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Review Article

Polyherbal Antiulcer Formulations- A Review

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Abstract

The development of peptic ulcers is triggered by an imbalance in the gastrointestinal tract's protective and aggressive forces. Modern ulcer treatment methods often include allopathic medications. Several issues, such as side effects, incongruence, and changed physiological characteristics, have prompted the search for new, safer medications. There is a long history of using herbal remedies to cure ulcers in Ayurveda. Polyherbal formulation, which involves combining herbs, has many benefits. These include greater patient compliance, reduced dosages of individual medications without compromising therapeutic efficacy, and synergistically amplified beneficial effects. Thanks to the priceless combination of modern value-added innovations with age-old traditional understanding of plant properties, enhanced Ayurvedic medicine has found therapeutic use in recent times. Over the last 20 years, researchers have examined various polyherbal combinations to see if they can alleviate ulcer symptoms. Thanks to developments in analytical methods, phytoconstituents from traditional herbal treatments can now be more easily isolated and studied for their potential therapeutic advantages. The primary objective of this research is to provide a thorough analysis of the ingredients used in various polyherbal remedies advertised as ulcer remedies, and to analyze the preclinical models used to show the gastroprotective effects of these remedies.

Keywords: Antiulcer, Ulcer, Phytoconstituents, and Polyherbal formulations

Introduction

Peptic ulcers are the most common condition affecting the gastrointestinal tract, and they affect a considerable portion of the global population. Both the financial and social costs associated with treating ulcers and their aftereffects have grown.[1] Ulcers form when acid and pepsin cause damage to certain parts of the digestive tract.[2] The underlying pathophysiology of ulcers is thought to be an imbalance between the beneficial and harmful components of the gastrointestinal system.[1] The protective factors include mucus secretion, adequate blood flow to tissues, bicarbonate, endogenous nitric oxide, and gastroprotective prostaglandin. Acid, free radicals, pepsin, abnormal motility, bile salts, nonsteroidal anti-inflammatory medications (NSAIDs), alcohol, and Helicobacter pylori

are all aggressive factors.The risk of consequences, such as gastrointestinal bleeding, blockage, and damage, increases with the duration of the lesion.The use of antibiotics, proton pump inhibitors, histamine receptor antagonists, antacids, ulcer protectives, and anticholinergics has recently been promoted for the treatment of peptic ulcers. [2,4] Prolonged use of these drugs has been connected with substantial adverse effects including impotence, nephrotoxicity, hepatotoxicity, and thrombocytopenia. Safer and more effective alternatives to these negative effects in ulcer treatment are urgently needed.There has been a significant uptick in the usage of phytopharmaceuticals as a CAM modality. Balsamodendron mukul, Aegle marmelos, Azadirachta indica, Carica papaya, Allium sativum, Acacia arabica, and Azadirachta indica are traditional herbs that include phytoconstituents and antiulcer qualities.[5] Ayurvedic literature The traditional medicinal benefit of herb-herb mixtures is acknowledged in Sharangdhar Samhita. A great deal of time has passed since the creation of polyherbal formulations (PHFs), which have been suggested as treatments for a wide range of diseases.[6] Thanks to advancements in analytical technologies, researchers have been able to separate a number of phytoconstituents and evaluate their therapeutic potential in peptic lesions. These compounds include 7,8-dihydro-8-hydroxypalmatine, Atropine, Cocaine, Matrine,[7] Thymoquinone,[8] Costunolide, and many more. Two main principles that support Ayurvedic formulations are the use of either a single plant or a combination of herbs.[9] Nowadays, most Ayurvedic medicines are polyherbal, which means they contain extracts from multiple plants instead of just one. One major benefit of mixing herbs is the synergism that occurs as a result of their interactions. Although the herbs may only have minute quantities of some components when taken alone, they may enhance one another's efficacy when together. And it's worth noting that some phytoconstituent activities were amplified when coupled with another plant, but were ineffective when administered singly. Due to synergy, lowering the dosage of one PHF component simultaneously lowers the dosage of the other, mitigating the negative side effects. Taking fewer pills at once makes the patient more comfortable, which in turn increases the likelihood that they will take each prescription as prescribed and has a positive effect on their recuperation. These advantages have contributed to the rise in popularity of PHFs over single herb formulations. However, there are several limitations associated with polyherbal compositions. The fundamental issue is that the components are incompatible with one another, whether they are quantitative, energetic, or functional. There may be interactions between herbal remedies and conventional medicine. Repeatability of clinical response may be challenging to establish when using herbal therapies.9 In the past, Ayurvedic medics would either concoct their own remedies or send prescriptions to nearby villages, where the peasants would collect herbs for therapeutic purposes. Dosage in old Ayurvedic medicine came in the forms of medicated oils, churna, asava-arista, sindoor extract, Vati, gutika, decoction, and so on. It wasn't until the modern age that a revolutionary breakthrough in industrial infrastructure made Ayurvedic formulae available in the form of pills, syrups, capsules, and salves.[10]

