EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 7
Issue: 11
228-233
Year: 2020

"HEPATOPROTECTIVE ACTIVITY ON THE COMBINATION OF ANDROGRAPHIS PANICULATA AND SOLANUM NIGRUM ON PARACETAMOL INDUCED HEPATOTOXICITY ON ALBINO RATS"

Ram Surat Yadav[1*], Ashok Kumar Yadav[2], Rajbahadur[3], Harikesh Yadav[4], Bhawna yadav[5] and Pankaj Kumar[6]

[1]Assistent Professor of Rishi Ramnaresh College of Pharmacy, Molnapur, Mau (U.P).
[2]Scholar, Malhotra College of Pharmacy Bhopal Madhya Pradesh
[3]Principal, V.M.Y College of Pharmacy, Gangaupur, Madhuban, Mau (U. P).
[4]Scholar, R K Pharmacy College Azamgarh (U.P).
[5]H.O.D, R K Pharmacy College Azamgarh (U.P).
[6]Scholar, R.K Ayurvedic & Medical College Azamgarh (U.P).

***Corresponding Author: Ram Surat Yadav**
Assistent Professor of Rishi Ramnaresh College of Pharmacy, Molnapur, Mau (U.P).

Article Received on 02/09/2020 **Article Revised on 22/09/2020** **Article Accepted on 12/10/2020**

ABSTRACT
Measurement of urinary ascorbic acid production, bloodBromsulphthalein clearance, SGPT, SGOT, alkaline phosphatase, serum bilirubin, total proteins, wet liver weight/100 gm body weight, and hepatic lipid peroxidation, superoxide dismutase, glutathione, catalase , and glutathione peroxidase are the appropriate models for the hepatoprotective drug research. Commonly referred to as 'Black nightshade' (Solanaceae), which has been commonly used to treat digestive disorders, chronic skin diseases (psoriasis which ringworm), autoimmune symptoms, painful periods, fevers, eye infections, hydrophobia, etc., in herbal medicine in India and other parts of the world. Compounds of anti-tumor function, such as full alkaloids, steroid alkaloids, steroidal saponins and glycoproteins, have been shown to contain Solanum nigrum. In Indian herbal medicine, the plant is used as a hepatoprotective agent. In this report, we investigated the phyto-pharmacological properties of the Solanum nigrum plant and compiled its detailed pharmacological applications to understand and synthesise the subject of its possible multipurpose image of medicinal agents. Andrographis Paniculata has been used for centuries in India , China, Thailand, and other Asian nations and is present in 26 different polyherbal formulations in the Ayurvedic classical health system. Kalmegh is identified as a cold herb used to eliminate fevers and dissipate toxins from the body in the 1992 Pharmacopoeia of the People's Republic of China. An immunostimulant preparation known as Kan Jang containing Kalmegh and eleutherococcus has been used for 20 years in the Scandinavian countries. In the United States, Kalmegh is produced and marketed as well.

KEYWORDS: hepatotoxicity, Solanum nigrum, Andrographic Paniculata, liver.

INTRODUCTION

Liver

The liver is one of the main organs of the human body and the prime site for intense ingestion and excretion. So in the preservation, productivity and homeostasis management of the body, it has a surprising function. It includes almost all biochemical pathways to growth, disease control, food supply, energy supply and reproduction. The digestion of sugars, proteins and fats, detoxification, bile secretion and vitamin absorption are the primary functions of the liver.

In the right upper portion of the belly, the liver is a vital organ located under the ribs. Liver disease is a life-threatening condition in which liver function rapidly deteriorates. Liver failure is caused by liver disease, which makes it impossible or impossible for the liver to function properly in processes that are essential to life and general health, including:

Blood clotting
Clearing the blood of toxins
Fighting infection
Making bile that assists with digestion
Metabolizing medications and other substances
Producing proteins, enzymes, and healthy blood
Removing waste
Storing vitamins, minerals and energy

Hepatoprotective Agents

Hepatoprotective agents are substances which decrease liver damage caused by hepatotoxic agents. The hepatoprotective impact against hepatoinduced chemicals (alcohol, CCl4, alcohol-CCl4, beta-galactosamine, thioacetamide) and drugs (paracetamol, Nimesulide, isoniazid, rifampicin, etc.) of the involvement of bioactive substances such as alkaloids , flavonoids, terpenoids, ascorbic acid, tannin, glycosides, sugars, triterpenoids, fructose, phenol, etc. were studied. Various models used for screening hepatoprotective drugs are.

