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Phytochemical Evaluation And Pharmacological Screening Of Antiparkinson's And Laxative Activities Of *Hylocereus Undatus* (White Pitaya) In Rodents

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ABSTRACT:
Objective: To evaluate the antiparkinson's and constipation activity of Hylocereus undatus Haw. fruit extract in haloperidol induced parkinson's disease and loperamide induced constipation in mice.
Method: Parkinson's disease was induced by administering haloperidol daily for a week. The mice were divided into five groups (n=6).Group I received 0.9% Normal saline (10ml per kg), Group II received Haloperidol (2 mg/kg i.p), Group III received combination of Levodopa and Carbidopa (100mg + 10mg per kg i.p along with haloperidol) and Group IV and Group V received ethanolic extract of Hylocereus undatus (200 and 400mg/kg p.o), respectively for 7 days along with haloperidol. To evaluate antiparkinson's activity of Hylocereus undatus, Catalepsy bar test, Rota rod test, Hang test, Horizontal bar test, Actophotometer test were used. One way ANOVA was used to test statistical significance followed by Bonferroni multiple comparison tests. Constipation was induced by administration of loperamide. The mice were divided into 5 groups (n=6). Group I received 0.9% Normal saline (10ml per kg) ,Group II received loperamide (5mg/kg p.o), Group III received bisacodyl (20 mg/kg p.o along with loperamide) and Group IV and Group V received ethanolic extract of Hylocereus undatus (200 and 400mg/kg p.o), respectively along with loperamide. To evaluate Constipation activity, Number, weight and % of faecal matter were studied. One way ANOVA was used to test statistical significance followed by Tukey's model test.
Result: Hylocereus undatus extract was found to decrease the duration of catalepsy significantly ($P < 0.001$) catalepsy bar test as compared to Haloperidol group and significantly increases ($P < 0.001$) fall off time in Rota rod test, Hang test, Horizontal bar test and increase count in Actophotometer test respectively as compared to Haloperidol group. Hylocereus undatus extract was found to increase the number of faecal matter, faecal weight and decrease in the water content of faeces which were indication of laxative activity of Hylocereus undatus.
Conclusion: The result of the study shows the Antiparkinson's and Constipation activity of Hylocereus undatus.

Key words: *Parkinson's disease, Constipation, Hylocereus undatus, Levodopa, Carbidopa, Haloperidol, Bisacodyl, Loperamide.*

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I. INTRODUCTION

Parkinson's disease (PD) is a neurodegenerative disorder that affects predominately dopamine-producing ("dopaminergic") neurons in a specific area of the brain called substantia nigra marked by tremor, muscular rigidity and slow imprecise movement, chiefly affecting middle aged and elderly people [(1)]. The symptoms of disease are different from one person to another person both in terms of intensity and how they progress. The motor symptoms include tremors, rigidity, bradykinesia, postural instability, walking or gait difficulties and vocal symptoms. Non motor symptoms include disturbances in sense of smell, sleep progress, depression and anxiety, fatigue, mental process, weight loss, gastrointestinal issues, light-headedness, urinary issues, sexual concerns, sweating, melanoma. The pathological hallmarks of Parkinson's disease (PD) are marked loss of dopaminergic neurons in the substantia nigra, which causes dopamine depletion in the striatum, and the presence of intracytoplasmic inclusions known as Lewy bodies in the remaining cells [(2)]. Constipation is passage of small amounts of hard, dry bowel movements, usually fewer than three times a week. People who are constipated may find it difficult and painful to have a bowel movement. Other symptoms of constipation include feeling bloated, uncomfortable, and sluggish [(3)].

Since the Parkinson's disease and constipation were a huge impact on our lives; it is worth to look after the alternative forms of medicines which can be used for its treatment. The efficacy and safety of herbal

medicine have turned the major pharmaceutical population towards medicinal plant's research. Owing to the global trend towards improved 'quality of life', there is considerable evidence of an increase in demand from medicinal plant [4]. There is growing interest in herbals remedies because of their effectiveness, minimal side effects in clinical experience and relatively low costs [5].

Hylocereus undatus is typically the most cultivated vine cactus belonging to the family of Cactaceae [6] originating natively from Mexico and America. Several species having large edible fruits, which are known as pitayas or dragon fruits [7]. It is often referred to as night-blooming Cactus [8].

The chemical constituents present in Hylocereus undatus are Kaempferol, Quercetin, B-sitosterol, Isorhamnetin, Carbohydrate, Proteins and amino acids, Alkaloids, Terpenoids and Steroids, Glycoside and Flavanoids, Tannins and phenolic compounds, Saponins, Vitamin B1, Vitamin B2, Vitamin B3, Vitamin B6, Vitamin Cand minerals like copper, iron, calcium, phosphateand magnesium. They are responsible for the anti-oxidant [9,10], anticancer property [11,12], Hypocholesterioic effect [13], Prebiotic effect, anti-bacterial property [14], wound healing property [15].

This research work was conducted to evaluate the efficacy of an ethanolic extract of Hylocereus unatus in the treatment of Haloperidol induced catalepsy, for antiparkinson activity and loperamide induced catalepsy. To verify the potential of plants with scientific approach for antiparkinson's and constipation activities.

