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A Study of Natural Medicine's Toxicology Analysis

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Abstract - Natural-source medicines have become the foundation for pharmaceutical pharmaceuticals. Herbal medicines are naturally occurring plant-derived substances that have been utilised for treating and curing a variety of ailments as well as as nutraceuticals. Toxicological research and testing assist in living securely and accurately predicting the benefits of synthetic and natural substances while avoiding harm. Toxicology studies are carried out for data profiling and the safety of herbal medications, and toxicity studies of diverse plants and herbal formulations are reported. This review briefly highlights the importance of toxicity research, plant toxicity, and safe traditional herbal therapy.

Keywords - Toxicity, Medicinal Plant, Herbal Formulations, Toxic constituents.

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INTRODUCTION

Thousands of years have passed since herbal therapy was first employed. Traditional herbal medicine is used by an estimated 80% of the world's population for primary health care. Herbal treatments have gained popularity as a dietary supplement for illness prevention and as an alternative/complementary therapy in recent years. Herbal medications come in a broad variety of forms and can be found in stores all around the world. The safety and efficacy of herbal therapy have become a public health concern as the use of herbal products has increased. Both the intrinsic toxic effects of herbal medicine and the toxicities generated by adulterants/contaminants could be blamed for adverse health consequences linked with herbal goods. The demand for and requirement of toxicological studies for herbal products has grown as more evidence about the negative effects of herbal medication has been available.Many therapeutic herbs can be found in India's natural resources. Traditional remedies have been used in India since ancient times, according to numerous sources. Ayurveda, Unani, and Siddha are three important traditional systems in India that use medicinal plants. The essential principals and practises that run across these systems are a shared thread. About 2000 medications of natural origin are included in the Indian materia medica, which are drawn from various traditional systems and practises [1]. Medicinal plants offer a lot of promise to help rural people supplement their earnings and enhance their quality of life. However, there are severe issues that must be addressed in terms of data gathering, processing, and marketing [2]. Toxicology is the study of how chemical compounds interact with living systems and alter natural functions.The information's applications give safe exposure levels. Toxicological research and testing assist in living securely and accurately predicting the benefits of synthetic and natural substances while avoiding harm. At some amount of exposure, all substances can cause harm. That is, exposure to a little amount of any drug has no discernible influence on normal biological processes and is therefore regarded harmless. Although some dosages are healthy, increased exposure will eventually induce negative consequences and the chemical will be termed toxic at that level [3]. Before incorporating any plant in toxicity study, it should be assessed independently. Toxicity testing is done to learn more about a drug's biological activity and mechanism of action.The results of the test are used to identify medication hazards and control risk. Herbal drug preclinical studies give scientific support for their traditional use and demonstrate that they are safe and effective [4].

HERBAL TOXICITY

Despite the increasing market demand for herbal medications, there are still worries about their use as well as their safety. Only around 10% of herbal products on the market are fully standardised to recognised active ingredients, and tight quality control techniques are not always strictly followed.The active and/or harmful ingredients of the bulk of these products in use are unknown. Herbal medications are not subjected to the same regulatory criteria as orthodox drugs in many countries, including the United States, in terms of efficacy and safety. This raises questions about their safety as well as the ramifications of using them as medicines. Toxicity testing can show some of the

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hazards that come with using herbs as medicine, allowing you to avoid any potentially hazardous side effects. These poisonous chemicals are not distinguishable from therapeutically active ingredients in several toxicologically and medicinally relevant plant species such as Digitalis purpurea, Hyoscyamus niger, Atropa belladonna, Physostigma venenosum, Podophyllum peltatum, and Solanum nigrum.Despite the rising demand for herbs on the market for usage in various medicinal goods, there are still some concerns about their safety. Only a small percentage of marketed herbal products (less than 10%) are standardised and subjected to stringent quality control techniques [7]. There is very little information about the toxicity of these products. Toxic constituents are produced by some plants as a defence mechanism. These hazardous compounds are *Aconitum columbianum, Blighia sapida, Trifolium hybridum, Digitalis purpurea, Gymnocladius dioica, Hyoscyamus niger, Solanum nigrum, Sanguinaria Canadensis, Atropa belladonna, Physostigma venenosum, Pteridium aquilinum, and Podophyllum pelt Alkaloids, flavonoids, terpenoids, and saponins are phytochemicals that can imitate or antagonise the actions of signalling molecules, neuropeptides, hormones, and neuropeptides in humans* [8-11].

