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TO DESIGN AND EVALUATE MIRACLE FORMULATION OF ANOREXIA USING AMALAKYADI CHURNA

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Abstract:

Ayurvedic medicines play an important role in gastro intestinal problems due to safety and efficacy in it. Hence churna meant for digestive property. Amalakyadi churna (a Rucikara Pachan Dravya) is a classical Ayurvedic medicinal preparation, which finds its mention in Sharangadhara Samhita. Even though many modern research works are available in respect to its individual ingredients, but a comprehensive.

Anorexia and cachexia are major clinical problems seen in a large proportion of patients with advanced cancer. Weight loss has also been identified as an indicator of poor prognosis in cancer patients. Around 20% of patients with advanced cancer present mortality from the effects of malnutrition rather than from cancer itself. Early nutrition intervention has seen to improve outcomes in cancer patients such as weight gain, treatment tolerance, and improved quality of life. Effective therapies for addressing these threatening conditions are lacking. Pharmacotherapeutic agents such as corticosteroids, megestrol acetate, and cyproheptadine have several adverse reactions and also lack satisfactory results. Rasayana therapy is known to prevent loss of body mass and at the same time help to improve appetite and increase patient's. The Rasayana compound used by us to prevent cachexia mainly includes swarna sindoor, Hirak bhasma, and suvarna bhasma.

Amalakyadi Churna was subjected to pharmaceutical evaluation (evaluation of different physicochemical and phytochemical parameters) in order to prepare a profile of the formulation.

Keywords: *Amalakyadi Churna, Suvarna Bhasma, Hirak Bhasma, Emblica officinalis.*

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INTRODUCTION:

Ayurveda is considered by many scholars to be the oldest healing science. In Sanskrit, Ayurveda means "The Science of Life." Ayurvedic knowledge originated in India more than 5,000 years ago and is often called the "Mother of All Healing." It stems from the ancient Vedic culture and was taught for many thousands of years in an oral tradition from accomplished masters to their disciples. Some of this knowledge was set to print a few thousand years ago, but much of it is inaccessible. The principles of many of the natural healing systems now familiar in the West have their roots in Ayurveda, including Homeopathy and Polarity Therapy.

The basic difference between Ayurveda and Western allopathic medicine is important to understand. Western allopathic medicine currently tends to focus on symptomatology and disease, and primarily uses drugs and surgery to rid the body of pathogens or diseased tissue. Many lives have been saved by this approach. In fact, surgery is encompassed by Ayurveda. However, drugs, because of their toxicity, often weaken the body. Ayurveda does not focus on disease. Rather, Ayurveda maintains that all life must be supported by energy in balance. When there is minimal stress and the flow of energy within a person is balanced, the body's natural defense systems will be strong and can more easily defend against disease.

It must be emphasized that Ayurveda is not a substitute for Western allopathic medicine. There are many instances when the disease process and acute conditions can best be treated with drugs or surgery. Ayurveda can be used in conjunction with Western medicine to make a person stronger and less likely to be afflicted with disease and/or to rebuild the body after being treated with drugs or surgery.

We all have times when we don't feel well and recognize that we're out of balance. Sometimes we go to the doctor only to be told there is nothing wrong. What is actually occurring is that this imbalance has not yet become recognizable as a disease. Yet it is serious enough to make us notice our discomfort. We may start to wonder whether it is just our imagination. We may also begin to consider alternative measures and actively seek to create balance in our body, mind and consciousness.

