Chendhooram* (PVC).The principles of laboratory animal care were followed and the Institutional Animal Ethical Committee approved the use of the animals and the study design.[4]

5. Route of administration and procedure:

The test substance was administered orally. The Female Wistar albino rats belonging to the vehicle control group were treated with Distilled water at the same administration volume as the rest of the testing groups.

5.1. Doses:

The doses for the study were selected based on literature search and range finding study. Following the period of fasting, the animals were weighed and then drug was administered orally as single dose using a needle fitted onto a disposable syringe of approximate size at the following different doses.

Table 2: Acute oral toxicity study animal grouping and doses

Group	No. of Animals (Female)	Dose
I(Vehicle control)	3	Distilled water 2ml/100g
II	3	5 mg/kg + Distilled water 2ml/100g
III	3	50 mg/kg + Distilled water 2ml/100g
IV	3	300 mg/kg + Distilled water 2ml/100g
V	3	2000 mg/kg + Distilled water 2ml100kg

The test drug was administered as single dose. After single dose administration period, all animals were observed 14 days.

5.2. Preparation of Doses:

PVC was added in distilled water and completely dissolved to form oral for administration. The dose was prepared of a required concentration before dosing by dissolving, in distilled water. It was mixed well. The preparation for different doses was vary in concentrations to allow a constant dosage volume.

5.3. Administration of Doses:

The test drug was administered orally to each Female Wister rats as single dose using a needle fitted onto a disposable syringe of appropriate size at the following different doses. The concentration was adjusted according to its bodyweight. The volume was not exceeding 10 ml/kg bodyweight. Variability in test volume was minimized by adjusting the concentration to ensure a constant volume at all dose levels.

6. Observational period:

All animals were observed for following changes / activities. The appearance, change and disappearance of these clinical signs, if any, were recorded for approximately 1.0, 3.0 and 4.0 hours post-dose on day of dosing and once daily thereafter for14 days.

6.1. Physical and behavioral changes
6.2. Home cage activity
6.3. Handheld activity
6.4. Mortality and Morbidity: All animals were observed for mortality and morbidity at ½ hour, 1 hour, 2 hours, 4 hours and up to 24 hours on day of dosing and twice daily (morning and afternoon) thereafter for 14 days.

7. Data and reporting:

All data were summarized in tabular form, (Table- 25 to 28) showing for each test group the number of animals used, the number of animals displaying signs of functional and behavioral changes, the number of animals found dead during the test, description of toxic symptoms.

Sub-Acute (Repeated Dose) Oral Toxicity Study (28 Days) of *PavalaVankaChendhooram* in Wistar Albino Rats (OECD Guideline – 407)

Aim:

The aim of this Study is to evaluate the toxicological profile of the test item when treated as a single dose daily. Animals should be observed for 28 days after the drug administration. This study provides information on the possible health hazards likely to arise from exposure over a relatively limited period of time.

1. The Sub acute toxic class method is a stepwise procedure with the use of 10 animals of a both sex per step.
2. The duration of exposure should be 28 days.
3. Doses are selected on the basis of ED50 and LD50.
4. Animals are observed for overt effects, food and water intake, hematological parameters, Biochemical parameters, body weight and organ toxicity.
5. The method allows establishing doses for sub chronic studies.

The test substance is orally administered daily in graduated doses to several groups of experimental animals, one dose level per group for a period of 28 days. During the period of administration the animals are observed closely, each day for signs of toxicity. Animals that die or are euthanized during the test are necropsied and at the conclusion of the test surviving animals are euthanized and necropsied. The 28 day study provides information on the effects of repeated oral exposure and can indicate the need for further longer term studies. It can also provide information on the selection of concentrations for longer term studies.

Table 3: Numbering, identification and dose in Sub Acute Toxicity Study

Cage No	Group	Dose(mg/kg/day)	Animal Marking	Sex	No. of Animals
1	I	VEHICLE CONTROL	H,B,T,HB,NM H,B,T,HB,NM	Male Female	5 5
2	II	PVC 200 mg/kg	H,B,T,HB,NM H,B,T,HB,NM	Male Female	5 5
3	III	PVC 300 mg/kg	H,B,T,HB,NM H,B,T,HB,NM	Male Female	5 5
4	IV	PVC 400 mg/kg	H,B,T,HB,NM H,B,T,HB,NM	Male Female	5 5

H – Head, B – Body, T – Tail, HB – Head and Body, NM – No Marking

Preparation for Sub acute Toxicity Studies:

Rats were deprived of food overnight (but not water 16-18 h) prior to administration of the, *Pavala Vanka Chendhooram* (PVC). The principles of laboratory animal care were followed and the IAEC approved the use of the animals and the study design.[5]

Route of Administration and Procedure:

The test substance was administered orally. The Wistar albino rats belonging to the vehicle control group were treated with Distilled water at the same administration volume as the rest of the testing groups.