Herb-Herb Combination

There is a long history of using both unprocessed and processed plant parts for their ethnomedicinal properties in traditional medicine. It is more effective to utilize a combination of herbs rather than just one while treating an illness, since the therapeutic effects

of solo herbs are insufficient. It would suggest that the ethnobiological components are likely formed through interconnections. Collaboration, rivalry, complimentary abilities, and weaknesses would all play a role in bringing these two parties together.[12] Negative effects such as incompatibility, potentiation, reinforcement, restraint, counteraction, and detoxification may emerge from these interactions.[13]

Benefits of Herb-Herb Combination

There are many benefits to using polyherbal formulations, which are made by combining many plants, rather than using just one herb or allopathic therapy. Herbal medication therapy became popular as a result of this.

The presence of various phytoconstituents exerts a high therapeutic efficiency against a huge number of ailments. The efficacy and potential benefits of herbal remedies have led to their favor in scientific evaluations.[9]

The presence of multiple components in the mixture enhances the efficacy of each individual medicine. When used independently, these components might not be able to achieve this level of activity improvement.[10]

The therapeutic window for polyherbal preparations is quite large. Since they are effective at lower doses and inert at higher ones, the risk-to-benefit ratio is often favorable for these substances.[9]

The synergism makes polyherbal preparations the best. To get the desired pharmacological effect, a smaller dose can be administered. Compared to allopathic treatment, this results in a decreased risk of undesirable side effects.Patients benefit from polyherbal preparations because they eliminate the need to take multiple herbal formulations at once [9, 10]. Improved patient compliance is an unintended consequence of the increased simplicity of administering numerous herbs in a single formulation.[10]

Combinations of herbs with several components work on multiple targets at once to produce powerful relief. When different kinds of ingredients are present, they work together to treat the disease in a comprehensive way.[10]

Creating a polyherbal compound from a naturally occurring substance is both cost-effective and readily accessible. Because it is easily accessible and inexpensive, PHF has seen a surge in demand worldwide, particularly in underdeveloped nations.[9]

Pharmacodynamic or pharmacokinetic synergism is possible. When one herb helps another herb with absorption, distribution, metabolism, and elimination, this is called pharmacokinetic synergism. To achieve pharmacodynamic synergism, it is necessary to direct the active principles of different components toward shared physiological systems.nine, ten

Limitations of Herb-Herb Combination

Because different herbs might have different effects in different contexts, it's not always better to use a combination of herbs than just one.

The combination of herbs may not be compatible chemically, which could cause instability and the plants' medicinal advantages to be lost.[10]

According to Charaka Samhita, harmful effects might occur from using or preparing Ayurvedic formulations incorrectly. Unbeknownst to the medical practitioner, there has been a noticeable increase in the simultaneous use of allopathic medication and Ayurvedic preparation. Using medications from different sources could lead to drug-herb interactions, which could worsen the patient's health.[9]

Clinical repeatability is challenging to attain with Ayurvedic PHFs. The quality of the final product may not be reproducible despite the availability of standards due to variables such as habitat, harvesting conditions, the time of year the herbs are harvested, storage conditions, and various production methods. As a result, there is often variance from batch to batch, which impacts the preparation's safety and effectiveness.[9]

The presence of heavy metals, such as mercury, even in minute quantities, raises concerns about their toxicity. It has been reported that these components can have hepatotoxic, nephrotoxic, hematotoxic, and neurotoxic effects.[9]

Presented here is a synopsis of a few commercially available polyherbal remedies. A quick rundown of the parts and the models that prevent ulcers, as well as the parameters that were taken into account, is provided in Table 1.

