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A Study of Pharmacognostical Profile of the Herbal Drugs

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Abstract – The pharmacological therapy of the disease has been carried out using herbs for a considerable period. Plants have from the beginning of time been utilized as medicine. The Rig-veda allusions to the therapeutic qualities of certain herbs seem to be the oldest records of plant usage in medicine in India. Herbal medications were the earliest medicines for humanity, and they continue to play an important part in medicine. The World Health Organization's statement (WHO), herbal medicine is used by 75-80 percent of the world's population for primary health care due to its cultural acceptance, compatibility with the human body, and lack of adverse effects Crude medicines are plant or animal pharmaceuticals that are made up entirely of natural ingredients that have simply been collected and dried, The phrase "natural substances" refers to compounds found in nature that have not had their molecular structure altered by humans, and the study which discussed about crude drug, Pharmacology, Plant as Nephroprotective agents, Epidemiology, Pathophysiology, Medicinal chemistry, Evaluation of crude drugs, Drug development process, Drug development

Keyword – Drugs, Pharmacology

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INTRODUCTION

The pharmacological therapy of the disease has been carried out using herbs for a considerable period. Plants have from the beginning of time been utilized as medicine. The Rig-veda allusions to the therapeutic qualities of certain herbs seem to be the oldest records of plant usage in medicine in India. Herbal medications were the earliest medicines for humanity, and they continue to play an important part in medicine. The World Health Organization's statement (WHO), herbal medicine is used by 75-80 percent of the world's population for primary health care due to its cultural acceptance, compatibility with the human body, and lack of adverse effects.

Herbal medicine has grown more popular across the world in the last decade. Plant extracts or isolated active principles derived from plant components are thought to make for around a quarter of all prescription medicines. The demand for herbal goods is now increasing at an exponential rate throughout the globe, and large pharmaceutical firms are undertaking significant research on plant materials for their potential therapeutic benefit. [1]

In ancient literature, approximately 500 plants with medicinal properties are mentioned, and about 800 plants are utilized in indigenous medical systems. Herbal medications are ancient medicines that mainly treat patients using medicinal herbs. Many synthetic medicines have replaced plants in many nations today, yet plants still provide 30% of medicinal products, either directly or indirectly.

The term "Nephrotoxicity" refers to kidney damage caused by medicines, toxic substances, or industrial or environmental toxins and pollutants. Nephrotoxicity is a kidney-specific condition in which excretion is disrupted by harmful substances or medicines. Drugs cause around 20% of Nephrotoxicity, but as the average life duration rises, so does the incidence of Nephrotoxicity in the elderly. The induction of renal failure is known to be caused by radio contrasting substances; cyclosporine, aminoglycoside (gentamicin); anticancer medications; and chemical compositions such As ethylene glycol; carbon tetrachloride; sodium oxalates; acetaminophen; heavy metals; pesticides.

CRUDE DRUG

Crude medicines are plant or animal pharmaceuticals that are made up entirely of natural ingredients that have simply been collected and dried. The phrase "natural substances" refers to compounds found in nature that have not had their molecular structure altered

by humans. Senna and Cinchona, for example, are used as medication for humans and animals, both orally and topically, to treat illness.

Any unprocessed substance that occurs naturally, generated from organic or inorganic sources such as plants, animals, microorganisms, or organic matter or whole organisms for use in human or other animal diagnostic, cure, mitigation, processing or disease prevention, should be referred to as raw materials. The phrase "crude drug" refers to items of plant and animal origin that are present in their natural state. The phrase "crude drug" was once used to describe medicinal compounds derived from the mineral kingdom, different kinds of medicines. [2]

QUALITY CONTROL AND QUALITY ASSURANCE OF HERBAL DRUGS

The value control of herbal drugs is a worldwide necessity to be fulfilled. Good quality assurance is needed when dealing with the herbal products. Quality refers to the inherent worth of the drug and the amounts of vigorous constituents present.