Hepatotoxicity

The most prevalent cause of iatrogenic illness is hepatotoxicity from medications and chemicals. Arsenic, arsenic, copper and iron are some of the inorganic compounds that generate hepatotoxicity. Other naturally occurring plant toxins such as pyrrolizidine alkaloids, mycotoxins and bacterial toxins are found in the organic agents. A significant number of pharmaceutical agents are a synthetic category of organic compounds. In addition, industrial, environmental or domestic susceptibility to hepatotoxicity substances that may be unintended, homicidal or suicidal intake may be.

Models to Evaluate Effect of Drugs on Liver

Since the liver is a multifunctional organ, the effect of drugs on the liver, which are non-invasive functional procedures, is tested by a series of liver function tests:
Content of ascorbic acid in urine
Sleeping time was caused by Pentobarbitone
Clearance Screening for Bromsulphthalein

Morphological Parameters

To measure the protective effect of the drug, morphological parameters such as animal weight, liver weight and volume were also used. Hepatotoxicity produces liver weight loss/100 gm of rat body weight.

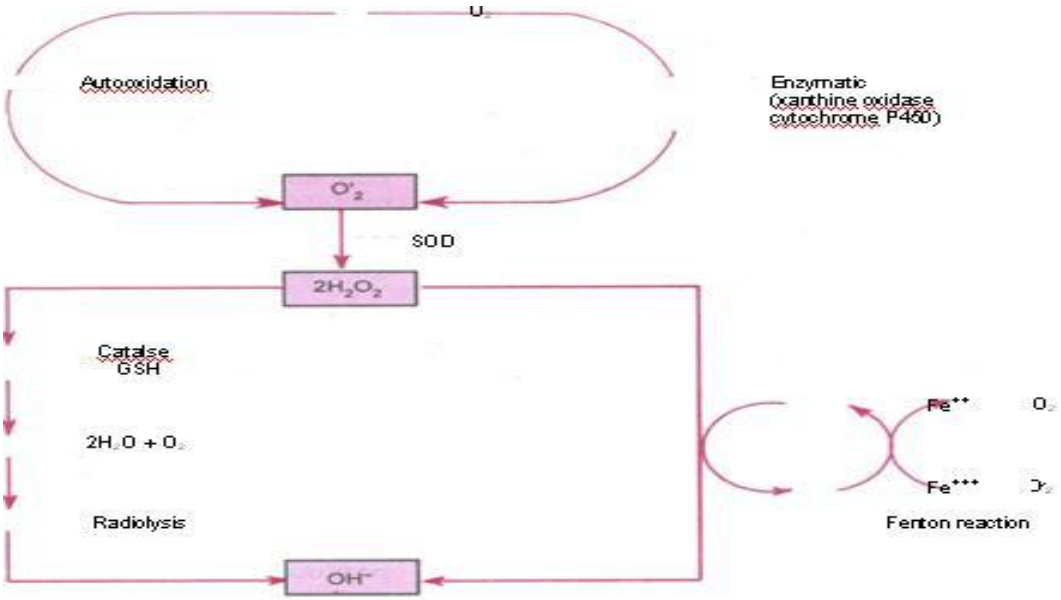

Fig 1: (Mechanism of generation of free radicals).

MATERIALS AND METHODS

Fresh matured leaves of Andrographis Paniculata and Solanum Nigram were collected from botanical garden of our institute R. K. Pharmacy college Kashipur Surai Sathiaon Azamgarh garden and were identified by Pharmacognosy expert. At the time of collection standard herbarium record sheets were completed with the name of the collector, collection no, date locality and local name.

Fig .2: Solanum Nigram.

Fig. 3: Andrographis Paniculata.