PHFS WITH ANTIULCER POTENTIAL

Yelathy Chooranam

Seven drugs—Taxus buccata, Piper nigrum, Eletaria cardamomum, Syzygium aromaticum, Cinnamomum zeylanicum, Zingiber officinale, and Curcuma angustifolia (Arrowroot)—make up the Yelathy Chooranam Polyherbal antiulcer Siddha composition. Within the Siddha medical system, the components' various therapeutic functions have been described. The antiulcer potential of the polyherbal formulation's components has been shown in many animals. Both the aspirin- and ethanol-induced acute ulcer models were shown to be strongly suppressed by petroleum ether fractions and methanolic extracts of Eletaria cardamomum. Syzygium aromaticum showed a reduction in ethanol-induced lesions. Ferula foetida and Piper nigrum, when given orally, reduced cysteamine-induced duodenal lesions in rats in a dose-dependent manner. The indomethacin-induced ulcer rat models showed less severe ulceration when treated with a Cinnamomum zeylanicum suspension. The lignan components of Taxus buccata showed anti-inflammatory and antinociceptive effects by reducing the production of TNF and cytokines. Zingiber officinale demonstrated its gastroprotective efficacy by reducing indomethacin-induced stomach damage. Yelathy Chooranam's antiulcer benefits were recovered by the writers.[14]

NR-ANX-C

Organic Remedies Pvt. Ltd. of Bangalore, India, sells NR-ANX-C, a PHF made of Camellia sinensis, Withania somnifera, shilajit, and Triphala. These components have shown significant antioxidant effects. Ayurvedic Rasayana makes use of Ocimum sanctum and Withania somnifera because of their anti-ulcerative properties. The practice of gastrointestinal care has benefited greatly by triphala. Additionally, the polyherbal formulation was tested for its ability to prevent ulcers, taking into consideration the role that free radicals, acidity, and the breakdown of mucosal defences play in ulcerations. Aspirin and pyloric ligation gastric lesion assays were part of the experimental methodology, which also involved measuring ulcer index, malondialdehyde (MDA), gastric pH, gastric volume, total acidity, and adherent gastric mucus. The standards for the assays were ranitidine (27 mg/kg p.o.) and omeprazole (1.8 mg/kg p.o.). Findings showed that MDA levels, gastric juice volume, and total stomach acidity were all significantly reduced at higher dosages of the PHF (25 and 50 mg/kg p.o.), with the decrease being dose-dependent. As a result of the formulation, stomach pH and adhering gastric mucus both increased noticeably. Furthermore, the PHF shown greater adequacy in reducing stomach ulcers compared to the norm. Research found that

NR-ANX-C's antiulcer effectiveness was due to its antioxidant, cytoprotective, and antisecretory properties.[15]

Livina

Solanum nigrum, Holarrhena antidysenterica, Tephrosia purpurea, Andrographis paniculata, Phyllanthus niruri, Tinospora cordifolia, Terminalia chebula, Asteracantha longifolia, Alstonia scholaris, Berberis aristata, Cichorium intybus, and Picrorhiza kurroa are all parts of the Livina polyherbal capsule made by Dey's Medical Stores (Mfg.) Ltd. Antiulcer efficacy against ethanol-induced ulcers was assessed using the polyherbal formulation. Ethanol is known to irritate the stomach mucosa, but the exact pathogenic pathways are still a mystery. Free radicals produced by ethanol cause lipid peroxidation, which in turn causes oxidative damage. The experimental design used dose levels of 50, 100, and 200 mg/kg p.o. of Livina powder methanol extract to measure ulcer index, total acid, free acid, stomach volume, and gastric juice pH. A petechial lesion and lengthy haemorrhage bands were shown by the morphological examination, which revealed an apparent large mucosal lesion. Very little lesions with interstitial haemorrhage or no lesions at all were seen prior to Livina therapy. Both the ethanol-treated and Livina pre-treated animals showed significant microscopic alterations. In the submucosa, there was a lot of swelling, stomach epithelial necrosis, mucosal haemorrhage, and edoema. In contrast, the pre-treated rats showed little loss of mucosal epithelial cells. By comparing the ethanol-induced ulcer index, total acid, free acid, and stomach volume with the standard, Ranitidine (50 mg/Kg p.o.), Livina (200 mg/kg p.o.) showed a substantial reduction. A substantial increase in pH was also seen in comparison to the group that was treated with ethanol.[16]