REQUIREMENT OF HERBAL TOXICITY TESTING

The worry about drug toxicity testing is for the sake of safety. There must be no toxicity in any of the medications used in the study [5]. Because herbs are categorised as dietary supplements rather than foods or medications, they are exempt from the pre-market testing that drugs and food additives must undergo. Acute toxicity testing is done to determine the drug's safety and to further assess its biological activity and mechanism of action. The information obtained from the test is utilised to identify medication hazards and control risk [6].One or more biological activities have been discovered in medicinal plants, and these plants have traditionally been used in herbal formulations. Table 1 shows the toxicity profiles of various plants, plant parts, types of extracts, and medicinal uses that have been reported and determined to be safe. Plants from this genus have been employed in a variety of pharmacological and commercial preparations. Figure 1 depicts the toxicological examination of herbal medicine extract.

HERBALS' SAFETY AND EFFICACY

Investigating the efficacy of herbal medicine, scrutinising adverse effects, identifying marker compounds or therapeutic agents in medicinal or botanical products, and identifying serious contaminants from herbal mixtures are all important and difficult tasks for scientists working in herbal drug development.

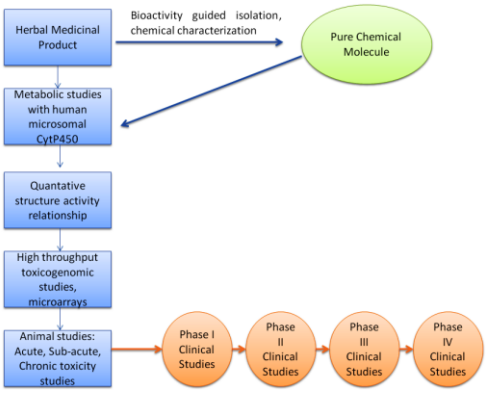

Figure 1: Toxicological evaluation of herbal extract

The most common reasons or causes of botanical or herbal drug toxicity are incorrect identification or authentication of botanicals or herbals, improper or mislabeling of plant material, contamination of herbals with microorganisms, contamination of herbals with fungal toxins such as aflatoxin, contamination of herbals with pesticides and heavy metals, interaction with conventional drugs when taken together, improper or unprofessional processing, and inadequate standardisation.The bulk of herbals or plant-derived natural products used by the general public require the creation of strong standardisation and quality control requirements. The majority of these plants lack safety data or have very limited information about their toxicity.

Table 1: Traditional Medicinal Plants That Have Been Toxicity Tested

S. No.	Plant Name	Plant Parts	Extract	Use	Reference
1	Nigella damascena	Seed	Methanolic	Amenorrhoea diuretic	[12]
2	Pisonia Aculeata LINN.	Leaves	Methanolic	Hepatoprotective and Antioxidant	[13]
3	Hemodya(Cassia siamea flamboyant, Garcinia cowa Ro		Aqueous	Sickle Cells	[14]
4	Cosmos Caudatus	Leaf	Ethanolic	Anti-aging agent	[15]
5.	Astercantha longifolia	Seed	Ethanolic	Gout and rheumatoid arthritis	[16]
6	Crinum giganteum		Aqueous	Anti - Inflammatory	[17]
7.	Solanum nigrum	Whole plant	Ethanolic	Pain, fever, inflammation	[18]
8.	Dalbergia latifolia	Root	Ethanolic	Muscle relaxant, for	[19]
9.	Chrozophora plicata	Leaf	Chloroform	Tantircuse and jaundice	[20]
10.	Momordica dioica	Fruit	Aqueous	Hepatoprotective, antibacterial	[21]
11.	Boerharia diffusa	Whole	Methanolic	Headache, anxiety	[22]