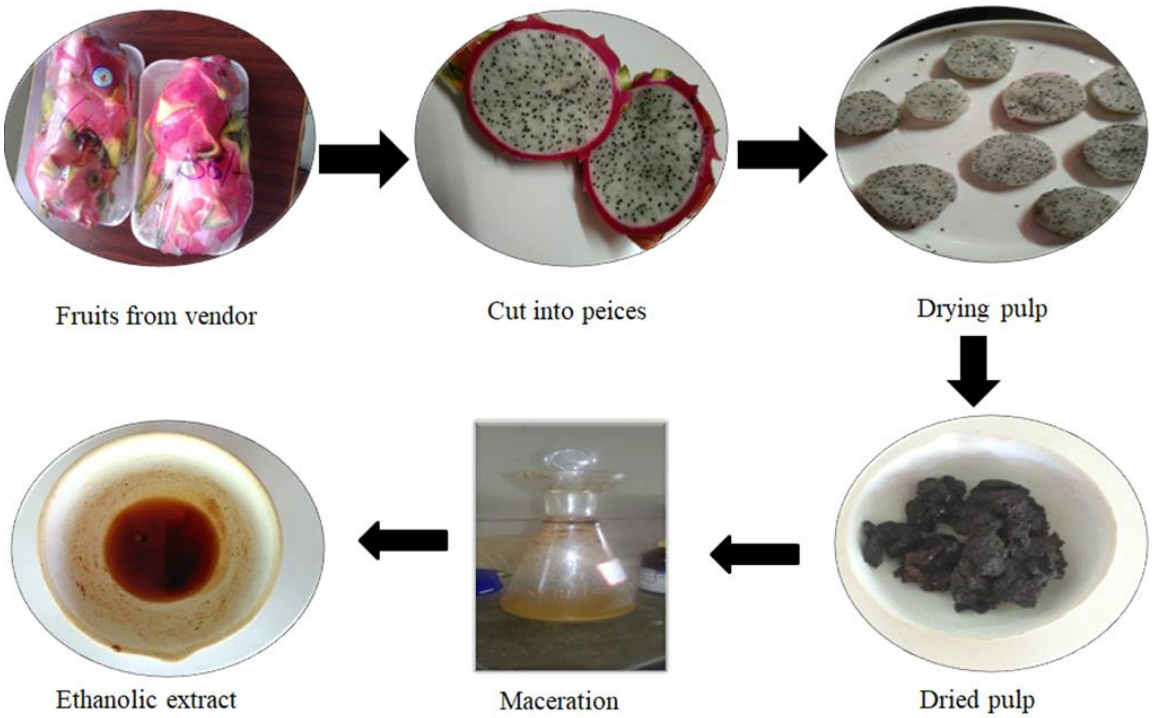
II. MATERIALS AND METHODS

2.1. Collection of plant materials:

Hylocereus undatus (white pitaya) (2.5kg) were collected in the month of October, 2017 procured locally from the vendors in Vijayawada. The plant was Authenticated by V.S.Raju kakatiya University and a voucher specimen herbarium with number KUW 5006 was deposited at the faculty of Pharmacy, Kakatiya University, Warangal.

2.2. Preparation of extract:

Fruit pulp of *Hylocereus undatus* was cut into pieces and then dried under shade. The pulp extract was stored in airtight container and kept in room temperature. Dried plant material (500 gm) was extracted with 1500ml of ethanol using Maceration technique for 48 hrs. The extract was filtered through Whatmann filter paper (no.1) and then concentrated in vacuum at 40^0C using a rotary evaporator. The extract was kept in the dark at 40^0C.



Preliminary phytochemical screening:

The preliminary phytochemical investigation was carried out with ethanolic extract of fruit pulp of Hylocereus undatus for quantitative identification of photochemical constituents. Photochemical tests were carried out by standard methods [16].

2.3. Experiental Animals:

Swiss albino mice (weighing 20-25g) of either sex were used in this study. They were procured from Mahaveer Enterprises, Hyderabad. The animals were acclimatized for one week under laboratory conditions. They were housed in polypropylene cages and maintained constant temperature at 27°C ± 2°C under 12 hrs dark / light cycle. They were fed with standard mice pellet feed and water *ad libitum*. The husk in the cages was renewed every day to ensure hygeinity and maximum comfort for animals.

III. ACUTE TOXICITY

Acute oral toxicity was performed as per OECD-423 guidelines. The purpose of this study is to know the safety & toxicity of the extract doses. For this study, Swiss Albino mice of weights 20-26 gm were selected & divided into groups. The animals were fasted 18h with water *ad libitum.*

IV. EXPERIMENTAL DESIGN

Haloperidol and Parkinson's disease model:

4.1. Animal required:

a) Species	:	Adult Swiss Albino Mice
b) Age/Weight/Size	:	3 months, 20-25g
c) Gender	:	Male
d) Numbers to be used for each activity	:	mice:30

4.2. Preparation and mode of administration of drugs: All drug solutions are freshly prepared and suspended in saline solution.

- **Drug for induction of Parkinson's Disease:** Haloperidol (2.0 mg/kg i.p.) Daily for a week.
- **Drug for induction of Constipation:** Loperamide (5.0 mgkg, p.o.)
- **Standard drug for Parkinson's disease:** Levodopa and carbidopa (10mg/kg, i.p, once per day x 1 week)
- **Standard drug for Constipation:** Bisacodyl (20 mg/kg p.o.)

Table I - Groups classification for Anti parkinson's activity

GROUPS	DRUG TREATMENT	DOSE	ROUTE	PURPOSE
GROUP – I	0.9% Normal saline	10ml/kg	i.p	Control
GROUP –II	Haloperidol	2mg/kg	i.p	+ve control
GROUP –III	+ve control + Levodopa+ carbidopa (Std drug)	10mg/kg	i.p	Standard
GROUP- IV	+ve control + HUFE	200 mg/kg	Per oral	Therapeutic
GROUP - V	+ve control + HUFE	400 mg/kg	Per oral	Therapeutic

Table II - Groups Classification for Laxative activity

GROUPS	DRUG TREATMENT	DOSE	ROUTE	PURPOSE
GROUP – I	0.9% Normal saline	10ml/kg	i.p	Control
GROUP –II	Loperamide	5mg/kg	p.o	+ve control
GROUP –III	+ve control + Bisacodyl (Std drug)	20mg/kg	Per Oral (Mice)	Standard
GROUP- IV	+ve control + HUFE	200 mg/kg	Per oral	Therapeutic
GROUP – V	+ve control + HUFE	400 mg/kg	Per oral	Therapeutic

4.3. Experimental procedure:

Male Swiss / Albino mice weighing 20-25 g were divided into five groups of three animals each (n=6). Group I received normal saline and served as normal control. Group II received haloperidol (2mg/kg body weight) alone and served as Positive control without any drug treatment. Group III received combination of levodopa and carbidopa (100mg+ 10mg/kg by i.p. administration) and served as Standard and Group IV and V received Hylocereus undatus fruit extract at doses of 200 and 400mg/kg body weight, respectively for 7 days. The standard (L-dopa) drug was administered by intraperitoneal route and test drug was administered by oral route, half an hour prior to the Haloperidol administration for 07 days of experimental period.

4.4. Behavioural studies test

4.4.1. Measurement of catalepsy:

It was assessed in terms of the time for which the mouse maintained an imposed position with both front limb extended and resting on a 4cm high bar (1cm diameter). The end point of catalepsy was considered to occur when both front paws were removed from the bar or if the animal moved its head in an exploratory manner. A cut off time 300 seconds was applied. Between the determinations, the animals were returned to their individual home cages. All the observations were made between 9.00 and 15.00 hrs in a quiet room at 23-25^{0}C.

Scoring Method

If the animal maintained the imposed posture for at least 30 seconds.It was considered to be cataleptic and the time was recorded in seconds. The animals were tested on every first, fourth and seventh day of the drug treatment and only the greater duration of the immobility were considered.

Fig no 4.5: Showing Catalepsy Model

4.4.2. Hang test:

Neuromuscular strength was determined in the grid hang test. Mice were lifted by their tail and slowly placed on a horizontal grid and supported until they grabbed the gird with both their fore and hind paws. The grid was then inverted so that the mice were allowed to hang upside down. The grid was mounted 20 cm above a hard surface, to discourage falling but not leading to injury in case of animal fall. Start a stop clock and note the time when the mice fall off or remove it. When the criterion time of 30 sec is reached.