RO12

Rumi Herbal Research Institute Private Limited of Chennai markets RO12, a PHF. Aegles marmelos, Glycyrrhiza glabra, Eletteria cardomum, Citrous aurantifolia, and Saccharum officinarium are all included in its water-based extracts. Aegles marmelos, Citrous aurantifolia, and Glycyrrhiza glabra have all been known to have antiulcer effects in the past. Antioxidant activity has been found in Eletteria cardomum and Glycyrrhiza glabra, according to research. We conducted preliminary phytochemical evaluations on the PHF aqueous extract. Acute toxicity testing was conducted in accordance with OECD guideline 423 and found that doses up to 2000 mg/kg were safe. Pyloric ligation- and ethanol-induced ulcers were used to test the antiulcer efficacy of high and low dosages of PHF (400 mg/kg and 200 mg/kg p.o., respectively). Mucosal barrier collapse, decreased blood flow, and autodigestion by gastric fluids all play a role in ulcer induction after pylorus ligation. Results showed a statistically significant reduction in ulcer score and index compared to the control group given Ranitidine (50 mg/kg p.o.). Total acidity, free acidity, total protein, and pepsin levels were significantly reduced by the 200 m/kg dosage of RO12 aqueous extract. On the other hand, total protein content increased while pepsin and free acidity levels decreased with the high dosage. Hematoxylin and eosin were used to stain and fix slices of stomachs for microscopic examinations in histopathology. The research proved that PHF's gastroprotective effects are due to its antisecretory, antioxidant, cytoprotective, bicarbonate-raising, and blood-circulating properties.[17]

Avipattikar Churna

In Nepal, a product called Avipattikar churna is sold as a PHF. It contains the following ingredients: Vida Lavana, Terminalia chebula, Operculina terpethum, Cyperus rotundus, Embelia ribes, Syzgium aromaticum,

Cinnamomum tamala, and Sharkara. The antiulcer activity of each component has been confirmed. When applied to the stomach mucosa, Piper nigrum, Terminalia chebula, and Piper longum all show cytoprotective effects. Research on Zingiber officinale has shown that it reduces stomach output, increases mucosal resistance, and strengthens the gastric mucosa's protective properties. In addition to increasing gastric mucus production, Syzgium aromaticum helps maintain blood flow to the stomach mucosa. Gastric ulcers were created in this investigation by use of Shay's pyloric method. Avipattikar churna was tested for its gastroprotective effects by comparing two oral dosages of the drug—500 mg/Kg and 750 mg/kg—to a conventional dose of ranitidine—25 mg/kg. Gastric content volume, acidity, pH, ulcer score, ulcer length, ulcer count, curative ratio, gastric irritancy size, and gastric irritancy index are some of the parameters that have been researched. A person's gastric irritancy size was determined as the total length of their ulcers. An ulcer's stomach irritancy index was the product of its size and the number of ulcers. The control group's stomach tissue was found to have fibrinopurlent exudates, dead neutrophils, and pus formation upon histological testing. Groups treated with Avipattikar churna showed signs of ulcer healing with little inflammatory cell involvement. The group that received ranitidine showed less deformation in the architecture of the stomach mucosa. When compared to the control group, the research found that the lower dosage of churna had a substantial antisecretory and gastroprotective effect. There was no statistically significant difference between the churna-treated and Ranitidine-treated groups.[18]

VRC/AS/014 Syrup

Vasu Research Centre, Vadodara, makes and sells a polyherbal syrup called VRC/AS/014 syrup. It contains Emblica officinalis, Asparagus racemosus, Glycyrrhiza glabra, Hemidesmus indicus, Centella asiatica, Terminalia chebula, Terminalia belerica, Ipomoea turpethum, Sodii carbonas, and black salt. Despite claims that several of these ingredients have antiulcer properties, there has been no preclinical testing of the mixture. The formulation underwent acute toxicity assessment using a step-up, step-down technique in accordance with OECD guideline 423. To assess the acid-neutralizing and antiulcer potential, several in-vitro and in-vivo investigative models were used. We tested its astringent qualities, prokinetic activity, and ability to neutralise acids in vitro. The antiulcer potential of the PHF (2 and 4 mL/kg p.o.) was tested using an aspirin plus pylorus ligation induced ulcer model. The model included evaluation of parameters such as ulcer index, total acidity, volume of gastric secretion, and gastric wall mucus content. The gastroprotective benefits were shown by an increase in mucus content and a reduction in ulcer index. Similar to the conventional Sucralfate (300 mg/kg p.o.), the larger dosage (4 mL/kg) exhibited substantial antiulcer and antisecretory effects. Preclinical scientific evidence supporting the foundation for the clinical usage of VRC/AS/014 syrup was supplied by the current work's results. Furthermore, the formulation does not include aluminium or magnesium, which are often found in antacids. This means that it has little effects on absorption and digestion.[19]