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12	Garuga pinnata	Leaf	Alcoholic	Diabetes	[23]
13	Albizia lebbeck		Methanolic	for snake poison	[24]
14	Tephrosia purpurea		Ethanolic	BronchitIS, diuretic	[25]
15.	Saccharum spontaneum Linn.	Root	Ethanolic	Antioxidant, antimicrobial	[26]
16.	Lygodium flexuosum	Whole plant	n-hexane	Hepatoprotective	[27]
17.	Pterospermum acerifolium	Leaf	methanolic	Analgesic, antioxidant, antiulcer	[28]
18	Eupatorium	Leaf	Methanolic	Antifungal, antimicrobial	[29]
19.	Eichhornia crassipes	leaves and shoot		Antimicrobial	[30]
20.	Combretum Molle	Leaf	Aqueous	Antibacterial, antifungle	[31]
21.	Moringa oleifera	Leave	Ethanolic	Anti inflammatory	[32]
22.	Carica papaya Linn	Leaf	Ethanolic	Analgesic, amebicide, antibiotic	[33]
23.	Annona senegalensis	Root bark	-	-	[34]
24.	Anacyclus pyrethrum	Root	Ethanolic	Antibacterial, antidepressant	[35]

CONCLUSION

The need for toxicity studies of herbal plants and herbal formulations is described in this review paper. The information offered may be useful in furthering the research of herbal plants or formulations, as well as in using herbs in various traditional medical systems. Research is required to back up the medicinal claim, as well as to ensure that the herbal plant and herbal formulation are safe for human ingestion.

REFERENCES

1. Mukherjee PK. Evaluation of Indian traditional medicine. Drug Inform J. 2001; 35:631–40.

2. Puri S, William AJ. Health care and development of medicinal plant. 1999.

3. Drive MF. Animal in research, the importance of animal in science of toxicology. The society of toxicology. 2006.

4. WHO. Research guideline for evaluating thr safety and efficacy of herbal medicines, Phillippines, Manila: regional office, western pacific region. 1993.

5. Gamaniel KS. Toxicity from medicinal plants and their products. Nigerian Journal of Natural Products and Medicines. 2000; 4: 4-8.

6. Akila B, Manickavasakam K. Antiiflammatory and antinociceptive activity of two siddha formulations in combination. Ijpsr. 2013; 4(2): 856-861

7. Winston D, Maimes S. Adaptogens: Herbs for strength, stamina and stress relief. Rochester, Vermont: Healing Arts Press. 2007.

8. Nassel DR, Winther AM. Drosophila neuropeptides in regulation of physiology and behaviour. Progress in Neurobiology. 2010; 92: 42-104.

9. Klowden MJ. Physiological systems in insects. London: Academic Press. 2007.

10. Daniels RW, Gelfand MV, Collins CA, Diantonio A. Visualizing glutamatergic cell bodies and synapses in Drosophila larval and adult CNS. Journal of Comp. Neurology. 2008; 508: 131-152.

11. Ismail N, Christine S, Robinson GE, Fahrbach SE. Pilocarpine improves recognition of nestmates in young honey bees. Neuroscience Letters. 2008; 439: 178-181.

12. Yacine B, Noureddine B, Mustapha T, Samira A, Bachra K. Acute and sub-chronic toxicity study of *Nigella damascena* methanolic seed extract in mice. Int. J. Pharm. Bio. Sci. 2013; 4(2): 413-419.

13. Ghode P, Sweta Rajkapoor B. Acute and subacute toxicity studies of the methanol extract from leaves of *Pisonia aculeata* linn. Int. J. Pharm. Sci. Rev. Res. 2013; 20(1): 171-175.

14. Kotue TC, Ndomou M, Pieme AC, Oumdoum PC, Ngogang YJ. Acute and subacute toxicity studies of Hemodya aqueous extract of three medicinal plants, used to fight against sickle cells disease in albino rats. J. Biotechnol. Pharm. Res. 2013; 4(2): 22-28.

15. Amna FO, Nooraain H, Noriham A, Azizah AH, Husna RN. Acute and oral subacute toxicity study of ethanolic extract of *Cosmos caudatus* leaf in sprague dawley rats Int. J. Biosci. Biochem. Bioinforma. 2013; 3(4):301-305.

16. Rajina PV, Dominic Shini. Toxicity evaluation of ethanolic extract of *Astercantha longifolia* seeds. Hygeia. J. D. Med 2013; 5(1): 152-163.

17. Refaat J, Kamel MS, Ramadan MA, Ali AA. Crinum; an endless source of bioactive

principles: a review. part v. biological profile. Int J Pharma. Sci. and Res. 2013; 4(4): 1239-1252.