AIM:

"To Design and Evaluate Miracle Formulation of Anorexia Using Amalakyadi Churna"

OBJECTIVE:

Amalakyadi churna is best ayurvedic medicine for fever induced anorexia and constipation. It is a blend of antipyretic, appetizer, digestive and carminative herbs. Amalakyadi Churna reduces bodyache due to various types of fever. Amalakyadi churna relieves anorexia and constipation caused by fever. (**Novella S. et.al 2019).**

ACTIVE PROFILE:

Amalakyadi Churna:

Amalakyadichurna (a Rucikara Pachan Dravya) is a classical Ayurvedic medicina lpreparation, which finds its mention in Sharangadhara Samhita. Even though many modern research works are available in respect to its individual ingredients, but a comprehensive profile in respect to the crude drug is lacking. Amalakyadi Churna was subjected to pharmaceutical evaluation (evaluation of different physicochemical and phytochemical parameters) in order to prepare a profile of the formulation. Amalakyadi churna consists of Amlaki (Phyllanthus emblica Linn., syn. Emblica officinalis Gaertn.), Citraka (Plumbago zeylanica Linn.), Haritaki (Terminalia chebula Retz.), Pippali (Piper longum Linn.) & Saindhav lavan (Rock-salt). Amalakyadi Churna is an Ayurvedic medicine, in herbal powder form. It is mainly used in the treatment of **anorexia,** fever and indigestion. Amalakyadi churna is a powder of 5 herbal ingredients and rocka salt, used in the management digestive system related problems.

Table No. 1 Amalakyadi Churna

Sr No	Sanskrit name	Botanical Name
1	Amalaki	Emblica officinalis
2	Chitraka	Plumbago zeylanica
3	Pathya(Haritaki)	Terminalia chebula
4	Pippali	Piper longum
5	Saindava lavana	Rock salt

- **Indication:** Used in condition like loss of appetite, distaste, indigestion and fever.\
- **Dose:** 2 to 6 grams, two to three times daily before or after food as directed by physician.
- **Adjuvent(Anupana):** warm water.
- **Side effects:** May induce gastric irritation in higher dose, Used with caution in hypertensive patients as it contain salt.
- **Preparation:** The above ingredients are powdered separately and mixed together in specified quantity.
- **Method of Storage:** Stored in airtight container in dryplace.
- **Shelf life period:** Around 6 month.
- **Reference:** Sharangadharasamhita, Madhyamakhanda 6/7
- **Ayurvedic properties of Amalakyadi churna:**
- **Roga karma:** Sarvajwara, aruchi and agnimandya.
- **Dosha karma:** Kaphahara.
- **Agni karma:** Deepana, Pachana.
- **Other karma:** Vatanulomaka, vibandahara, srotoshodaka

A proper method has to be carried out while Formulating Amlakyadi Churna Selection of actives are as,

1) **Collection and Authentication**
2) **Formulation**
3) **Preparation**

Methods:

Collection & Identification of raw materials:

The dried parts used of every individual herb was collected from Chopda region of Jalgoan district (Maharashtra).and The identification was done in the Department Of Pharmacognosy.

Preparation of medicine:

The medicine was prepared as per guidelines mentioned in Ayurvedic Pharmacopoeia of India 1978 Part-1, Volume-1.

Collection and Authentication:

Fresh every individual herb sample was collected from the Botanical Garden Chopda region of Jalgoan district (Maharashtra) and The plants were authenticated and herbarium was deposited in Smt. S. S. Patil College of Pharmacy, Chopda Dist. Jalgaon. Department of Pharmacognosy.

EXPERIMENTAL WORK:

Formulation of Active Herbs:

Table No.2: Formulation of Active Herbs

Sr No	Sanskrit name	Botanical Name	Category	Quantity
1	Amalaki	Emblica officinalis	Effective in acidity,Indigestion	10gm
2	Chitraka	Plumbago zeylanica	Appetizer	10gm
3	Pathya(Haritaki)	Terminalia chebula	Effective in UTI Infection, Obesity	10gm
4	Pippali	Piper longum	Effective in stomachache, diseases of the spleen.	10gm
5	Saindava lavana	Rock salt	Boost Metabolism	10gm

Raw Material of Standardisation:

Standardization of herbal formulation is important so as to assess the standard, purity, safety and efficacy of the drugs. Most of the normal system of drugs is effective but they lack of standardization. So there's a requirement to develop a standardization technique. During this research is an effort to guage “Amalakyadi churna” an Ayurvedic formulation for its internal control parameters. In house Amalakyadi churna preparation was evaluated by performing Organoleptic evaluation, Physicochemical evaluation, Physical characteristics and Phytochemical screening. it had been observed that the set parameters were wont to standardize the Amalakyadi churna” these findings are going to be help towards establishing pharmacopoeia standards for crude drugs also as for

formulation which are gaining relevance in research on traditional medicinal system.