Fig no 4.6: Showing Hang Test Model

4.4.3. Rotarod test:

The main symptom of the Parkinsonism disease is muscle rigidity. This effect can be easily studied in animal by using rotarod apparatus. Turn on the rotarod. Select the speed (20-25 rpm is ideal). Before the test, each animal was given 1 min exposure to the moving rod. The animal was placed on the rotating rod for 3 mins. Latency to fall off from the rotating rod of animal in control and the treated group was recorded. Movement impairement was indicated by the inability of the animal to remain on the rotating rod for a 3 min test period.

Fig no 4.7: Showing Rotarod Model

4.4.4. Horizontal bar test:

Hold the mouse by the tail; place it on the bench in front of the apparatus. Slide it quickly backwards about 20 cms, rapidly raise it and let it grasp the horizontal bar at the central point with its fore paws only and release the tail simultaneously starting the stop clock. The criterion point is either a fall from the bar before the mouse reaches one of the end columns of the bar, or the time till one forepaw touches a column Maximum cut off time is 30 seconds.

Fig no 4.8: Showing Horizontal Bar Test

4.4.5. Actophotometer test:

The animal locomotor behavior was monitored using actophotometer. Animals were placed in actophotometer individually, and basal activity score was recorded over the period of 30 sec. Each animal was treated with respective drug, and activity score was recorded after 30 min and 1 h. Decreased activity score was taken as index of CNS depression.

Fig no. 4.9 Showing Actophotometer Test

4.5. Faecal parameters measurements in normal mice

Mice, given food and water *ad lib*, were randomly divided into five groups (n=6 in each group): control, Positive control, Standard and HUFE (two groups of different dosage). After either HUFE - 200 and 400mg/kg body weight was administered, the animals were immediately placed in clean transparent cages individually and allowed access to their standard lab chow and tap water *ad libitium.* Then, faeces for each mouse were collected, counted and weighed at 0-8 h period. The number and weight of faeces were expressed in terms of the total number and wet weight per mouse.

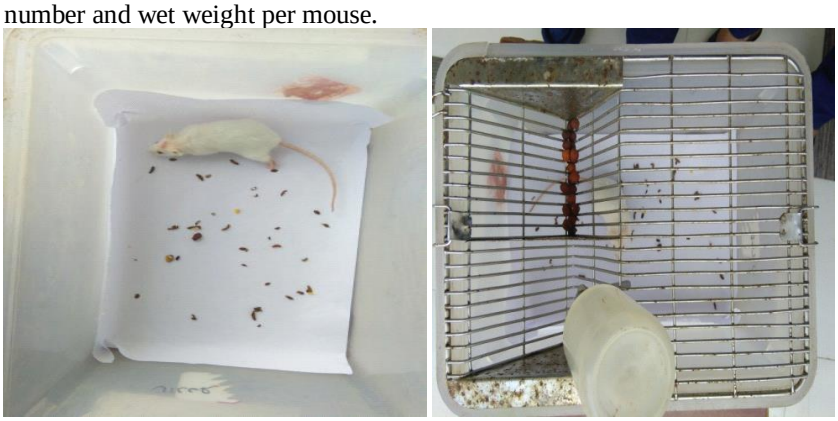


Fig no: 4.10 Faecal parameters measurements in normal mice

4.5.1. Faecal parameters measurement:

The number and weight of faeces for each mouse in loperamide-induced constipation model mice were measured as the method of Lakino et al. The mice given food and water *ad lib*, were administered (p.o.) saline, standard drug or HUFE at 200 and 400 mg/kg body weight, and then administered loperamide (5 mg/kg bw, dissolved in 1% v/v Tween80, p.o.) at 1h after HUFE treatment. Then, after no. of faeces and faecal content was weighted, the wet faeces for mouse were dried at 105^0C for 48 h. The water content of faeces was calculated as: **faecal water content (%) = (faeces weight before dried – faeces weight after dried)/ faeces weight before dried × 100.**

4.6. Statistical analysis:

Statistical analysis for Antiparkinson's Activity was expressed in terms of mean ± SEM. Statistical significance of data was assessed by one-way analysis of variance (ANOVA) followed by Bonferroni multiple comparision test using Graph Pad instant software. The significant difference between and within various groups was determined. Difference were considered to be extremely significant when $P < 0.001$.

Statistical analysis for constipation activity was expressed in terms of mean ± SEM. Statistical significance of data was assessed by one-way ANOVA followed by Tukey's model test using Graph Pad instant software. A probability level of less than 1% ($p < 0.01$) was considered as significant. Treated groups were compared with the normal and positive control groups.

V. RESULTS FOR PARKINSON'S AND CONSTIPATION ACTIVITY OF *HYLOCEREUS UNDATUS* (Haw.) ETHANOLIC FRUIT EXTRACT (HUFE)

5.1. Results of preliminary phytochemical studies:

The preliminary phytochemical analysis of ethanolic extract of fruits of Hylocereus undatus revealed the presence of flavanoids, terpenoids, carbohydrates, saponins, oils, tannins and phenolic compounds as represented in table.

Table no: 5.1 - The phytochemical profile of the fruit extract

Phytochemicals	Presence/ Absence
Carbohydrates	+
Saponins	+
Flavanoids	+
Tannins & Phenolic compounds	+
Glycosides	+
Oils	+
Alkaloids	+
Proteins & Amino acids	+
Terpenoids	+
Steroids	+