Authenticity

A report of macroscopic, microscopic and sensory characteristics of the plant should be provided, together with drawings or photograph if promising. An explanation should be provided of the physical or chemical test done to recognize the plant substances and chromatogram of the active part.[3]

Purity

Restrictions of foreign organic stuff (such as stem and rachis fragments in the leaves or leaflets, leaf fragments in the flowers, etc) and foreign substance (such as sand and soil adhering to the plant material) should be specified.

Assay

It should be described for physical, chemical or biological assay of active fractions and the biological activity of the plant origin drugs articulated in term of assay.

Problems in standardization of plant drugs:

1. Little specific standards are mentioned in the official monographs.
2. A series of variations take place which do not match to individuals confirmed in the pharmacopoeia.
3. Certain constituents cannot be satisfied for magnitude to meet the demand as the large geographical variations.
4. The crude herbal drug rendered flabby for use during microbial contamination.
5. The large demand for herbal drugs of pharmacopoeial quality make it difficult to maintain its

PHARMACOLOGY

Any manufactured (in-body) natural or endogenous substance that has a biochemical or physiological effect on cells, tissues and organisms may be classified as a medicinal product and pharmacology is a medicinal business. Drugs, pharmaceutical and biological sciences (sometimes the word pharmacognosy is used as a term to encompass these endogenous and exogenous bioactive species). The research examines the influence of chemicals in the interaction of living organisms upon normal or aberrant biochemical activity. Therapeutic properties of pharmaceuticals are compounds. [4]

Pharmaceutical composure and synthesis characteristics, design, molecular and cellular mechanisms, organ/system mechanisms, transduction and cell communications, molecular diagnosis, interactions, chemical biology, treatment, and antipathogenic capacity are covered. Pharmacodynamics and pharmacokinetics are the two major areas of pharmacology. Pharmacodynamics is the study of the impacts of a drug on biological systems, whereas pharmacokinetics investigates the effects of a drug on biological systems. Pharmacodynamics concerns chemical interactions with biological receptors, while pharmacokinetics is concerned with the absorption of chemical agents from biochemical systems, distribution, metabolism and excretion (ADME).

Pharmacology and pharmacy cannot be replaced, although frequently both are interchangeably utilized. Pharmacology is a biomedical science focused on research and discovery, characterization and understanding of the function of cells and organisms with respect to substances with biologic effects. On the other side, pharmacy is a medical profession which applies pharmacological concepts in clinical settings, whether it provides clinical treatment or dispense. The main difference between the two occupations is the division between direct healthcare, pharmacy and scientific research in pharmacology.

PLANT AS NEPHROPROTECTIVE AGENTS

The nephroprotective impact was investigated in ginger, which substantially protected renal cells, decreased tube damage from gentamicin and the

capacity to regenerate tubes in animal models. The following has been shown by other research: a) improved urinary glycosis renal function; b) lower serum urea and creatinine; and c) lower MDA levels. The findings of this research have now been published as follows: Garlic juice was proven helpful in gentamicin acute renal failure, whether administered simultaneously or later.

The protective effect of a Polyherbal formulation on mice given 3 mg/kg of Cisplatin was investigated. Angelica radix was shown to be more effective than the other components in the formulation and to have the greatest protective impact against toxicity. Angelica radix has been ascribed to its L-Malate component, which isolated and assessed for nephroprotective effect. [5]

The herb Cordyceps sinesis protects proximal tubular cells against gentamicin toxicity in combination with gentamicin. Research in clinical, experimental and immunological Biskhapra studies shows the same diuretic effect on frusemide (Boerhavia diffusa). Bishkhapra (Boerhavia diffusa) raises serum protein and reduces the elimination of urine protein in people with nephritis syndrome. Biskhapra has been shown to be a helpful and safe medicine in patients with nephritic syndrome in clinical studies. Female rats received 200 mg/kg/day oral gokhrosin and gentamicin, both structural and functional, which reduced the associated nephrotoxicity. The results were similar the results of Verapamil. In carbon tetra-chloride-induced nephrotoxicity a methanol extract from Icacina tricantha tuber was shown to be beneficial. Weight is lost on rats that have only had carbon dioxide chloride and on those who had carbon dioxide chloride with extract. Histopathologists examined the kidney for nephrotoxicity and found it completely safe from carbon tetra chloride.