Preparation of Amlayadi Churna:
Amlayadi Churna was prepared in house using method described in Ayurvedic Pharmacopoeia. Take all the ingredient like Amlaki, Chitraka, Haritaki, Pippali, Saindava lavana, and Power all ingredient separately and passed through sieve no.80. Weight each ingredients 5 gm separately, mixed together to obtain a homogeneous blend and packed in a well closed container to protect them from moisture.

Evaluation of Amlayadi churna:
Organoleptic evaluation:
Organoleptic evaluation refers to evaluation of formulation by appearance, colour, odour, taste, etc. The organoleptic characters of the preparations were administered.

Physico-Chemical Evaluation:
A. Loss on drying:
Loss on dying is that the loss of mass expressed as percent w/w. About 10g of drug samples of each formulation were weighed accurately and dried during a tarred evaporating dish at 1050C for five hrs. Percent w/w was calculated with reference to initial weight.

B. Determination of Total Ash:
2 gm of churna was weighed accurately during a previously ignited and tarred silica crucible. The material was then ignited by gradually increasing the heat to 500-600°C until it appeared white indicating absence of carbon. It's then cooled during a dessicator and total ash in mg per gm of air dried material is calculated.

C. Acid Insoluble Ash Value:
To the crucible containing the whole ash, add 25 ml of acid, cover with a watch-glass and boil gently for five minutes. Rinse the watch-glass with 5 ml of predicament and add this liquid to the crucible. Collect the insoluble matter on an ashless filterpaper and wash with predicament until the filtrate is neutral. Transfer the filter-paper containing the insoluble interest the primary crucible, dry on a hotplate and ignite to constant weight. Allow the residue to relax during an appropriate desiccator for half-hour, then weigh directly. Calculate the content of acid-insoluble ash in mg per g of air-dried material.

D. Water Soluble Ash Value:
To the crucible containing the whole ash, add 25 ml of water and boil for five minutes. Collect the insoluble matter during a sintered-glass crucible or on an ashless filter-paper. Wash with predicament and ignite during a crucible for quarter-hour at a temperature not exceeding 450°C. Subtract the load of this residue in mg from the load of total ash. Calculate the content of water-soluble ash in mg per g of air-dried material.

E. Determination of water soluble extractive:
5gms of Amalakyadi Churna was accurately weighed and placed inside a glass stoppered conical flask. It's then macerated with 100ml of water for 18 hours. It had been then filtered and about 25ml of filtrate was transferred into a china dish and was evaporated to dryness on a water bath. It had been then dried to 105°C for 6 hours, cooled and eventually weighed and water soluble extractive value was calculated.

F. Determination of alcohol soluble extractive:
5gms of each Amalakyadi Churna was accurately weighed and placed inside a glass stoppered conical flask. It had been then macerated with 100ml of ethanol 18 hours. It had been then filtered and about 25ml of filtrate was transferred into a china dish and was evaporated to dryness on a water bath. It had been then dried to 105°C for 6 hours, cooled and eventually weighed and calculated10.

G. Determination of pH:
1% w/v and 10% w/v solutions of samples were prepared in water and pH decided using Digital pH Meter.