18. Marwa MAE, Ghada ZAS, Emam AMAR. Effect of *Solanum nigrum* Linn against Lambda Cyhalothrin-Induced Toxicity in Rats. J. Pharm. and Bio. Sci. 2013; 5(5):55-62.

19. Prasad D, Chandiran R, Kavimani S. Neuropharmacological profile of ethanolic extract of *Dalbergia latifolia* roxb in swiss albino mice. J. Global. Trends. Pharma. Sci. 2013; 4(3):1193-1199.

20. Kadiri SK, Rao AS. Evaluation of antiulcer activity of plant *Chrozophora plicata*. Int J Pharm. 2013; 3(4): 774-778.

21. Yadav AK, Khatoon R, Rao CV, Sharma A. Antiulcer activity of *Momordica dioica* fruits, extract. World J Pharm and Pharma Sci. 2013; 2(4): 1921-1944.

22. Venkateswarlu B, Rao YR. Anxiolytic -hypnotic activity of whole plant extract of *Boerhaavia diffusa*. Int. J. Phytotherapy. 2013; 1(3): 33-36.

23. Chitra V, Das SMM, Rajalakshmi V. Evaluation of antiulcer activity of alcoholic extract of *Garuga pinnata* roxb. leaves in experimental animal models. Int. J. Pharm. Tech Res. 2013; 5(3): 991-1000.

24. Sivakumar B, Velmurugan C, Kumar PRL. Diuretic activity of methanolic extract of *Albizia lebbeck*. Int. J. Pharm. Tech. Res. 2013; 5(2): 404-406.

25. Hussain T, Fareed S, Siddiqui HH, Vijaykumar M, Rao CV. Acute and subacute oral toxicity evaluation of *Tephrosia purpurea* extractin rodents. Asian Pac. J. Trop. Dis. 2012; 2(2):129-132.

26. Sathya M, Kokilavani R. Acute and sub-acute toxicological assessment of the ethanolic root extract of *Saccharum spontaneum* Linn. (Poaceae) in male wistar albino rats. J. Chem. Pharm. Res. 2012; 4(8): 3894-3899.

27. Pallara JW, Velikkakathu V. Acute and subacute toxicity studies of *Lygodium flexuosum* extracts in rats. Asian Pac. J. Trop. Biomed. 2012; 200-202.

28. Nandy S, Datta R. Acute and sub-acute toxicity studies of methanolic leaves extract of *Pterospermum acerifolium* (L.) Willd in rodents. Int. J. Pharm. Life Sci. 2012; 3(3): 1519-1529.

29. Negi A, Sharma N, Singh FM. Formulation and evaluation of an herbal anti-inflammatory gel containing *Eupatorium* leaves extract. J. Pharmacogn. Phytochem. 2012; 1(4): 112-117.

30. Lalitha P, Sripathi SK, Jayanthi P. Acute toxicity study of extracts of *Eichhornia crassipes* (mart.) Solms. Asian J. Pharma. Clin. Res. 2012; 5(4): 59-61.

31. Yeo D, Bouagnon R, Djyh BN, Tuo C, Nguessan JD. Acute and subacute toxic study of aqueous leaf extract of *Combretum molle*. Trop J Pharma Res. 2012; 11(2): 217-223.

32. Kasolo JN, Bimenya GS, Ojok L, Ogwal-Okeng JW. Sub-acute toxicity evaluation of *Moringa oleifera* leaves aqueous and ethanol extracts in swiss albino rats. Int. J. Med. Plants. Res. 2012; 1(6): 075-081.

33. Protus AT, Gabriel AA, Tchamgoue DA, Tchokouaha LRY, Kemeta D, Ngadena YSM. Acute and chronic toxicity studies of the aqueous and ethanol leaf extracts of *Carica papaya* Linn in Wistar rats. J. Nat. Prod. Plant Resour. 2012; 2(5): 617-627.

34. Okoye TC, Akah PA, Ezike AC, Okoye MO, Onyeto CA, Ndukwu F. Evaluation of the acute and sub-acute toxicity of *Annona senegalensis* root bark extracts. Asian Pac. J. Trop. Dis. 2012; 5(4): 277-282.

35. Kuttan S, Ronald D, Venkatesan S. Toxicological evaluationethanolic extract of *Anacyclus pyrethrum* in albino wistar rats. Asian Pac. J. Trop. Dis. 2012; 2(6): 437-441.

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