Digitrall

The Kolkata-based pharmaceutical company M/s. S. C. Pharmaceuticals Ltd. sells Digitrall. Aqueous extracts of many plants, including Amomum sabulatum, Foenieulum vulgar, Zingiber officinale, Piper nigram, Berberis aristata, Ptychotis ajowan, and Carica papaya, make up its makeup. The purpose of this research was to determine if Digitrall was

effective in preventing stomach ulcers. The indomethacin-induced stomach mucosal damage was significantly reduced when Digitrall was administered orally at dosages of 1, 2, and 4 mL/kg compared to the normal dose of Ranitidine (50 mg/kg). The anti-cycloxygenase action of indomethacin increases 5-lipoxygenase and leukotriene synthesis. These have a mediating role in the development of ulcers. The stomach lining is damaged by reactive oxygen species such hydroxyl radicals, hydrogen peroxide, and superoxide anion, which further complicates matters. The research that was cited to showed that in the stomach mucosal tissue, there was a drop in MDA that was dose-dependent, an increase in SOD levels, and a decrease in glutathione levels. The component of antiulcer effect that Digitrall may have, according to the scientists, is its antioxidant activity.[20]

Pepgard Syrup

Developed and manufactured in Vadodara by Vital Care Pvt. Ltd., Pepgard syrup is an exclusive Ayurvedic PHF. The syrup contains the following ingredients: Glycyrrhiza glabra, Asparagus racemosus, Astoneman indicum, Centella asiatica, Emblica officinale, Ipomoea turpethum, Syzygium aromaticum, Fumaria officinalis, and Coriandrum sativum. Many people use it as an antacid for conditions such drug-induced gastritis, heartburn, GERD, and non-ulcer dyspepsia. In order to determine the test dosage, we extrapolated the human dose relative to body surface area using the standard table of Paget and Barnes. It was thought that coordinated hits or release of reactive species constituted the basic pathophysiology of Aspirin-induced ulcerogenic damage. Modifications to the gastrointestinal mucosa were seen in response to impedances with defensive capabilities, including mucus formation, bicarbonate synthesis, and blood circulation. The DPPH and H2O2 scavenging techniques were used to measure the antioxidant activity of the formulation's alcoholic extract. The effectiveness of the formulation's alcoholic extract as an antiulcer agent was assessed using the Aspirin-induced ulcers model. Doses of 1, 2, and 4 mL administered orally were considered. The results showed that increasing the amount of Pepgard syrup alcohol extract and ascorbic acid significantly reduced the levels of DPPH and H2O2 radicals. A dose-dependent increase in the antiulcer potential was also seen when compared to the standard, Ranitidine (100 mg/kg p.o.). Pepgard syrup's cytoprotective properties may be due in part to its phytobiological components, which the authors identified as include terpenoids, alkaloids, tannins, saponins, flavonoids, and glycosides. Someone brought up the idea that antioxidant activity could interfere with the gastroprotective effects.[21]

Amlapitta Mishran Suspension

Phyllanthus emblica, Adhatoda vasica, Tinospora cordifolia, Azadirachta indica, Swertia chirata, Eclipta alba, Glycyrrhiza glabra, Terminalia chebula, Terminalia belerica, Shouktik bhasma, and Fumaria indica are the active ingredients in Amlapitta Mishran, a herbo-mineral suspension made by Shree Dhootapapeshwar Limited, Mumbai. Each component has shown antiulcer efficacy in animal studies. To help scavenge reactive species caused by ulcers, Fumaria indica has shown antioxidant activity. The antiulcer potential of polyherbal suspension was tested using an indomethacin-induced ulcer model. Doses of 1.35 and 2.7 mL/kg p.o. were administered, with 100 mg/kg p.o. of ranitidine serving as the reference. It may be concluded that the Amlapitta Mishran suspension has great gastroprotective potential based on the results of the % inhibition and decrease in ulcer index. Amlapitta Mishran may be able to prevent ulcers by increasing the synthesis of prostaglandins.[22]