Determination of Physical Characteristics:
A. Bulk Density
Bulk density is that the ratio of given mass of powder and its bulk volume. It's determined by transferring an accurately weighed amount of powder sample to the graduate with the assistance of a funnel. The initial volume was noted as untapped or poured volume. The ratio of weight of the number it occupied was calculated8,9. Bulk Density = (W/V0) gm/ml
Where,
W = mass of the powder
V0 = untapped volume

B. Tapped Density
It is measured by transferring a known quantity (25 gm) of powder into a graduated cylinder and tapping it for a specific number of times. The initial volume was noted. The graduated cylinder was tapped continuously for a period of 10-15 min. The density can be determined as the ratio of mass of the powder to the tapped volume.
Tapped Volume = (W/Vf) gm/ml

Where,
W = mass of the powder
Vf = tapped volume.

C. Angle of Repose
Angle of Repose has been used as indirect methods of quantifying powder flow ability due to its relationship with inter particle cohesion. The internal angle between the surface of the pile of powder and therefore the level is understood because the angle of repose. The powder is skilled funnel fixed to a burette at a height of 4 cm. A paper is placed below the funnel on the table. The height and the radius of the pile were measured. Angle of repose of the powder was calculated using the formula10.
Angle of Repose= tan-1(h/r)
Where,
h=height of the pile
r = radius of the pile

D. Hausner Ratio
It is related to inter particle friction and as such can be used to predict the powder flow properties. Powders with low interparticle friction like coarse spheres have a ratio of roughly 1.2, whereas more cohesive, less flowable powders like flakes have a Hausner ratio greater than 1.6.
Hausner ratio is = Df / Do,
Where Df = Tapped density and
Do = Bulk density.

E. Carr's Index:
Another indirect method of measuring the powder flow from bulk density is Carr's index9,10. Carr's index = % compressibility = (Df-Do/Do) × 100
Where Df = Tapped density and
Do = Bulk density.

Preliminary phytochemical screening:
In house formulation of Amalakyadi Churna were subjected to test separately for the presence of various phytoconstituents like saponins, tannins, carbohydrates, alkaloids, flavonoids, glycosides, steroids, proteins and alkaloids.

Pharmacognostical Evaluation (Organoleptic Analysis):
Microscopic and macroscopic studies of the Churna were done at State Drug Testing Laboratory, AYUSH, Govt. Ayurvedic College and Hospital, Guwahati. 0.5mg of the powdered sample was analyzed in dry form with the help of Trinocular Research microscope (MAGNUS). The powder was analyzed in 10X and 40X magnification lens and observations were made regarding changes in appearance. The evaluation of colour, odour, texture and taste includes the macroscopic appearance and were done as per standard procedures.

Physicochemical Evaluation/ Quantitative Estimation:
Physicochemical parameters (Total ash value, pH value, LOD, Alcohol soluble extractive and Water soluble extractive values) were determined as per the guidelines of WHO.

Preliminary Phytochemical Screening:
An amount of 50 mg of air-dried powdered plant material was extracted successively with following solvents in a Soxhlet apparatus
a. Petroleum ether (60 ˚C- 80 ˚C)
b. Benzene
c. Chloroform
d. Acetone
e. Ethanol (95 %)
f. Methanol
Each time before extracting with the next solvent, the powdered material was washed with chloroform water and dried in an air oven below 50˚C. Each individual extract was concentrated by distilling off the solvent and then evaporating to dryness on the water bath. Fluorescence analysis of different extracts obtained thus was done under UV radiation at 254 nm.