EPIDEMIOLOGY

Nephrotoxicity is an increasingly frequent and possibly fatal consequence. Acute renal failure is caused by drugs in around 20% of community-acquired cases and 18–27% of hospital-acquired cases. The prevalence of drug-induced Nephrotoxicity in older people may be as high as 66%. Patients today are older, have a greater prevalence of diabetes and cardiovascular disease, take numerous medicines, and are subjected to more diagnostic and therapeutic procedures that may impair kidney function than patients 30 years ago. Although acute kidney failure (AKF) or renal impairment can usually be reversed if the offending medication is stopped, the condition may be expensive and may require several treatments, including hospitalization4. A growing number of clinical investigations focused on particular forms of acute kidney damage (for example, in the context of intravenous contrast, sepsis, and major surgery) have added to our understanding of this complex condition

EVALUATION OF CRUDE DRUGS

The evaluation of a medication guarantees its identification while also determining its quality and purity. The key reasons why crude drug evaluations are required include biochemical changes in the medication, the treatment and storage effects, and adulterations and replacements. Microscopic assessment, chemical assessment, physical evaluation, and biological evaluation are all examples of organoleptic evaluation. [6]

1. Organoleptic Evaluation

The term "Organoleptic assessment" refers to the study of medicines utilizing the sense organs. Color, smell, taste, size, form, and unique characteristics such as touch, texture, and so on are examples of techniques of analysis. Obviously the initial sight is so distinctive that the plant or extract tends to identify itself. When not enough, it may have an unique odour or taste in the plant or extract. Morphology is the study of a basic drug's shape, whereas morphography is the description of that form. Cinchona, quillaia, and cascara barks, as well as quassia wood, have broken surfaces that are significant features. The sweet taste of licorice and the aromatic smell of umbelliferous fruits, All the curved shape, powerful capsicum and ginger flavours, a black cinnamon colour, odour and flavour are all significantly diagnosed with spicions, including asafoetida, black pepper, nutmeg, caravan and cumin, Functions Organoleptic.

2. Chemical Evaluation

All of them are part of the chemical assessment: qualitative chemical testing, quantitative chemical testing, and chemical testing and tool analysis. Insulating, purifying and identification of active constituents are chemical assessment methods. Tests on identification of certain phytocontributors such alkaloids, glycosides, tannins, and other phytocontituents are included in qualitative chemical testing. Copper acetate, for example, is used to identify colophony as an adulterant. [7] Ergot reagent of Van Urk The tropane alkaloids response of Vitali Morins Iodine is used to treat starch. Acid value, resins, balsams, saponification value, ester value, acetyl value, balsamic value and volatile oils (volatile oils), and other quantitative chemical tests are also helpful in evaluating a medication via chemical treatment. Assays for alkaloids, resins, volatile oils, glycosides, vitamins, and other constituents are examples of chemical assays. Estimation of total alkaloid, total alkaloid and nonphenolic alkaloid in belladonna plant, strychnine, alkaloid, nux vomica,

jalap resin, and vitamins, for example cod liver oil. The results obtained may be utilized to establish the presence of a lower or exhausted drug as well as the absence of the component that was examined. Instrumental analyses of the chemical groups of phytocontributors are carried out using chromatographic spectroscopic methods.

3. Physical evaluation

Wherever feasible, medicines should be subject to physical criteria. These are seldom consistent in crude medicines but may contribute to the assessment of the moisture content, specific gravity, density, optical rotation, refractive index, melting point, viscosity and solubility in various solvents.

1) **Moisture content:** The moisture content of a medication is responsible for the breakdown or microbiological growth of crude pharmaceuticals. So, it is necessary to identify and regulate the moisture content of a medication. [8] A medication is constantly heated to 105° C in an oven to measure the humidity level. Eg. Digital and ergot humidity should not exceed 5 percent W/W correspondingly.