Hingwashtak Churna

Piper nigrum, Nigella sativa, Ferula foetida, Zingiber officinale, Cuminum cyminum, Piper longum, Trachyspermum ammi, and Saindhava lavana are the components of Hingwashtak churna, a PHF-type blend. Astringent, digestive, carminative, and antacid are some of its uses. Citrous aurantium, Zingiber officinale, Ferula foetida, Nigella sativa, and Piper nigrum were shown to be powerful antioxidants. Reports indicated that Zingiber officinale, Ferula foetida, and Piper longum increased mucus production and decreased stomach cell shedding. An antioxidant activity test using DPPH, nitric oxide, lipid peroxidation, and 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid (ABTS) was performed on the chloroform water extract (750 mg/kg p.o.) of the formulation. Multiple dosage levels were tested for acute toxicity. Neurological, autonomic, and behavioural alterations in the mice were continuously monitored over 2 hours. We noticed any harmful effects within three days. The gastroprotective research of the extract was evaluated using ibuprofen- and ethanol-induced ulcer models, with Ranitidine (2.5 mg/kg p.o.) serving as the benchmark. The findings indicated that the antioxidant property of the PHF was dose-dependent, according to the scientists. It was shown that 10,000 mg/kg of the formulation was the safe amount. Hingwashtak churna showed a strong antiulcer effect when evaluated using criteria including ulcer number, ulcer size, and ulcer index. One possible explanation for the protection against harm is the presence of antioxidants and an elevated prostaglandin level.[23]

Qarahine

Hamdard Laboratories in Pakistan created Qarahine, a polyherbal compound that contains Glycyrrhiza glabra Linn., Cochlospermum gossypium DC., Lapis lazuli, Koalinum ponderosum, Pistacia terebinthus Linn., silicate of magnesia, magnesium silicate, ferrum, and other ingredients. For the treatment of amoebic and bacillary dysentery, acute and chronic gastritis, diarrhoea, and other gastrointestinal issues, the PHF is recommended. Glycyrrhiza glabra, one of the components, has antiulcerogenic potential. Models of ulcers caused by aspirin and ethanol were used to assess the antiulcer potential. Using One-way ANOVA, we compared the pH and ulcer index of Qarahine (250, 500, and 1000 mg/kg p.o.) with conventional Omeprazole (20 mg/kg p.o.). At a dosage of 500 mg/kg, the research found that ulcer index significantly decreased and stomach content pH increased, providing optimum protection. Both versions demonstrated the same level of protection against ulceration. Significant reductions in injury severity, ulcer index, and number of lesions were seen as compared to the control group.[24]

Phy-Blica-D

Glycyrrhiza glabra, Aegle marmelos, Phyllanthus emblica, Terminalia arjuna, Terminalia bellirica, Cyperus rotundus, Maerua siamensis, Terminalia citrina, Piper retrofractum, Zingiber officinale, Alpinia galanga, Solanum torvum, Allium sativum, and Tinospora crispa are the ingredients of Phy-Blica-D, a traditional Thai polyherbal infusion. The revitalising Phy-Blica-D formula has a high concentration of flavonoids and phenols, making it an effective antioxidant, and THP-R016 or Phy-Blica-O. The original, powerful recipe had a number of drawbacks, including an unpleasant smell and a strong bitter taste. The antioxidant effect was unaffected by the minor formula changes that improved the sensory appeal. To determine the antioxidant capability of the Phy-Blica-D water extract, the oxygen radical antioxidant capacity (ORAC) test was used as an in vitro antioxidant activity approach. An omeprazole standard of 20 mg/kg p.o. was used to evaluate

the efficacy of Phy-Blica-D aqueous extract at 500 and 1000 mg/kg p.o. against Ethanol-induced acute gastric lesions in terms of ulcer activity. Both PHF dosages substantially reduced the stomach ulcer index (UI), according to the study's results. Although the gastric juice pH remains same, the levels of glutathione (GSH), superoxide dismutase (SOD), and catalase (CAT) significantly increase. Both MDA activity and iNOS levels were significantly lower in the extract pre-treatment group compared to the vehicle control group. The scientists deduced that Phy-Blica-D's gastroprotective action may be due to its ability to mask oxidative damage and increase antioxidant activity. Previous research indicated that the phytoconstituents have gastroprotective and free radical scavenging activities, which may explain the formulation's therapeutic value.[25]