Doses:

Generally, at least three test groups and a control group should be used. Following the period of fasting, the animals were weighed and then drug was administered orally as single dose using a needle fitted on to a disposable syringe of approximate size at the following different doses.

Table 4: Sub acute oral toxicity study animal grouping and doses

Group	No of Animals (Male + Female)	Dose
Group-I (Vehicle control)	5+5	Distilled water (2ml/kg)
Group-II	5+5	200 mg/kg + Distilled water(2ml/100g)
Group-III	5+5	300 mg/kg + Distilled water (2ml/100g)
Group-IV	5+5	400 mg/kg + Distilled water (2ml/100g)

The test drug was administered in repeated doses for 28 days. All the animals were observed for 28 days.

Observations:

These observations were also performed on week-ends. The observations include but were not limited to changes in skin and fur, in the eyes and mucous membranes, in the respiratory, circulatory, central nervous and autonomous systems, somatomotor activity and behavior.

Clinical Signs of Toxicity:

All the rats were observed at least twice daily with the purpose of recording any symptoms of ill- health or behavioral changes, clinical signs of toxicity daily for 28 days.

Blood Collection:

Blood was collected through retro-orbital sinus from all the animals of different groups on 28th day. The blood was collected in tubes containing Heparin/EDTA as an anticoagulant and was centrifuged at 4000 rpm at 4°C for 10 minutes to obtain the serum for biochemical parameters. Animals were fasted overnight prior to the blood collection.

Laboratory Studies:

During the 4th week of treatment, samples of blood were withdrawn from the orbital sinus of 6 rats from each group, under light ether anesthesia after fasting for 16 hours. The blood samples are used to evaluate Hematological parameters like RBC, WBC, and Platelets etc. The collected blood samples also centrifuged at 10000 rpm in 10 minutes to separate the serum. The separated serum used to evaluate biochemical parameters like SGOT, SGPT, ALP, and Bilirubin etc.

Terminal Studies:

Sacrifice and Macroscopic Examination: On completion of the 4 weeks of treatment, 18 Wistar rats were sacrificed by ether inhalation. A full autopsy was performed on all animals.

Organ Weights: After the macroscopic examination the following organs were weighed after separating the superficial fat: Brain, Heart, Spleen Kidneys, Testes, Liver, Lungs, pancreas and stomach

Histopathology: Histopathological investigation of the vital organs was done.

Data and Reporting:

All data were summarized in tabular form, (Table- 29 to 35) showing for each test group animals body weight changes, organ weight changes, Hematological parameters, Biochemical parameters, electrolytes, food and water intake.

Results

Acute Toxicity Study:

Table 5: Physical and behavioural examinations

Group No	Dose (mg/Kg)	Observation Sign	No. of Animal Affected
Group-I (Vehicle control)	Distilled water	Normal	0 of 3
Group- II	5mg/kg	Normal	0 of 3
Group-III	50mg/kg	Normal	0 of 3
Group-IV	300mg/kg	Normal	0 of 3
Group-V	2000mg/kg	Normal	0 of 3

Table 6: Home cage activity

Functional and Behavioural observation	Observation	Vehicle control Group (G-I)	5mg/kg (G-II)	50mg/kg (G-III)	300mg/kg (G-IV)	2000g/kg (G-V)
		Female n=3	Female n=3	Female n=3	Female n=3	Female n=3
Body position	N	3	3	3	3	3
Respiration	N	3	3	3	3	3
Clonic involuntary Movement	N	3	3	3	3	3
Tonic involuntary Movement	N	3	3	3	3	3
Palpebral closure	N	3	3	3	3	3
Approach response	N	3	3	3	3	3
Touch response	N	3	3	3	3	3
Pinna reflex	N	3	3	3	3	3
Sound response	N	3	3	3	3	3
Tail pinch response	N	3	3	3	3	3

*N-Normal, n-numbers

Table 7: Hand held observation

Functional and Behavioural observation	Observation	Vehicle control Group (G-I)	5mg/kg (G-II)	50mg/kg (G-III)	300mg/kg (G-IV)	2000mg/kg (G-V)
		Female n=3	Female n=3	Female n=3	Female n=3	Female n=3
Reactivity	N	3	3	3	3	3
Handling	N	3	3	3	3	3
Palpebral closure	N	3	3	3	3	3
Lacrimation	N	3	3	3	3	3
Salivation	N	3	3	3	3	3
Piloerection	N	3	3	3	3	3
Pupillary reflex	N	3	3	3	3	3
Abdominal tone	N	3	3	3	3	3
Limb tone	N	3	3	3	3	3