Qualitative Chemical Examination:
The extracts obtained as above are then subjected to qualitative tests for the identification of various plant constituents. In addition, 50 gm of air-dried or fresh plant material is also subjected to hydro-distillation to detect the presence of volatile oil.
a. Detection of alkaloids:
A small portion of the solvent free chloroform, alcoholic extract is stirred separately with a few drops of dil.HCL acid and filtered. The filtrate was tested carefully with alkaloidal reagents such as Dragendorffs reagent (orange brown precipitate).
b. Detection of carbohydrates and glycosides :
A small quantity (300 mg) of alcoholic extract is dissolved in 4 ml of distilled water and filtered. The filtrate was treated with Molischs test to detect the presence of carbohydrates. A small portion of the extract was hydrolysed with dil. HCL acid for a few hours in water bath. The hydrolysate is subjected to Leibermann-Burchards test to detect the presence of glycosides.
c. Detection of phytosterol:
The petroleum ether extract is refluxed with solution of alcoholic potassium hydroxide till complete saponification takes place. The saponification mixture with distilled water is diluted with distilled

water and the extract is diluted with ether. The residue is treated with Leibermann-Burchards test.

d. Detection of fixed oils and fats:

Small quantities of petroleum ether and benzene extracts are pressed separately between two filter papers. Oil stains on the paper indicate the presence of fixed oils.

e. Detection of saponins:

1 ml of alcoholic extract is diluted with distilled water to 20 ml and shaken in a graduated cylinder for 15 minutes. A one cm layer of foam indicates the presence of saponins.

f. Detection of proteins and free amino acids:

A small quantity of alcoholic extract is dissolved in a few milliliters of water and the solution is subjected to Minhydrin test.

Thin Layer Chromatography:

The chromatogram of Amalakyadi churna was carried out with methanolic extract and maximum spots had been separated on precoated silica gel TLC plate with trial and error methods. The pigments were separated from their spots at UV 254 nm wavelength. A solvent system of n-hexane: ethyl ether: glacial acetic acid (80:20:1) was selected after trial and error. The Rf value of each spot was calculated and then compared with literature.

Animals Study:

Wistar albino rats of both sexes weighing between 150–200 g were used for the study. The animals were maintained under ideal husbandry conditions and reared under standard conditions of temperature, humidity and exposed to 12–h light and dark cycles. All animals were exposed to the same environmental conditions and were maintained on standard diet and water ad libitum. The experimental protocol was approved by the Institutional Animal Ethical Committee (Pharmac/08) as per the guidelines of the Committee for the Purpose of Control and Supervision on Experiments on Animals, India.

Dose:

The dose for the experimental study was calculated by extrapolating the clinical human dose of Amalakyadi churna (1000 mg per day) to an animal dose based on body surface area ratio by using conversion factor of 0.018. Based on that the therapeutic dose of Amalakyadi churna was calculated for rats i.e. 1000 mg x 0.018= 18 mg/200 g body weight of rat= 90 mg/kg body weight of rat.

Acute toxicity study:

The study was carried out as per the World Health Organization (WHO) guidelines for acute toxicity test and modified as per experimental need.Rats were randomized into five groups, each consisting of six animals. Group I formed the control group, received the vehicle as an aqueous suspension of 1% carboxymethyl cellulose in a dose of 10 ml/kg, orally. Groups II to V formed the drug–treated groups and received the Amalakyadi churna orally in doses of 360, 720, 1440 and 2000 mg/kg respectively. The rats were observed closely for behavioral changes, signs and symptoms of toxicity and mortality continuously for the first four hours and thereafter periodically up to 14 days.

Long-term toxicity study:

The study was carried out following WHO guidelines for long-term toxicity tests, modified according to experimental need.The rats were randomized into three groups, each consisting of six animals. Group I formed the control group, and received a vehicle consisting of an aqueous suspension of 1% carboxymethyl cellulose in dose of 10 ml/kg, orally. Groups II and III were kept as drug-treated groups and received Amalakyadi churna orally in the dose of 450 and 900 mg/kg respectively for 45 consecutive days. The administration period of the drug for the long-term toxicity study was determined from the WHO guidelines combined with the recommended period of clinical use of Amalakyadi churna as stated in the literature.

The rats were carefully observed daily for any overt or apparent signs or symptoms of toxicity. The body weight change of individual rats was noted initially and thereafter weekly during the study period. At the end of the 45–day period, blood was drawn from the retro–orbital puncture under light ether anesthesia using a capillary tube. The body weight of each rat was noted on the last day when the rats were sacrificed.