2) **Solubility Drug:** It takes into account unique behaviour towards solvents. Eg solubility of light petroleum colophony, solubility of Peru chloral hydrate solution

3) **Optical rotation:** The direction of polarized light may be rotated by anisotropic crystalline solids and samples with an excess of an enantiomer of a chiral chemical. These compounds are considered to be optically active and are called optical rotation this attribute. Eg. Eucalyptus oil (0o c to +10o c), honey (+3o c to -15o c)

4) **Refractive index:** It is defined as the property of a substance that alters light velocity, calculated to be the ratio of light velocity by vacuum to light velocity by the material. Their refractive indices influence the angle of transmission refraction of the light beam when the angle of transmission is between two distinct materials. In general, the refractive index changes according to the frequency of the light; therefore, various light colors move at varying speeds. The refractive index may also be modified at high intensities. The criterion for assessing herbal medicines may be. Eg castor oil 1.4758-1.527

5) **Specific gravity:** Relative density is also known. The ratio of the solid or liquid mass of a distilled water volume equal to 4o c(39o F) or a gas equivalent to the air volume or hydrogen at the specified temperature and pressure parameters. eg. Cotton oils 0.88-0.93, coconut oils 0.925, castor oils o.95 and others, represent the specific seriousness of medicines.

6) **Viscosity:** A liquid's viscosity at a certain temperature is constant and is an indicator of its composition. Cinematic viscosity of pyroxyl, 1100-2450 centistokes, for example,

7) **Melting point:** Plant components have extremely acute melting points and constantly. With regard to crude medicines, owing to combined ingredients the melting point range was set. eg. 62-65o c beeswax, 34-44o c wool fat

8) **Ultraviolet light:** Some medicines glow, and it is helpful in the identification of these substance, when the sliced surface and powder are subjected to UV light. For example, some bits of rhapontic, Indian and Chinese rhubarb are difficult to identify, which is difficult to identify in powdered form. But UV inspection results in such significant fluorescence variations that the species may readily be differentiated from one other.

9) **Ash value:** Ash is helpful to identify goods of poor quality, depleted medicines and excess sand or earthy materials. Displaying raw medicines like total ash, acid-soluble ash, water soluble ash and sulphated ash are employed in the detection of different kinds of ash. In order to enhance their look with nutmegs and ginger, total ash is helpful in identifying the crude medicaments combined with various mineral components, such as sand, dirt, calcium oxalate and chalk powder. Insoluble acid ash implies the dilute hydrochloric acid ash insoluble. Calcium oxalate in the majority of rough medication changes often with the amount of calcium oxalate, In this instance, total ash is worthless to identify earthy stuff that is associated with such a substance. Eg. Rhubarb, total ash varies from 8 to 40%. For rhubarb, therefore, acid insoluble ash is preferred. The hydrochloric acid contains calcium oxide or carbonate produced by the burned oxalate; the rest of the ash is weighed and known as the acid-insolvable ash. Through this we may identify the presence of roots and rhizomes of an excessive soil. [9] The water-soluble ash is utilized for the detection of the presence of waste materials. Sulfuric ash is made using sulfuric acid to produce sulphate

salts and the amount of ash is estimated with the air drug.

10) **Extractive values:** Approximate measurements of their chemical components are the extracts produced by exhausting raw medicines with different solvents. Different solvents are employed per component type to be examined. A crude drug is used for water-soluble extractive products such as glycosides, tannins, mucilage, etc.; for crude medicines including tannins, glycosides, resins, etc.; and for medications with volatility substances and fat ether-soluble extractives.

11) **Foreign organic Matters:** Parts of organs other than those of the medicines referred to in the definition and description of the medicine are known as organic foreign materials. You may have insects, mould, soil, excreta, etc. For example, kernel should not be more than 2%, saffron not be more than 2%.