Animal

A laboratory rat is a rat of the species Rattus norvegicus(brown rat) which is bred and kept for scientific research. Laboratory rats have served as an important animal model for research in psychology, medicine, and other fields.

Fig. 4: Wister Albino Rat.

The first time one of these albino rat mutants was brought into a laboratory for a study was in 1828, in an experiment on fasting. Over the next 30 years rats were used for several more experiments and eventually the laboratory rat became the first animal domesticated for purely scientific reasons. Streptozotocin drug use in albino rat for enhances the diabetic activity in my experimental project. Healthy Wistar albino rats (150 – 250 gm body weight)

Plan of work

A brief introduction of plan of work is as follows:

During experiment perform on Hepatoprotective activity of

A. *Paniculata & Solanum Nigrum* are collected form botanical garden of R. K. Pharmacy College Kashipur, Surai, Sathiaon, Azamgarh Uttar Pradesh India.

Select the method for performing the experiment.

Inform the CPCSEA committee for the project.

Obtained the approval for experiment from the CPCSEA committee and no. of animal are used during the experiment.

Enrolment the volunteer and divided into the four & each group has 5 albino rat present of the experiment.

Experimental design:

Group 1 – The rats received oral saline 10 ml/kg BW (control group).

Group 2 – The rats induce Paracetamol 300 Dose(mg kg^{-1}).

Group 3 – The rats received a single dose of the combination of *A.Paniculata* (125 Dose(mg)./200 g BW) and *Solanum Nigrum* (375 Dose(mg)./200 g BW) with a ratio of 50:50 w/w percentage, orally.

Group 4 – The rats received a single dose of the combination of *A.Paniculata* (250 Dose(mg)./200 g BW) and *Solanum Nigrum* (250 Dose(mg)./200 g BW) with a ratio of 75:25 w/w percentage, orally.

Group 5 – The rats received a single dose of the combination of *A.Paniculata* (375 Dose(mg)./200 g BW) and *Solanum Nigrum* (125 Dose(mg)./200 g BW) with a ratio of 25:75 w/w percentages orally.

Extraction of plant material

In DEC 2019, the fruits were harvested from the S.Nigrum Linn vine. The leaves were gathered in good dry weather and dried for a week in the sunshade. For more research, the shade-dried pant content was coarsely powdered and used. Ethanol extract, the petroleum ether chloroform, is prepared by the process of hot continuous extraction and aqueous extraction is prepared by maceration. Phytochemical Analysis: The petroleum ethe extract was yellowish brown in hue. This was carried out in conjunction with the methodology described in the Qualitative phytochemical study of Solanum nigrum crude powders for the testing of phytochemicals such as alkaloids, saponins , tannins, flavonoids and proteins, etc.

Alkaloids test: 210 mg of plant content was taken and 10 ml of methanol was applied and then purified. After that, 2.1 ml filtrate was taken and 1.1 percent HCL was applied with steam filtrate of 1 ml and Mayer's reagent / Wagners reagent / Dragendorff's reagent of 6 drops. The Creamish / Brown / Red / Orange precipitate formed indicates the presence of alkaloids.

Saponin test: Roughly 0.6 ml of purified water was taken and 5.1 ml of fresh water was applied. Persistence of frothing suggests the presence of Saponins.

Tannins Test: 210 mg of plant content was taken and 10.5 ml of purified water was applied and then washed. After that, 2, 1 ml of filtered philtre was taken and 2,1 ml of FeCl3 Blue was added. The existence of Tannins & Phenols is then shown by black precipitates.

Flavonoids test: 210 mg of plant material was taken and 10.5 ml of ethanol was applied, then purified. After that, 2.1 ml filtrates were taken and conc HCL and magnesium ribbon were applied. Pink, tomato, red colour indicates the presence of Flavonoides, glycoside.

Protein test: Take 3.5-5.5 ml of plant extract or filtrate and apply a few drops of Millons reagent and blend well with heat. The white precipitate is formed and after boiling the precipitate turns brick red.

Chemicals

Paracetamol was purchased from Bahelia Tola Varanasi S.S. Science CENTER 221001. All the other chemicals and other biochemicals used in the tests by various companies were of scientific standard. Prior to use, the organic solvents were purified.