Normacid Syrup

Normacid syrup (marketed by Ayurlab herbals Pvt. Ltd., Vadodara) is composed of Ficus glomerata Roxb., Fagonia Arabica L., Vetiveria zizanioides Stapf., Santalum album L., Andrographis paniculata Nees., Melia azadirachta L., Terminalia bellerica Roxb., Emblica officinalis Gaertn., Terminalia chebula Retz., Adhatoda vasica Nees., Trichosanthes dioica Wall., Fumaria officinalis L., Tinospora cordifolia Miers., Kapardika bhasma, Praval bhasma, and Shauktik bhasma. Because of their antioxidant and antiulcer characteristics, these substances found their way into the innate pharmaceutical system for the treatment of stomach ulcers. Acute oral toxicity experiments were conducted on mice for 14 days in accordance with OECD guideline 423 to confirm the syrup's safety. Up to a dosage of 5000 mg/Kg, the formulation exhibited no symptoms of toxicity or death. We used the Pylorus ligation model and the Diclofenac-induced ulcer model to assess the antiulcer potential of Normacid syrup (250 and 500 mg/kg p.o.), with Ranitidine (20 mg/kg p.o.) serving as the benchmark. Volume of gastric juice, pH, total acid, free acid, mucus secretion, ulcer index, and sulphur, hydrogen, and peroxidase levels are among the parameters measured. Results showed that gastric juice volume, total acid, free acid, ulcer index, and malondialdehyde levels all dropped significantly. On the other hand, pH, mucin secretion, and nitrite, SOD, CAT, and GSH levels all rose. Normacid syrup treatment reduced histological alterations, normalised the stomach mucosa, and eliminated ulcerations. The scientists reasoned that mucosal nitrite and mucin may have a self-protective role or that Normacid syrup's scavenging activity on reactive oxygen species may be responsible for its cytoprotective effects. [26]

Shivaksharpachan Churna

Each of the following herbs—Ferula foetida, Cuminum cyminum Linn., Terminalia chebula Retz., Trachyspermum ammi Linn., and Piper longum Linn.—and Zingiber officinale Roscoe make up one component of Shivaksharpachan Churna. In order to validate the phytoconstituents, a preliminary phytochemical analysis was performed. The recommended dosage, according to acute toxicity studies, is 2000 mg/kg. We compared the antiulcer potential of the formulation (50, 100, and 200 mg/kg p.o.) to that of Ranitidine (100 mg/kg p.o.) using pylorus ligation and ethanol-induced ulcer models. Antioxidant activity was evaluated in ulcer models using parameters including LPO, CAT, and SOD. Saponins, flavonoids, bitter principles, steroids, and phenols were identified in the extract by the qualitative phytochemical evaluation. We observed that compared to the control group, pre-treatment with the extract dramatically decreased lipid peroxidation and increased CAT and SOD levels. The researchers came to the conclusion that the

formulation's ingredients may have an antioxidant effect, which might explain the gastroprotective effects.[27]

Gasteon Syrup

Shankha Bhasma, Kapardika Bhasma, Hedychium spicatum, Asparagus racemosus, and Glycyrrhiza glabra are the ingredients of Gasteon syrup. Antisecretory and antiulcer effects have been shown in Glycyrrhiza glabra and Asparagus racemosus. The histamine-induced ulcer model was protected against by Hedychium spicatum. Dysentery, hypoacidity, lack of appetite, duodenal ulcer, and alkaline Shankha Bhasma's antiulcer action are its indications. It is clear that Kapardika Bhasma and Kamadudha Rasa have an acidic effect. The mice were examined for 14 days after acute oral toxicity was administered according to OECD guideline 425. The gastropare syrup No-Observed-Adverse-Effect-Level (NOAEL) was found to be 2000 mg/kg. As a benchmark, ranitidine (27 mg/kg) was used to generate ulcer lesion using the Pylorus ligation procedure. Acidity, volume, pH, ulcer index, and total acidity were all measured after administering 25 mg/kg of syrup. The impact on SOD, catalase, and LPO-MDA, which are indicators of oxidative stress, was also assessed. The experimental group showed a considerable increase in catalase, superoxide dismutase, and pH activity. The following parameters were recorded: reduced stomach content volume, ulcer index, lipid peroxidation, free acidity, and total acidity. An antioxidant effect may have a part in the ulcer healing process, according to the positive results of stress indicators.[28]

Laghusoothshekhar

Nav Samhita states that Laghusoothshekhar is made with three ingredients: Zingiber officinale, Piper betle, and Suvarna gairik. Zingiber officinale has shown promise in treating gastritis and ulcers. Additionally, it showed anti-H. pylori action in vitro. The amount of mucus that adheres to the stomach mucosal membrane was improved by Piper betle. Additionally, it prevented the pathophysiology of ulcers by inhibiting free radicals. A variety of vomiting, burning sensations, bleeding problems, abdominal ailments, and emesis may be effectively treated with suvarna gairik, an iron oxide. This laid the groundwork for the verification of preventive activity against lesions that cause ulcers. Animals in the lab had ulcers induced using Shay's pyloric method. Comparisons were made between the control group and groups treated with Laghusoothshekhar (50 and 100 mg/kg) or Ranitidine (25 mg/kg, standard) with respect to ulcer index and percentage protection. Results from statistical analyses of the data demonstrated that rats given 100 mg/kg as a pre-treatment had effects similar to Ranitidine. The authors asserted that the formulation's components worked together synergistically. Its unique preparation method, Bhavana, is also essential to its enhanced efficacy.[29]