*N-Normal, n-numbers

Table 8: Mortality

Group no	Dose (mg/kg)	Mortality
Group-I (Vehicle control)	Distilled water	0 of 3
Group-II	5(mg/kg)	0 of 3
Group-III	50(mg/kg)	0 of 3
Group-IV	300(mg/kg)	0 of 3
Group-V	2000(mg/kg)	0 of 3

Sub – Acute Toxicity Study:

Table 9: Effect of sub- acute (repeated dose) oral toxicity study (28 days) ofPVC on body weight in gram

Group	Vehicle control	Low	Mid	High
1st day	155.09±0.23	169.15±0.10	169.80±0.04	175.75±0.64
7th day	157.53±0.32	171.24±0.27	170.31±0.24	177.25±0.53
14th day	169.14±0.51	174.07±0.40	173.38±0.32	180.31±0.52
21st day	171.13±0.22	176.29±0.23	175.22±0.36	182.45±0.31
28th day	174.45±0.37	181.13±0.62 *	177.35±0.26	190.03±0.96 *

Values are expressed as mean ± SEM Statistical significance (p) calculated by one way ANOVA followed by Dennett‟s (n=10); nsp>0.05, *p<0.05, **p<0.01, ***p<0.001, calculated by comparing treated groups with control group

Table 10: Effect of sub- acute (repeated dose) oral toxicity study (28 days) of PVC on organ weight in gram

Group		Vehicle control	Low	Mid	High
Heart		2.71±0.52	1.80±0.34	1.94±0.63	2.65±0.51
Liver		4.29±0.53	4.38±0.42	4.49±0.34	4.28±0.21
Lungs		0.93±0.41	1.06±0.23	1.39±0.56	1.35±0.76
Kidney	L	1.16±0.14	0.96±0.52	1.10±0.42	0.89±0.13
	R	1.12±0.29	0.93±0.31	1.05±0.15	0.97±0.39

Values are expressed as mean ± SEM Statistical significance (p) calculated by one way ANOVA followed by Dennett‟s (n=10); nsp>0.05, *p<0.05, **p<0.01, ***p<0.001, calculated by comparing treated groups with control group.

Table 11: Effect of sub- acute (repeated dose) oral toxicity study (28 days) of PVC on haematological parameters

Drug treatment	RBC1012/ litter	WBC 109/litter	Hb gm /litter	Differential count %			
				Neutrophils	Eosinophils	Monocyte	Lymphocyte
Vehicle Control	5.52±0.91	7.32±0.14	15.54±0.24	49.21±0.14	1.55±0.02	5.45±0.37	29.72±0.86
Low	5.45±0.42	6.15±0.34	16.65±0.12	51.02±0.62	2.56±0.96	7.15±0.18	34.12±0.16
Mid	6.52±0.29	8.25±0.65	16.91±0.12	58.63±0.12	3.65±0.23	6.36±0.26	37.34±0.23
High	5.64±0.13	10.28±0.22	15.95±0.22	57.63±0.25	3.76±0.13	5.28±0.12	39.53±0.69

Values are expressed as mean ± SEM Statistical significance (p) calculated by one way ANOVA followed by Dennett‟s (n=10);nsp>0.05, *p<0.05, **p<0.01, ***p<0.001, calculated by comparing treated groups with control group.

Table 12: Effect of sub- acute (repeated dose) oral toxicity study (28 days) of PVC on Biochemical parameters

Drug Treatment	SGPT (U/L)	SGOT (U/L)	ALP (U/L)	Urea (mg/dl)	Creatinine (mg/dl)	Total bilirubin (mg/dl)
Vehicle Control	38.10±0.18	32.21±0.36	104.29±0.55	9.62±0.36	1.13±0.21	0.78±0.23
Low	41.01±0.23	35.21±0.12	119.77±0.44	17.62±0.56	1.19±0.73	1.19±0.45
Mid	43.41±0.24	38.84±0.37	120.16±0.32	18.89±0.44	1.29±0.12	0.99±0.23
High	55.60±0.41	43.17±0.53	138.89±0.24	19.86±0.28	0.91±0.16	1.18±0.21

Values are expressed as mean ± SEM Statistical significance (p) calculated by one way ANOVA followed by Dennett‟s (n=10); ns p>0.05, *p<0.05, **p<0.01, ***p<0.001, calculated by comparing treated groups with control group.