5.2. Preliminary phytochemical tests

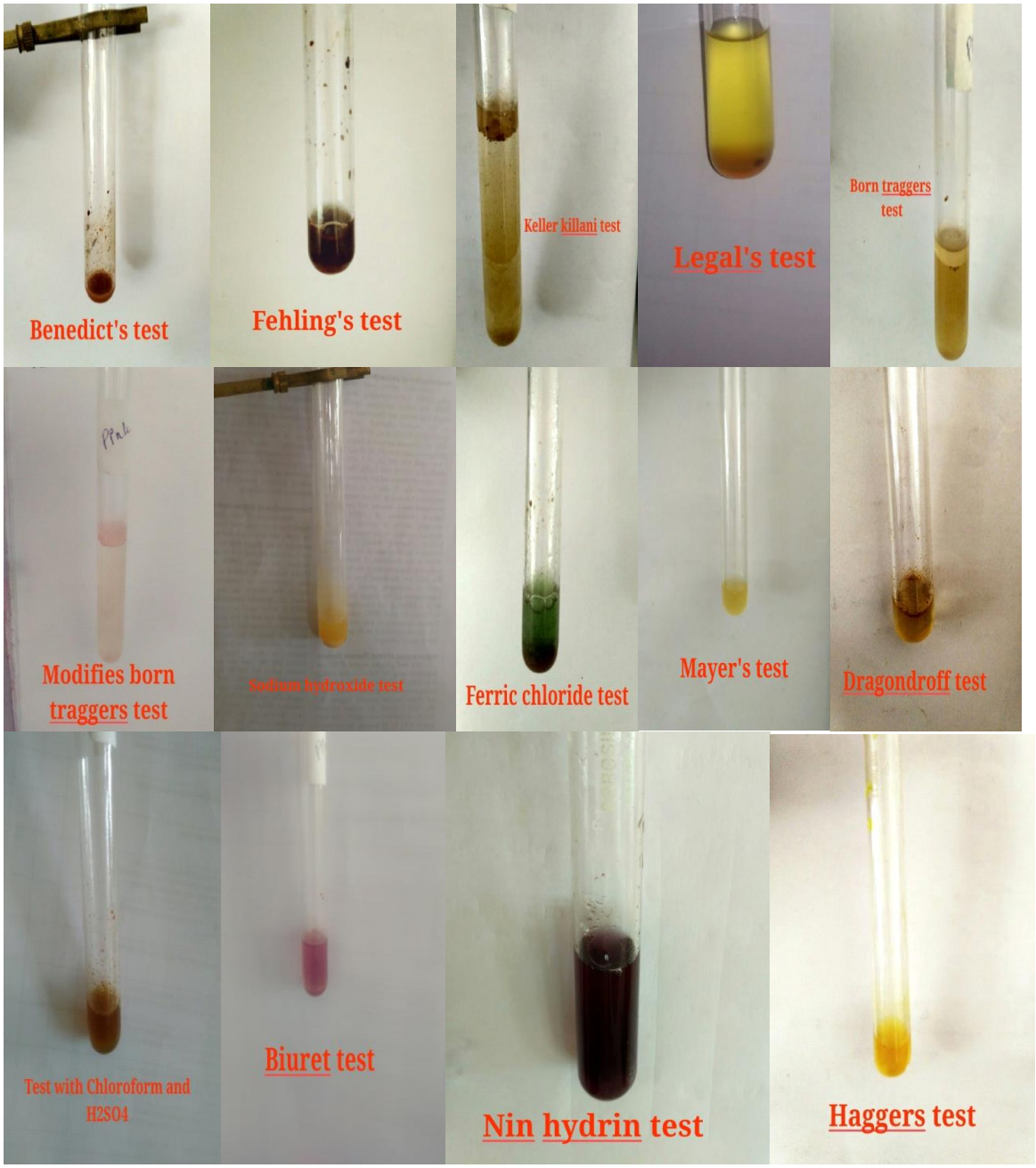


Fig no. 5.1. Preliminary phytochemical studies

5.3. ACUTE TOXICITY STUDIES FOR ANTI PARKINSON'S AND CONSTIPATION ACTIVITIES:

Table no 5.2. Acute toxicity studies for anti parkinson's and constipation activities

Groups (n=10)	Treatment (mg/kg)	No of animals dead	No of animals alive	Behavioral Changes within 48 h
1	100	0	10	None
2	300	0	10	None
3	500	0	10	None
4	1000	0	10	None
5	1500	0	10	None
6	2000	0	10	None

The procedure was followed as per OECD 423 guidelines. Different doses of HUFE were orally administered (100–2000 mg/kg), while the control group received only the vehicle. The groups were observed for 48 h and at the end of this period mortality was recorded for each group. Based on acute toxicity studies, there were no signs of toxicity observed up to 2000 mg/kg body weight. So, the doses selected for the laxative activities were $1/10^{th}$ and $1/5^{th}$ of 2000 mg/kg is 200 mg/kg and 400 mg/kg.

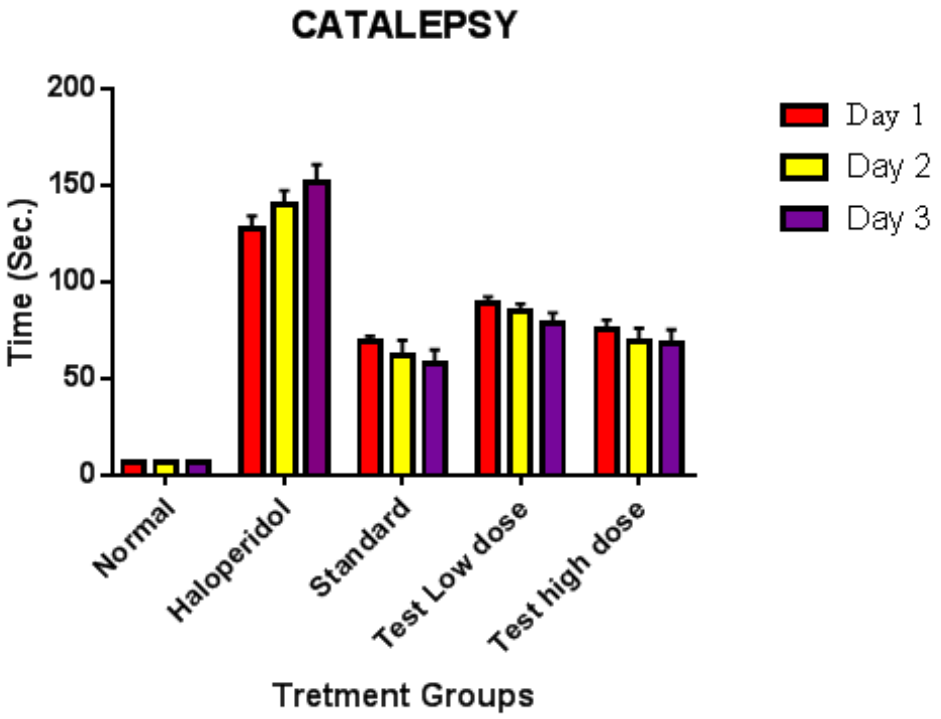
5.4. ANTIPARKINSON'S ACTIVITY:

5.4.1. Effect of hylocereus undatus on catalepsy bar test in mice:

S.no	GROUPS	CATALEPSY (Sec)		
		Day 1	Day 4	Day 7
1	Normal	6.9 ± 0.5774	6.967 ± 0.37	6.967 ± 0.42
2	Haloperidol	127.8 ± 12.4*	140.54 ± 13.05*	151.74 ± 10.05*
3	Standard	69.23 ± 3.927***	61.7 ± 4.921***	58.1 ± 8.546***
4	Test low dose	89.2 ± 3.5112**	84.57 ± 6.028**	78.4 ± 6.716**
5	Test high dose	75.4 ± 3.707**	69.7 ± 2.57**	68.37 ± 4.952**