Table.1: - Phytochemical- screening of *A.paniculata* and *S. nigrum*.

S.NO	Compound	Test	Plant part					
			A. Paniculata Leaf Extract			*S. Nigrum* Fruit extract		
			E	M	C	E	M	C
1	Alkaloid	Mayer's reagent	++	+	-	++	+	+
		Wagner's Reagent	+	+	–	+	+	–
		Picric acid	++	+	–	+	+	–
2	Amides	Hydrolysis with alkali	+	+	+	+	+	+
3	Amines	Amines test	+	+	+	+	+	+
4	Ascorbic acid	DNPH test	+	++	+	+	+++	+++
5	Carbohydrates	Benedict test	+	+	+	+	+	+
6	Carboxylic acid	Sodium bicarbonate test	+	+	+	+	+	+
7	Flavonoids	Ammonium Test	+	+ +	+	+	+ +	+
		Aluminum chloride tes	+	+	+	+	+	+
8	Glycosides	Fehling solution	+ +	+ ++	+ +	+	+ +	+ +
9	Phenol	Ferric chloride test	+	+	+	+	+	+
10	Proteins	Millons Reagent test	+	+	–	+	+	–
11	Reducing Sugar	Fehling solution tes	–	–	+	–	–	+++
12	Saponin	Frothing test	–	–	–	–	–	–
13	Starch	Starch test	+	+	+	+	+	+
14	Steroids	Liebermann - Burchard's test	++	+++	++	+	+++	+
		Salkowski's Test:	+	+ +	+ +	+	+ +	+
15	Tannin	Ferric chloride test	++	+ +	++	+ +	+ +	+
16	Terpenoides	Liebermann - Burchard's test	++	++	+	+	++	+
		Salkowski's Test:	+	++	++	+	+	++
17	Amino acid	Ninhydrin Reagent test	+	+	-	+	+	-
18	Aromaticity	Flame test (Ignition test)	+	+	+	+	+	+
19	Unsaturation	Test for Unsaturation	-	-	-	-	-	-

- =absent, + =Presence, ++ = Moderate, +++ = Maximum

E- ethanol, M- methanol and C- chloroform

RESULTS AND DISCUSSION

Effect of *a. paniculata : s. nigrum* on liver enzym level in paracetamol induced hepatotoxicity

S.N	Drug	N. of Rat	Quantity	Response (ALT(IUL^{-1}) serum)
1	Saline Water(**Control**)	5	------	61.18(55.28-65.08)
2	Paracetamol	5	300	198.63 (201.89-194.41)*
3	***(A. paniculata : S. nigrum)*** + Paracetamol **(25:75)+PCM**	5	500+300	66.29(63.29-68.30)
4	***(A. paniculata : S. nigrum)*** +Paracetamol **(50:50)+PCM**	5	500+300	67.21 (60.12-74.31)$^{\#}$
5	***(A. paniculata : S. nigrum)*** + Paracetamol **(75:25)+PCM**	5	500+300	65.10(58.15-70.63)

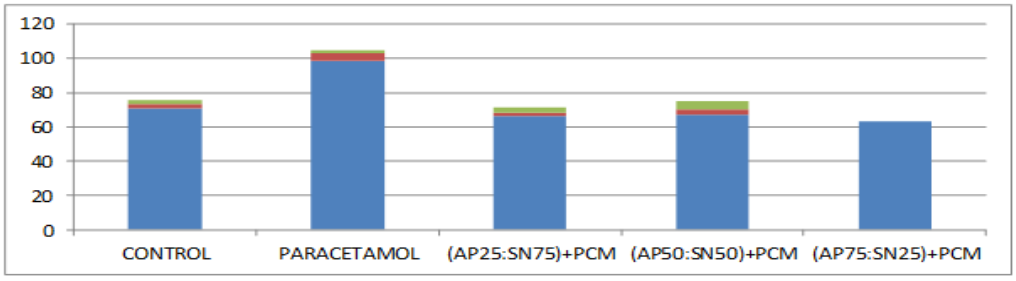

Fig. 4: Effect Of *A. Paniculata : S. Nigrum* On Liver Enzyme Level In Paracetamol Induced Hepatotoxicity.