Table 13: Effect of sub- acute (repeated dose) oral toxicity study (28 days) of PVC on electrolytes

Group	Vehicle control	Low	Medium	High
Sodium (mmol/L)	139.35±0.22	142.25±0.15	144.37±0.41	144.08±0.22
Chloride(mmol/L)	101.04±0.38	102.02±0.12	104.90±0.46	105.32±0.45
Potassium (mmol/L)	3.99±0.21	4.15±0.13	4.36±0.69	5.15±0.13

Values are expressed as mean ± SEM Statistical significance (p) calculated by one-way ANOVA followed by Dennett‟s (n=10); ns p>0.05, *p<0.05, **p<0.01, ***p<0.001, calculated by comparing treated groups with control group

Table 14: Effect of sub- acute (repeated dose) oral toxicity study (28 days) of PVC on food intake in gram

Group	Vehicle control	Low	Medium	High
1st DAY	8.19±0.23	9.09±0.42	10.49±0.24	9.98±0.44
7th DAY	10.33±0.86	10.06±0.63	12.26±0.36	10.99±0.52
14th DAY	12.52±0.12	12.84±0.32	13.47±0.58	12.03±0.39
21st DAY	14.35±0.29	14.22±0.63	15.21±0.92	15.09±0.23
28th DAY	16.25±0.38*	16.26±0.38*	17.35±0.44*	17.93±0.28*

Values are expressed as mean ± SEM Statistical significance (p) calculated by one-way ANOVA followed by Dennett‟s (n=10);nsp>0.05, *p<0.05, **p<0.01, ***p<0.001, calculated by comparing treated groups with control group

Table 15: Effect of sub- acute (repeated dose) oral toxicity study (28 days) of PVC on water intake in ml

Group	Vehicle control	Low	Medium	High
1st DAY	8.39±0.23	13.14±0.61	10.39±0.24	13.04±0.16
7th DAY	11.33±0.36	14.89±0.23	11.26±0.36	14.39±0.22
14thDAY	12.72±0.32	16.24±0.63	13.27±0.38	16.24±0.21
21st DAY	15.45±0.29	17.29±0.17	15.01±0.72	18.44±0.23
28thDAY	17.45±0.38*	19.35±0.22	17.05±0.44*	19.25±0.35

Values are expressed as mean ± SEM Statistical significance (p) calculated by one-way ANOVA followed by Dennett‟s (n=10); ns p>0.05, *p<0.05, **p<0.01, ***p<0.001, calculated by comparing treated groups with control group

Discussion

In the Acute oral toxicity study, the rats were treated with different concentrations of *Pavala Vanka chendhooram* from the range of 5mg/kg to 2000mg/kg.

1. This dose level did not produce the signs of toxicity, functional and behavioural changes, and mortality in the test groups as compared to the controls when observed during 14 days of the acute oral toxicity experimental period. So No- Observed-Adverse-Effect- Level (NOAEL) of *Pavala vanka Chendhooram* is 2000mg/kg.
2. However the test drug PVC does not produce much significant effect in Body weight, Water intake and food intake. The results are in non-significant.
3. In Acute oral toxicity test the *Pavala Vanka Chendhooram* was found to be nontoxic up to the dose level of 2000mg/ kg body weight.
4. These results showed that a single oral dose of the PVC showed no mortality of these rats even under higher dosage levels indicating the high margin of safety of this drug.

The dose selected for the 28 days of repeated dose sub-acute oral toxicity study was 200mg, 300 mg and 400mg/kg of *Pavala Vanka Chendhooram*. All the animals were free of intoxicating signs throughout the dosing period of 28 days.

Observations: Overall observations were similar in both sex rats. The values are non - significant.

Clinical signs of toxicity: No clinical signs of toxicity were observed. There is a slight variation in the values but they are within the non-significant ranges.

Mortality: No mortality was observed after 28 days repeated dose administration of PVC. All animals were survived up to study termination period.

Body weight: Animals from control and different dose groups show comparable body weight gain throughout the dosing period of 28 days.
Food and water consumption: During dosing period, the quantity of food and water consumed by animals also significantly increase.

Physiological activities: There is no change in their general behaviour.

Blood analysis

a. Haematological parameters: No significant changes in the haematological values when compared with those of respective controls. This gave clear justification that bone marrow and spleen were not influenced by PVC.

b. Biochemical parameters: There is no significant change in the values of different parameters studied when compared with those of respective controls. Urea, SGOT,SGPT, Bilirubin were within the limits.

Organ Weight: Organ weights of treated animals were found to be normal when compared with respective control group animals.