Table no 5.3. Effect of hylocereus undatus on catalepsy bar test in mice

.**Graph no: 5.1- Effect of Hylocereus undatus on catalepsy in mice**



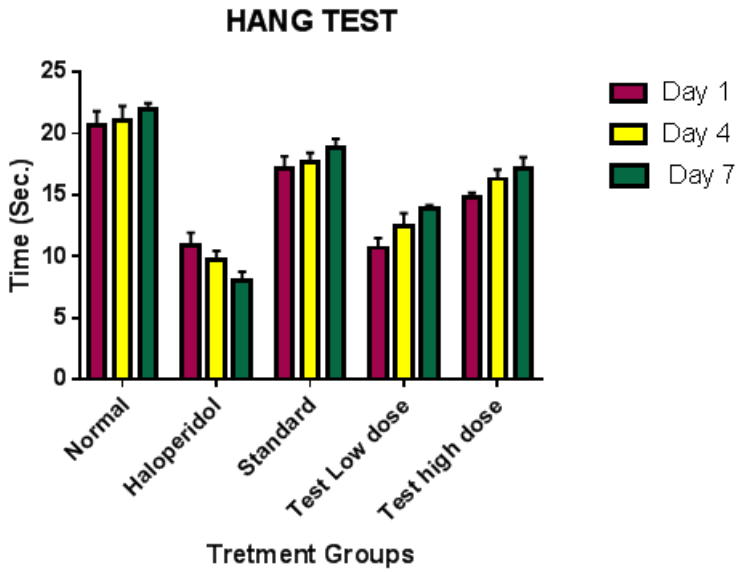
Values are expressed as Mean ± SEM (n = 6)
*P < 0.001 extremely significant on comparing group II vs. group I, **P < 0.001 extremely on comparing group III, IV, V vs. group II, ***P < 0.01 extremely significant on comparing group III vs. group IV

5.4.2. Effect of Hylocereus undatus on Hang test in mice:

S.no	GROUPS	HANGING TIME (Sec)		
		Day 1	Day 4	Day 7
1	Normal	20.7 ± 0.4726	21.1 ± 0.4583	21.96 ± 1.058
2	Haloperidol	10.934 ± 1.32*	9.7 ± 1.801*	8.00 ± 10.05*
3	Standard	17.1 ± 0.945***	17.7 ± 0.665***	18.8 ± 1.0***
4	Test low dose	10.7 ± 1.36**	12.43 ± 1.29**	13.80 ± 2.28**
5	Test high dose	18.67 ± 1.528**	21.33 ± 2.309**	22.0 ± 3.606**

Table no 5.4. Effect of Hylocereus undatus on Hang test in mice

Graph no: 5.2- Effect of Hylocereus undatus on Hang test in mice:



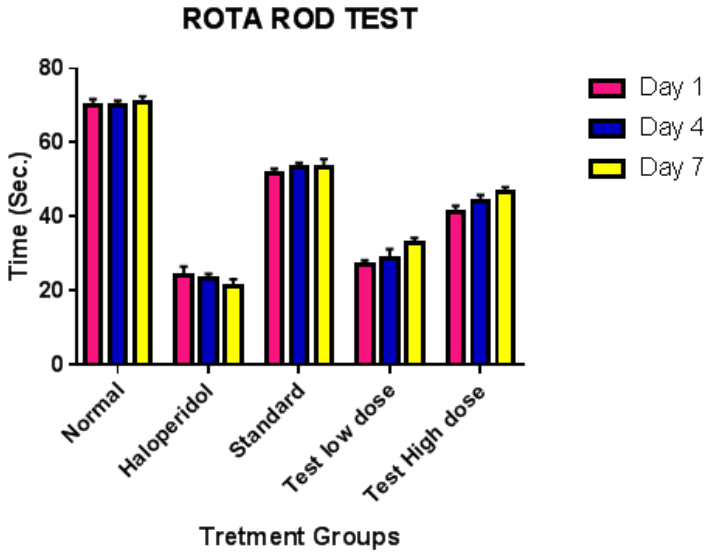
Values are expressed as Mean ± SEM (n = 6)
*P < 0.001 extremely significant on comparing group II vs. group I, **P < 0.001 extremely on comparing group III, IV, V vs. group II, ***P < 0.01 extremely significant on comparing group III vs. group IV, V.

5.4.3. Effect of Hylocereus undatus on Rota rod in mice:

S.no	GROUPS	ROTA ROD TEST (Sec)		
		Day 1	Day 4	Day 7
1	Normal	70.03 ± 0.3	69.96 ± 1.15	21.96 ± 1.058
2	Haloperidol	24.03 ± 1.405*	23.2 ± 1.801*	8.00 ± 10.05*
3	Standard	51.56 ± 1.652***	53.46 ± 2.159***	18.8 ± 1.0***
4	Test low dose	26.9 ± 3.219**	28.63 ± 2.73**	13.80 ± 2.28**
5	Test high dose	41.36 ± 3.109**	44.16 ± 2.752**	46.5 ± 2.464**

Table no 5.5. Effect of Hylocereus undatus on Rota rod in mice

Graph no: 5.3- Effect of Hylocereus undatus on Rota rod in mice



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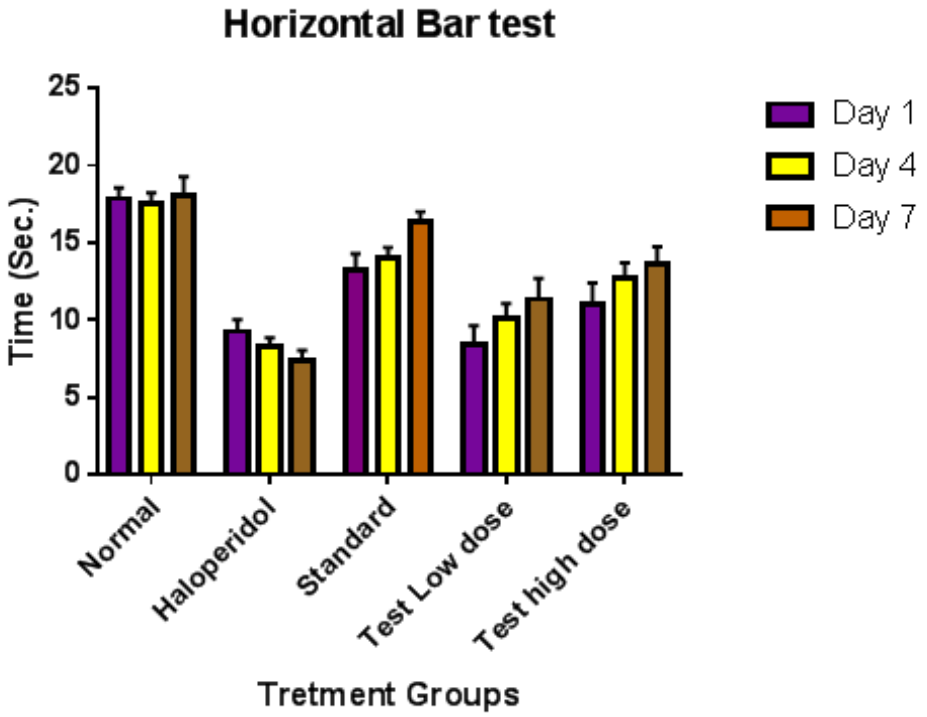
5.4.4. Effect of Hylocereus undatus on Horizontal Bar test in mice:

S.no	GROUPS	ROTA ROD TEST (Sec)		
		Day 1	Day 4	Day 7
1	Normal	17.27 ± 0.417	18.3 ± 0.854	17.93 ± 0.72
2	Haloperidol	8.83 ± 0.90*	8.53 ± 1.05*	7.6 ± 0.8*
3	Standard	14.8 ± 1.17***	15.1 ± 1.74***	13.7 ± 1.99***
4	Test low dose	9.33 ± 1.45**	9.3 ± 1.35**	11.3 ± 1.55**
5	Test high dose	11.53 ± 1.002**	12.27 ± 1.96**	13.6 ± 0.91**

Table no 5.6. Effect of Hylocereus undatus on Horizontal Bar test in mice:

Graph no: 5.4- Effect of Hylocereus undatus on Horizontal Bar test in mice



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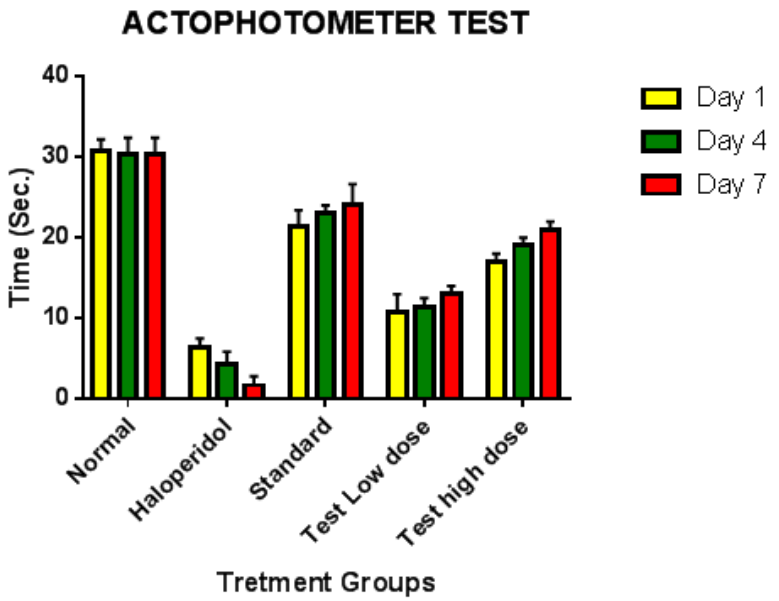
5.4.5. Effect of Hylocereus undatus on Actophotometer test in mice:

S.no	GROUPS	ACTOPHOTOMETER TEST (Sec)		
		Day 1	Day 4	Day 7
1	Normal	31.67 ± 0.5774	31.33 ± 0.5774	28.33 ± 0.5774
2	Haloperidol	4.667 ± 2.082*	4.667 ± 3.215*	3.00 ± 2.00*
3	Standard	22.0 ± 3.00***	23.33 ± 2.309***	21.67 ± 3.055***
4	Test low dose	9.667 ± 1.521**	11.33 ± 1.155**	31.33 ± 1.155**
5	Test high dose	16.00 ± 3.606**	18.33 ± 6.658**	19.00 ± 8.185**

Table no 5.7. Effect of Hylocereus undatus on Actophotometer test in mice:

Graph no: 5.5- Effect of Hylocereus undatus on Actophotometer test in mice



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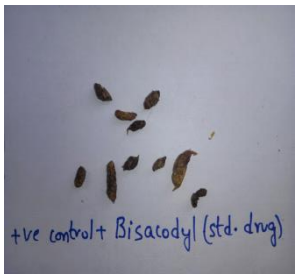
5.4.5. Effect of HUFE on lopiramide induced constipation using mice **(Avg no. of feces, Total weight of feces and % of water content)**

Table no 5.8. Effect of HUFE on lopiramide induced constipation using mice:

GROUPS	TREATMENT	AVG. NO.OF FECES	TOTAL WEIGHT OF FECES(gm)	% OF WATER CONTENT
Group-l	Normal	15.3	0.17	64.6%
Group-ll	loperamide	2.6	0.02	37.5%
Group-lll	Std (bisacodyl)	10.6	0.13	59.6%
Group-lV	HUFE 200mg/kg	4.3	0.08	40.4%
Group-V	HUFE 400mg/kg	8.0	0.12	49.8%

Normal (1A)

Loperamide (1B)



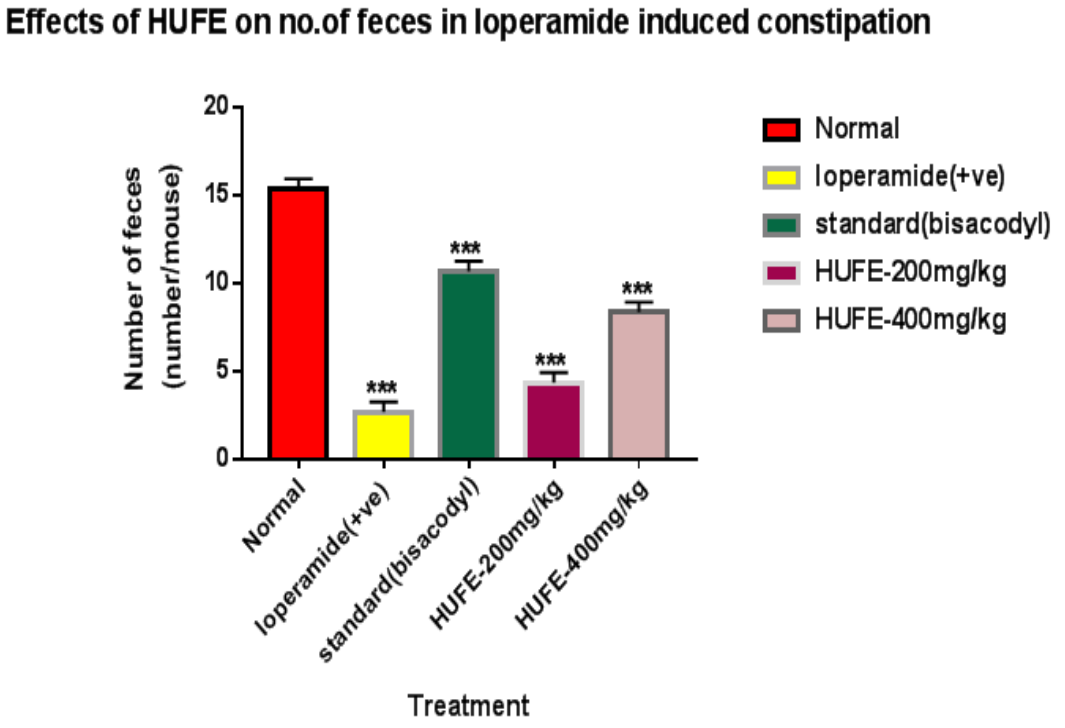
Standard (1C)