Tests for Hematological parameters were carried out in blood samples collected from the rats viz. red blood cell (RBC), hematocrit (HCT), hemoglobin (HB), mean cell volume (MCV), mean corpuscular hemoglobin (MCH), red cell distribution width (RDW), mean cell hemoglobin concentration (MCHC), white blood cell (WBC), lymphocyte percentage (%L), granulocyte percentage (%G), eosinophil percentage relative to other cells (MID%), platelet count (PLT), platelet crit (PCT), mean platelet volume (MPV) and platelet distribution width (PDW) by using an automatic hematological analyzer (MS–9 Veterinary Melet Schloesing Hematology Cell Counter, France).

The serum biochemical parameters' estimation was carried out using serum diagnostic kits in a Merck

auto-analyzer. The parameters were alkaline phosphatase (ALP), aspartate aminotransferase (AST), total protein, albumin and globulin, urea, bilirubin, creatinine, glucose, total cholesterol, HDL–cholesterol, LDL–cholesterol, triglyceride, sodium and potassium.

Bone marrow smears from the femur bone were prepared using the standard procedure. All the important internal organs were carefully dissected, namely the brain, liver, heart, thymus, spleen, kidney, testis, prostate, seminal vesicle, uterus, lung, adrenal gland, trachea, aorta, ovary and lymph node. After noting any signs of gross lesions or ponderal changes, the major organs were transferred to a 10% phosphate–buffered formalin solution for fixation, and later subjected to dehydrating, wax embedding, sectioning and staining with hematoxylin and eosin for histological evaluation by light microscopy.

Statistical analysis:
The data are expressed as mean ± standard error of mean for the six rats in each experimental group. One-way analysis of variance (ANOVA) was used to compare the mean values of quantitative variables among the groups followed by Dunnet's multiple *t*-test for unpaired data to determine significant between groups differences.

RESULTS AND DISCUSSION:

Formulation was prepared in accordance with the Ayurvedic Pharmacopoeia of India. As part of standardization procedure, the finished product Amalakyadi churna was tested for relevant organoleptic, physic-chemical, Physical characteristics and preliminary photochemical screening evaluation.

Organoleptic Evaluation:
The colour, odour, taste and appearance of the formulation were evaluated manually and given in Table No.3

Physicochemical Evaluation:
Quality tests for Amalakyadi churna were performed for LOD, pH, ash content, water soluble extractive, methanol soluble extractive, acid insoluble ash and water soluble ash were found to be within standard ranges. Various physiochemical parameters of churna are given in Table No.4

Physical characterization:
The result of Physical Parameter of Amalakyadi churna was in Table No.5

Preliminary phytochemical Screening:
The alcoholic extract of Amalakyadi churna and individual ingredients were studied for the presence of various phytoconstituents. The preliminary phytochemical observations of Amalakyadi churna was in Table No.6

Table No. 3: Organoleptic characteristics of Amalakyadi churna

Sr. NO.	PARAMETERS	RESULT
1	Colour	Brown
2	Odour	Characteristic(aromatic)
3	Taste	Sour, pungent & a sweet after-taste
4	Texture	Fine powder
5	Foreign matter	0.8 -1 %
6	Microscopic analysis	No any significant change

Table No. 4: Physiochemical Descriptions of Amalakyadi churna

Sr.No	Parameters	Observation
1	LOD (%)	1.83
2	pH 1% & 10%w/w	6.1 and 5.7
3	Total ash value(%w/w)	7.53
4	Acid insoluble ash value(%w/w)	3.11
5	Water soluble ash value(%w/w)	4.33
6	Water soluble extractive value(%w/w)	9.31
7	Alcohol soluble extractive value(%w/w)	6.55