Amukkara Choornam

The Erode-based SKM Siddha and Ayurvedic Medicines India (P) Ltd markets Amukkara choornam, a Siddha PHF. For TB, enlarged spleen, hiccups, leucorrhea, stomach ulcers, and anaemia, it's a mixture of spices and herbs. This recipe calls for cane sugar and a blend of spices including cinnamon, ginger, cloves, cardamom, and withania somnifera (Duncan), as well as syzygium aromaticum (Linn.), cinnamon bark (Blume), and cinnamon (Piper nigrum). In their protective effects against ulcers, these components display a variety of methods, as shown by the literature review. Researchers have shown that Withania somnifera has antistressor function, Cinnamomum wightii has urease activity, Elettaria cardamomum inhibits gastric ulcers, Zingiber officinale inhibits acid and pepsin

secretory action, and Syzygium aromaticum stimulates mucus formation. The presence of steroids, bitter components, flavonoids, saponins, and phenols was confirmed by phytochemical screening of the formulation. The formulation had a high concentration of piperine, eugenol, and trans-caryophyllene, as shown by the HPTLC examination. These components may have anti-H. pylori effects, aid in tissue healing, protect mucus membrane integrity, and scavenge free radicals. The antioxidant capability of the formulation was determined by conducting DPPH scavenging activity. Antioxidant activity was measured using ethanol-induced and pylorus ligation procedures to further determine the formulation's favourable benefits on stomach protection. After that, we examined the activities of catalase, SOD, and ulcer-inducing LPO at 50, 100, and 200 mg/kg of formulation, with 100 mg/kg of ranitidine serving as the benchmark. Both models showed dose-dependent protective benefits against very harmful outcomes, according to the cited research. This provide credence to the comprehensive approach of treating ulcers with Amukkara choornam.[30]

Ulcerene

Ingredients of PHF Ulcerene include Bambusa arundinacea, Coriandrum sativum, Elettria cardamomum, Foeniculum vulgare, Rosa damascene, Mineral bezoar triturated, and Pistacia lentiscus. The powder was left to macerate at room temperature for three days in a solvent that was 70% water and 30% methanol. The resulting extract was then tested for the presence of several types of phytochemicals. In terms of phytochemicals, the results showed that there were tannins, carbs, proteins, alkaloids, phenols, and saponins present. Various techniques were used to produce ulcers, including those using ethanol, aspirin, and stress. The three models' respective standards were 100 mg/kg of Sucralfate, 50 mg/kg of Ranitidine, and 50 mg/kg of Ulcerene extracts, whereas the test groups received 50 and 100 mg/kg of Ulcerene extracts, respectively. On histopathological evaluation, the control group showed signs of hyperplasia, localised erosion, infiltration of inflammatory cells, congestion in lamina propria, and persistent superficial gastritis. Animals given conventional medication showed only little or no changes to their stomach mucosa. Ulcerene at its highest dosage (100 mg/kg) produced less gastritis, infiltration, and congestion when contrasted with its lower dose (50 mg/kg). Both the ulcer score and index decreased in a dose-dependent manner after using Ulcerene. When comparing several models, it was shown that the PHF was the most efficient in reducing lesions caused by ethanol.[31]

Conclusion

Because of its alarming global frequency, peptic ulcer is a condition that deserves serious attention. Presently, ulcer therapy with allopathic methods is associated with unpleasant and often debilitating side effects. Herbal remedies for ulcers were therefore developed as a result of the ongoing quest for better alternative therapies. Synergism, ease of use, high efficacy, a broader therapeutic window, and cost-effectiveness are some of the benefits of polyherbal formulations that have recently been recognised. As a result, there has been a surge in the usage of PHFs for ulcer therapy. The PHFs included in this study have promising antiulcer properties, which gives them a solid scientific foundation for their widespread usage in society. Nevertheless, there is a great deal of need for more clinical and pharmacological research on these PHFs.

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