200mg/kg HUFE (1D)

400mg/kg HUFE (1E)

Fig no. 5.2- Faecal content data

Graph no: 5.6



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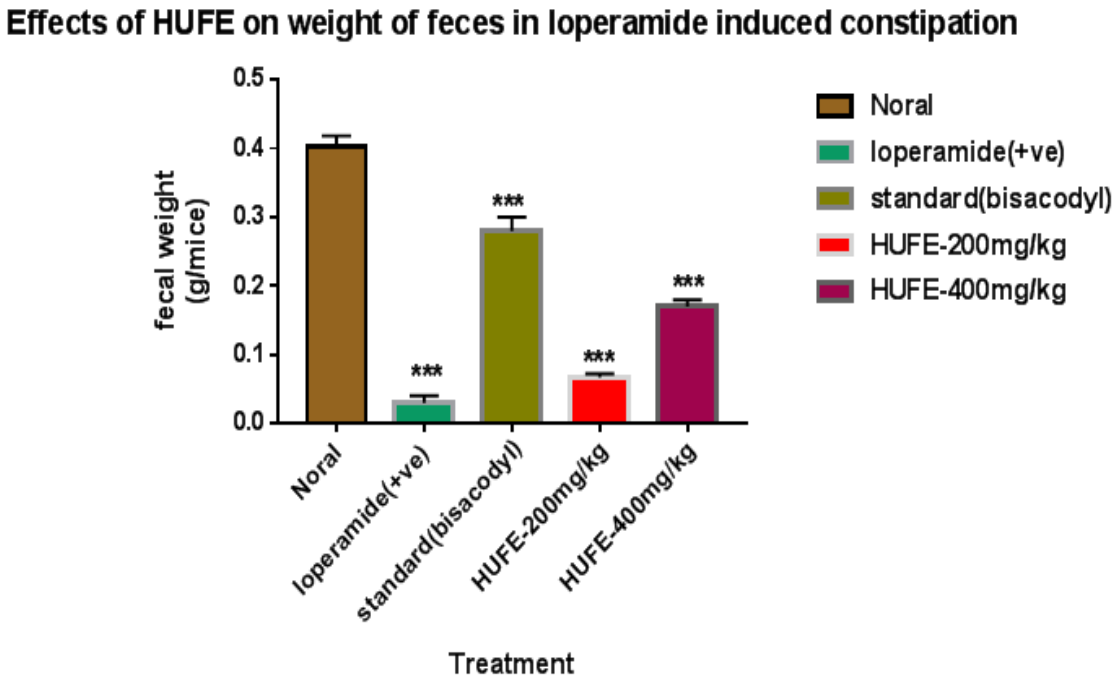
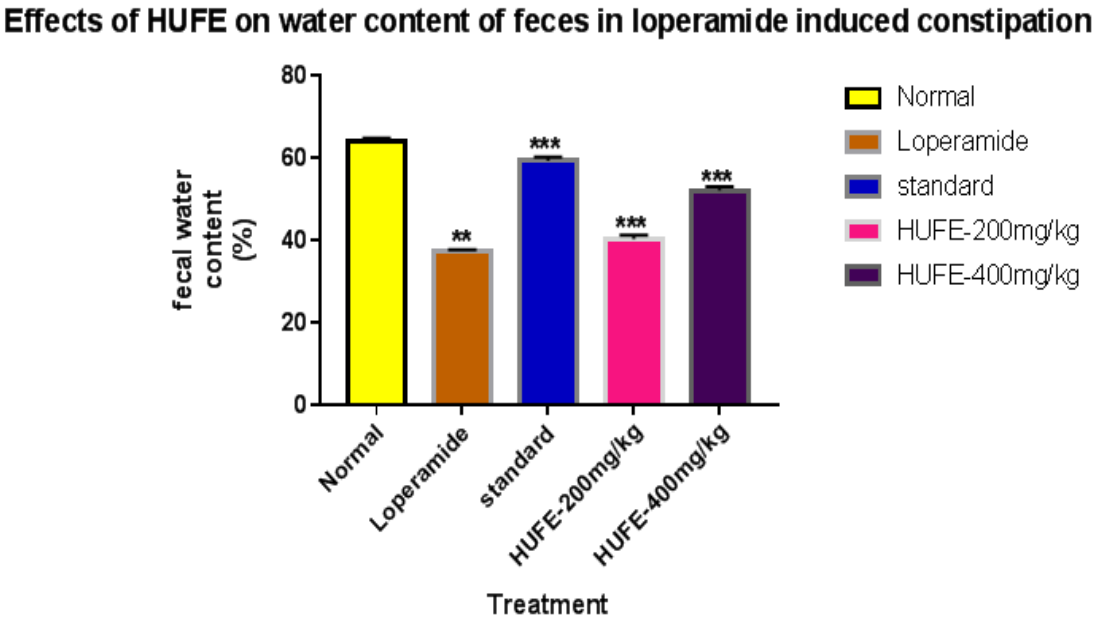


Graph no: 5.8



Increased fecal output in normal mice treated with HUFE. The effect of HUFE on number and weight of feces in normal mice were shown in figure 1A. Compared with the control treatment with HUFE (400mg/kg BW) produced a significant increase in no. of feces (figure 1E) and fecal weight.

VI. DISCUSSION

Parkinson's disease (PD) is a neurodegenerative disorder that affects predominately dopamine-producing neurons in a specific area of the brain called substantia nigra. Constipation is a highly prevalent functional gastro-intestinal disorder, affecting the quality of life in constipated persons, and the use of dietary fibre in the prevention and treatment of constipation is a common practice in many countries in the world. Haloperidol is a Antipsychotic drug which acts on Dopamine receptors in the striatum thereby induces parkinsonism. Toxicity of Haloperidol leads to the generation of free radicals leading to oxidative stress. As an agent for functional bowel disorders like diarrhoea, loperamide used as constipation inducer is well documented. The drug inhibits intestinal fluid secretion and intestinal motility, leading to delay faecal evacuation time and intestinal luminal transit, and is used to induce a model of spastic constipation.

In the present study, the fruit pulp of Hylocereus undatus was shade dried and then extracted with ethanol by maceration method. The % yield of the extract was found to be 10%. The ethanolic extract, then subjected to preliminary phytochemical screening. The phytochemical result shows the presence of Carbohydrate, Proteins and amino acids, Alkaloids, Terpenoids and Steroids, Glycoside and Flavanoids, Tannins and phenolic compounds, Saponins.