Table No. 5.: Physical Characters of Amalakyadi churna

Sr.No	Parameters	Observation
1	Bulk Density(g/ml)	0.601
2	Tapped Density	0.73
3	Angle of Repose	R= 2.9cm H= 3.1cm
4	Hausner Ratio	1.177
5	Carr's Index (%)	15.631

Table No. 6: Preliminary Phytochemical Screening

Sr.No	Phytoconstituents	Ethanolic extract
1	Alkaloids	+
2	Tannins	+
3	Glycosides	+
4	Flavonoids	+
5	Saponin	+
6	Steroids	+

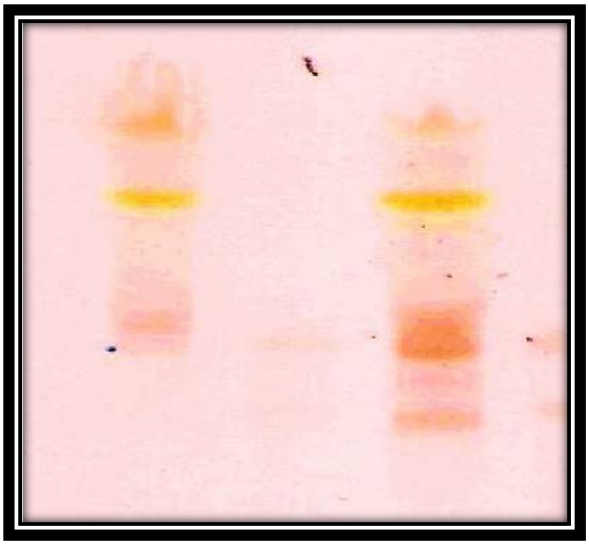

Fig No 1: Chromatographic profile of Crude drug Extract (TLC under UV chamber)*:

Table No. 7: Details of solvent system and Rf values

Extract	Solvent System	No. Of Spots	Rf Values
Methanol	nhexane: ethylether:glacial acetic acid(80:20:1)	5	0.17 0.48 0.58 0.66 0.83

Acute Toxicity Test:

Acute toxicity test results showed that Amalakyadi churna did not affect any behavioral changes or affect other parameters measured in the acute toxicity test. Amalakyadi churna did not produce any signs or symptoms of toxicity or mortality up to a dose of 2000 mg/kg. This dose is more than 20 times the therapeutic equivalent dose in rats, clearly indicating that the formulation is unlikely to induce any drastic toxic effect Show gastric irritation

Long-term toxicity test:

The effect of Amalakyadi churna on percentage change in body weight showed that weight gain was similar in all three groups: the percentage body weight change pattern in the treated groups did not differ significantly from the changes observed in the control group. Body weight change is an important indicator of gross toxicity. Drastic toxicity or interference with absorption of nutrients will be reflected in body weight reduction. Since the body weight gain pattern in the test drug-treated groups did not differ significantly from the control group it can be inferred that the test drug formulation has no proclivity to produce drastic tissue destruction nor does it seem to interfere with absorption of the nutrients. Further, of the eight organs for which relative weight was recorded, a significant decrease was observed only in the kidney at a dose of 450 mg/kg of Amalakyadi churna If we consider the data together with the findings of the histopathological study, the kidney weight reduction does not seem to represent loss of tissue mass, because no pathological changes were observed in the histological study consistent with tissue mass. Furthermore, kidney weight decrease was not observed at the higher dose level.