Effect of A.Paniculata:*S.Nigrum* on Liver Enzyme Level In Paracetamol Induced Hepatotoxicity.

S.N	DRUG	N. OF RAT	Quantity Dose(mg kg^{-1})	SGOT(IUL^{-1}) serum
1	**Saline Water(Control)**	5		47.84(35.87-59.82)#
2	Paracetamol	5	300	151.34(151.34-191.34)
3	***(A. paniculata : S. nigrum)*** + Paracetamol **(25:75)+PCM**	5	500+300	98.39 (101.11- 95.65)
4	***(A. paniculata : S. nigrum)*** +Paracetamol **(50:50)+PCM**	5	500+300	68.35(62.3-72.6)
5	***(A. paniculata : S. nigrum)*** + Paracetamol **(75:25)+PCM**	5	500+300	63.21(58.3-68.4)

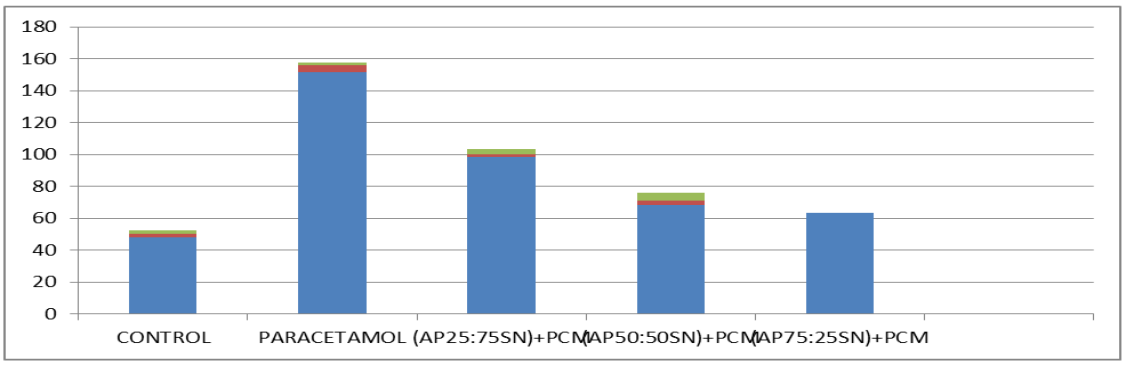

Fig. 5: A. Paniculata:*S.Nigrum* on Liver Enzyme Level In Paracetamol Induced Hepatotoxicity.

DISCUSSION

The outcome of these investigations revealed that the combination of Andrographis paniculata & solanum nigrum has hepatoprotective activity against paracetamol, as found in the paracetamol treated as stated by Gopal et al (1989).

Administration of a single high dose of paracetamol (300 mg / kg) increases serum relative to normal animals. However, a single high dose of Andrographis paniculata & solanum nigrum aqueous ethanol extract might only provide partial protection, but the combination of Andrographis paniculata & solanum nigrum requires maximum liver protection.

CONCLUSION

The mixture of Andrographic paniculata leaf extract and Solanum nigrum fruit extract demonstrated a powerful heap-to-protective effect in hepatotoxic rats induced by PCM. Thus, the hepatoprotective impact of the mixture of the fruit of Andrographis paniculata leaf extract & Solanum Nigrum in the ratio of (75:25) is greater than that of the separate extract of Andrographis paniculata & Solanum nigrum fruit.

ACKNOWLEDGEMENT

I am thankful to the management of R. K. Pharmacy College Kashipur, Surai, Sathiaon, Azamgarh, Uttar Pradesh, India for providing best lab facilities necessary for completion of my research

CONFLICT OF INTEREST

"The authors declared no conflict of interest"

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12. G.SUNEETHA1, Dr.V.RAVI21.Research scholar in Acharya Nagarjuna.University.""International Journal of Research and Reviews in Pharmacy and Applied science, 2011." www.ijrrpas.com.