In Parkinson's disease study uses five behavioural parameter such as Catalepsy bar test, Hang test, Rotarod test, Horizontal bar test and Actophotometer test to assess Haloperidol Induced Parkinson"s Disease in mice. In Catalepsy test, the group which received only Haloperidol (Group II), significantly, increases catalepsy ($P<0.001$) which was seen on 1st, 4th and 7th day as compared to the Normal group (Group I).In standard treated group (Group III), a significant decrease in catalepsy ($P<0.001$) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II). In extract treated group (Group IV & V), a significant decrease in catalepsy ($P<0.001$) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II).Whereas no significant difference in catalepsy was seen when 400mg/kg treated group (Group V) compared to standard treated group (Group III).

In Hang test, the group which received only Haloperidol (Group II), significantly, decreases hanging time ($P<0.001$) which was seen on 1st, 4th and 7th day as compared to the Normal group (Group I). In standard treated group (Group III), a significant increase in hanging time ($P<0.001$) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II). In extract treated group (Group IV & V), a significant increases in hanging time ($P<0.001$) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II).Whereas no significant difference in hanging time was seen when 400mg/kg treated group (Group V) compared to standard treated group (Group III).

In Rotarod test, the group which received only Haloperidol (Group II), significantly, decreases fall off time (P<0.001) which was seen on 1st, 4th and 7th day as compared to the Normal group (Group I). In standard treated group (Group III), a significant increase in fall off time (P<0.001) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II). In extract treated group (Group IV & V), a significant increases in fall off time (P<0.001) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II).Whereas no significant difference in fall off time was seen when 400mg/kg treated group (Group V) compared to standard treated group (Group III).

In Horizontal bar test, the group which received only Haloperidol (Group II), significantly, decreases fall off time (P<0.001) which was seen on 1st, 4th and 7th day as compared to the Normal group (Group I). In standard treated group (Group III), a significant increase in fall off time (P<0.001) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II). In extract treated group (Group IV & V), a significant increases in fall off time (P<0.001) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II).Whereas no significant difference in fall off time was seen when 400mg/kg treated group (Group V) compared to standard treated group (Group III).

In Actophotometer test, the group which received only Haloperidol (Group II), significantly, decreases count (P<0.001) which was seen on 1st, 4th and 7th day as compared to the Normal group (Group I). In standard treated group (Group III), a significant increase in count (P<0.001) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II). In extract treated group (Group IV & V), a significant increases in count (P<0.001) was seen on 1st, 4th and 7th day as compared to the Haloperidol treated group (Group II).Whereas no significant difference in count was seen when 400mg/kg treated group (Group V) compared to standard treated group (Group III).

The effects of HUFE on constipation in this study were tested in loperamide induced constipation mice. The administration of HUFE to the constipated mice was effective in increasing the faecal number and faecal weight, which were indications of the laxative character of *Hylocereus undatus Haw.* Loperamide also markedly decreased the water content of faeces through inhibition of intestinal fluid secretion. Treatment with HUFE significantly raised the faecal water content in loperamide induced constipation mice.

VII. CONCLUSION

- Through our study it was found that results of *Hylocereus undatus Haw.* Fruit extract possesses significant anti parkinson's and laxative activity comparable to those observed with standard drugs due to the presence of chemical constituents like of Carbohydrate, Proteins and amino acids, Alkaloids, Terpenoids and Steroids, Glycoside and Flavanoids, Tannins and phenolic compounds, Saponins.
- Based on some literature reviews it reveals that these chemical constituents can be helpful in treating Parkinson's disease and Constipation.
- The HUFE extract can be regarded as a safe, economic, natural source for the discovery of Anti parkinson's and laxative activity. And because of its easy availability, White pitaya could be recommended as a cost-effective alternative for parkinson's and constipation. Further studies on identification, isolation, purification of active principles of plants responsible for these therapeutic properties may lead to the new drug development.

REFERENCE:

[1]. Deepa B, Anu E joy, and Shyamjith manikkoth, Effect of phyllanthu samarus on haloperidol induced catalepsy in experimental animal models, IJABPT, 6(3), (2015), 199-203.
[2]. Braak, H., Del Tredici, K., Rub, U., de Vos, R. A., Jansen Steur, E. N. and Braak, E. (2003) Staging of brain pathology related to sporadic Parkinson's disease. Neurobiol Aging, 24, 197-211.
[3]. Fact sheet of National digestive diseases clearing house, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES National Institutes of Health NIH Publication No. 04–2754 October 2003.
[4]. Kotnis Ms, Patel P, Menon SN, Sane RT. Renoprotective effect of Hemidesmus indicus, a herbal drug used in gentamicin-induced renal toxicity, Nephrology (Cariton), 2004 Jun 9(3): 142-52.
[5]. P. Kanchana1*, M. Lakshmi Santha2 , K. Dilip Raja3, A REVIEW ON GLYCINE MAX (L.) MERR. (SOYBEAN), Volume 5, Issue 1, 356-371 Review Article ISSN 2278 – 4357, Revised on 20 Nov 2015, Accepted on 10 Dec 2015.
[6]. Britton NL, Rose JN (1937) The Cactaceae: Descriptions and illustrations of plants of the cactus family. The Carnegie Institution of Washington U S A 2: 1-334.
[7]. Mizrahi Y, Nerd A, Nobel PS (1997) Cacti as crops. Hort Rev 18: 291-319.
[8]. Lim Y, Lim T, Tee J (2007) Antioxidant properties of several tropical fruits: A comparative study. Food chemistry 103(3): 1003-1008.
[9]. Vaillant F, Perez A, Davila I, Dornier M, Reynes M. Colorant and antioxidant properties of red-purple pitahaya. Fruits. 2005; 60(1): 3-12.

[10]. Nurliyana R, Syed Zahir I, Mustapha Suleiman K, Aisyah MR, Kamarul Rahim k. Antioxidant study of pulps and peels of dragon fruits: a comparative study. Int Food Res J. 2010; 17: 367-75.
[11]. Wu LC, Hsu HW, Chen YC, Chiu CC, Lin YI, Ho JA. Antioxidant and antiproliferation activities of red pitaya. Food Chem. 2005; 95(2): 319-27.
[12]. Li F, Li S, Li H, Deng G, Ling W, Wu S, Xu X, Chen F. Antiproliferative activity of peel, pulps and seeds of 61 fruits. J Funct Food. 2013; 5(3): 1298-1309.
[13]. Stintzing FC, Schieber A, Carle R (2002) Betacyanins in fruits from red-purple pitaya, Hylocereus polyrhizus (Weber) Britton & Rose. Food Chemistry 77(1): 101-106.
[14]. Nurmahani, M.M., *Osman, A., International Food Research Journal 19(1): 77-84 (2012), Du WX, Olsen C 2011 et al.,), wound healing property, **(**Perez G RM, Vargas S R, Ortiz H YD (2005) et al.,**)**
[15]. Perez G RM, Vargas S R, Ortiz H YD (2005) Wound healing properties of Hylocereus undatus on diabetic rats. Phytother Res 19(8): 665-668.
[16]. Phytochemical screening by Khandelwal, 2006; Kokate, 2008.