Acute and sub-acute toxicity were carried out in Wister albino rats according to OECD guidelines (423, 407). In the Acute oral toxicity study, the rats were treated with different concentration of PVC from the range of 5mg/kg to 2000mg/kg. This dose level did not produce the signs of toxicity, functional and behavioural changes, and mortality in the test groups as compared to the controls when observed during 14 days of the acute oral toxicity experimental period. So No-Observed-Adverse-Effect- Level (NOAEL) of PVC is 2000 mg/kg. However the test drug PVC does not produce much significant effect in Body weight, Water intake and food intake. The results are in non-significant. In Acute oral toxicity test the PVC was found to be nontoxic up to the dose level of 2000mg/ kg body weight.

These results showed that a single oral dose of the PVC showed no mortality of these rats even under higher dosage levels indicating the high margin of safety of this drug.

Sub-acute toxicity is carried by repeated dose of test drug for 28 days. The doses selected Were 200mg, 300 mg and 400 mg/kg of *Pavala Vanka Chendhooram*. All the animals were free of intoxicating signs throughout the dosing period of 28 days. Overall observations were similar in both sex rats. No clinical signs of toxicity were observed. There is a slight variation in the values but they are within the non-significant ranges. All animals were survived up to study termination period. Animals from control and different dose groups show comparable body weight gain throughout the dosing period of 28 days. During dosing period, the quantity of food and water consumed by animals also significantly increase. There is no change in their general behaviour. No significant changes in the haematological values when compared with those of respective controls. This gave clear justification that bone marrow and spleen were not influenced by PVC. There is no significant change in the values of different biochemical parameters studied when compared with those of respective controls. Urea, SGOT, SGPT, Bilirubin were within the limits. Organ weights of treated animals were found to be normal when compared with respective control group animals. So the toxicological study of the test drug, PVC reveals the safety of the drug for long time administration.

Conclusion

In Acute oral toxicity test the PVC was found to be nontoxic up to the dose level of 2000mg/ kg body weight. These results showed that a single oral dose of the PVC showed no mortality of these rats even under higher dosage levels indicating the high margin of safety of this drug.

In Sub-acute toxicity study of *Pavala Vanka Chendhooram*, all the animals were free of intoxicating signs throughout the dosing period of 28 days. All animals were survived up to study termination period. No significant changes in the haematological values, general behavior and biochemical parameters. Hence the toxicological study of the test drug, PVC reveals the safety of the drug for long term administration.

References

1. Ayothithasa Kaviraja Pandithar. B, Agasthiyar chendhooram - 300, Rathnanayakar & sons, Chennai, Page No. 21.
2. Kuppusamymudhaliyar KN, Uththamarayan KS, Siddha vaidhyathirattu. Chennai, Department of Indian medicine and homeopathy, 2009, 3rd edition.
3. Muralidhara NK, Viswanatha S, Ramesh BS., Acute and subchronic toxic assessment of Debitterized Fenugreek powder in the mouse and rat. Food and Chemical Toxicology.1999;37: 831-838.
4. OECD Guideline for testing of Chemicals (2001) Guideline 423: Acute Oral Toxicity-Acute Toxic Class Method.
5. OECD Guideline 407 for testing of chemicals. Repeated dose 28-Day Oral Toxicity Study in Rodents. 2008; pp 2-8
6. Ramaswamy et al. Acute toxicity and the 28-days repeated dose study of a Siddha medicine Nunakadugu in rats, BMC Complementary and Alternative Medicine. 2012; 12:190.
7. Sambasivam Pillai T V, Siddha Medical Dictionary, Chennai, Department ofIndian Medicine & Homeopathy, 1931, 1st edition.
8. Thangadurai K. Acute and Sub-acute Toxicity of Siddha Formulation Dhathu Bhusti Chooranam. International Journal of Ayurveda and Pharma Research. 2017; 5(2):22-24.

9. Thyagarajan. R. Gunapadamthathu Jeevavaguppu, Part II,III. Chennai; Directorate of Indian Medicine Homeopathy; 2004. p.687.

Access this Article in Online	
	Website: www.ijarbs.com
Quick Response Code	Subject: Siddha Medicine
DOI:10.22192/ijarbs.2025.12.02.001	

How to cite this article:
Vigneshwari S, Singarajah Janani. (2025). Acute and Sub-acute Oral Toxicity Study of *Pavala Vanka Chendhooram* – A Siddha Formulation. Int. J. Adv. Res. Biol. Sci. 12(2): 1-13.
DOI: http://dx.doi.org/10.22192/ijarbs.2025.12.02.001