DRUG DEVELOPMENT PROCESS

A wide range of scientific skills is required to guide a pharmaceutical product along a complicated route from discovery through characterization of quality, effectiveness, and safety, which are the characteristics of a successful therapeutic product. Setting goals for evaluating and choosing a chemical with the best chance of success requires a business to be very proactive. In order to utilize current resources and expertise, the chemical and its therapeutic application must also be compatible with the company's research and marketing objectives. Understanding the drug development process and the many activities and milestones that are essential to a complete development plan is crucial to ensuring scientific and economic success. The discovery and development of new medications is a lengthy, complex process.[10] From the moment of discovery until the time the medication is ready for treating patients, it may take up to fifteen years to create a new treatment. Drug development is divided into three stages: The phases are: (i) pre-discovery/discovery; (ii) pre-clinical; and (iii) clinical and development. A potential "post-marketing" phase is also explored once the chemical is on the market.

DRUG DEVELOPMENT

Drug development is the process of bringing a new pharmaceutical drug to the market once a lead compound has been identified through the process of drug discovery. It includes preclinical research on microorganisms and animals, filing for regulatory status, such as via the United States Food and Drug Administration for an investigational new drug to initiate clinical trials on humans, and may include the step of obtaining regulatory approval with a new drug application to market the drug. The entire process – from concept through preclinical testing in the laboratory to clinical trial development, including Phase I–III trials – to approved vaccine or drug typically takes more than a decade

1. Pre-clinical

New chemicals (NCEs) are molecules derived from the drug development process that are also called new molecular entities or NMEs. They are promising for a biological goal that is essential in illness. However, the safety, toxicology, pharmacokinetics and metabolism of this NCE in people are not well understood. All these characteristics are evaluated before the human clinical trials in medication development. It is the function. Another important goal of medication development is to propose the first use dosage and schedule in a human clinical trial ("first-in-human" [FIH] or First Human Dose [FHD], previously also known as "first-in-man" [FIM]).

Furthermore, the physical characteristics of the NCE must be determined in drug development: its chemical composition, stability, and solubility. Manufacturers must optimise the method they employ to produce the chemical so that they can scale it up to a kilogramme and tonal scale, from a medical chemist who produces milligrammes. They further evaluate the products like capsules, pills, sprays, intramuscular, subcutaneous injectable or intravenous formulations for packaging. They examine the product. In preclinical and clinical research, these steps are known together as chemistry, production and control (CMC).

Many elements of drug development are focused on meeting new drug applications regulatory criteria. These are usually a series of experiments aimed at determining the main toxicity of a new drug before initial usage in people. The evaluation of main toxic organisms (heart and lung impacts, brain, kidney, liver and digestive system) and the effects on other sections of the organ that may be influenced by this medication are legal requirements (e.g., the skin if the new drug is to be delivered on or through the skin). Such early studies use in vitro (e.g. isolated cells) techniques, but many experiments only show a complicated mix of metabolism with drug exposure on toxicity requiring experimental animals

CONCLUSION

The use of medicinal plants and their products for curing various diseases has been recognized by traditional healers for many centuries. The importance of herbs and botanicals are rising for the safety and wellness benefits of human being.

Herbal drugs offer first-class rationale and they recommend a typical safeguard for the improvement of certain diseases. The traditional system of medicine has an immense value for curing a variety of chronic disorders, Nephrotoxicity of cisplatin and gentamicin was observed after administration of 5 mgkg-1 b.w, ip and 40 mg kg-1 b.w, sc for 15 and 13 days respectively as evident from biochemical and histopathological changes. The cisplatin and gentamicin -treatment showed significant elevation in the blood urea nitrogen, uric acid and serum creatinine level indicative renal damage, increase in tissue TBARS level and decrease in the level of SOD, catalase and GSH level together with rise in the level blood urea nitrogen, uric acid and serum creatinine due to oxidative damage as compared to control group, which confirms nephrotoxicity induced by cisplatin and gentamicin, Nephrotoxicity is one of the most common kidney problems and occurs when body is exposed to a drug or toxin. Kidney disease is the ninth leading cause of death and an estimated 80,000 persons have chronic kidney failure diagnosed annually in India. Till date for end stage renal failure, renal replacement is the only therapy. In case of non-availability of kidney, dialysis is the only alternative, which unfortunately is severely limited by several constraints including a good amount of expenditure. A number of potent therapeutic drugs like aminoglycoside antibiotics, chemotherapeutic agents like cisplatin etc.

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