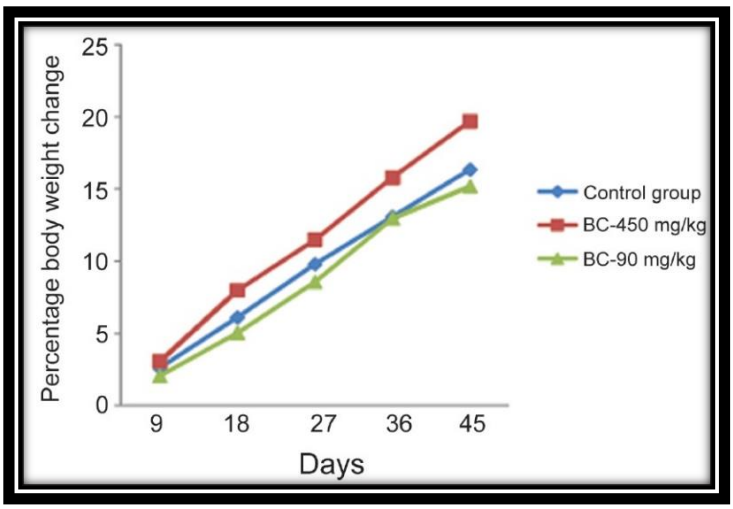

Fig No 2: Percentage body weight changes observed in control and treated groups at different time intervals

Analysis of the effect of Amalakyadi churna on the 15 hematological parameters found a single affected at each of the dose levels studied, as might be expected when so many parameters are measured. The observed changes were a significant decrease in the Hb level compared to the control group at 450 mg/kg dose and significant increase in WBC count at 900 mg/kg dose level. The decrease in hemoglobin content may be the result of a decrease in the number of circulating red cells or in the size of red cells, their concentration of Hb or any combination of these. In megaloblastic anemia the reduction in the number of red cells is the cause of anemia. In iron–deficiency anemia the reduction in the size of red cells (MCV) and MCH is the reason but reduction in cell number eventually contributes to the anemia. However, in both the treated groups the decrease observed in MCV and MCH was not significant. Hence it may be suggested that the decrease in Hb content is due to the decrease observed in the production of erythrocytes. The decrease observed in the Hb level at a lower dose level was not evident at a higher dose level–this and the fact that even 450 mg/kg is five times more than the therapeutic dose rules out any serious toxicological implications during therapeutic use. Further, the observed values are within the normal range.

Fig No 3: Effect of Amalakyadi churna on the hematological parameters recorded in rats

		450 mg/kg	900 mg/kg
RBC (10^6 /µl)	7.37±0.35	6.55±0.37	7.03±0.21
Hematocrit (%)	41.18±1.86	36.25±2.36	39.02±0.71
Hemoglobin (g/dl)	17.30±0.92	14.24±0.73[a]	16.65±1.35
MCV (µm³/red cell)	55.94±0.53	55.17±1.03	55.31±0.75
MCH (pg/red cell)	23.60±1.06	22.16±1.63	22.62±2.29
RDW (%)	5.957±0.11	5.90±0.10	5.79±0.05
MCHC (g/dl)	42.26±2.13	40.31±3.28	40.76±3.77
WBC (10^3 /µl)	3.72±0.49	4.98±0.63	7.45±1.35[b]
Lymphocyte (%)	74.24±5.11	82.06±2.16	75.75±3.27
Granulocyte (%)	12.10±1.27	9.90±1.28	15.12±2.31
MID (%)	8.66±0.15	8.04±1.48	9.26±1.25
PLT (10^3 /µl)	1077.0±97.0	931.0±133.0	833.0 ±81.0
PCT (%)	0.99±0.08	0.88 ±0.14	0.82 ±0.08
MPV (µm³)	8.27±0.294	8.44±0.146	8.85 ±0.62
PDW (µm³)	11.56±0.59	11.91±0.29	11.71 ±0.28

The values are expressed as mean ± SEM of six rats per group [a]$P < 0.05$, [b]$P < 0.01$ compared with control group

The exact reason for the increase in the WBC count, especially at the higher dose level is not clear. Normally, leucocytosis occurs in association with acute inflammatory reactions, tissue necrosis, thrombosis, hemorrhage, acute lysis of red cells and sometimes due to neoplasia. A mild to moderate increase occurs during strenuous exercise, severe mental stress and any factor leading to elevation of plasma level of glucocorticoids, corticotrophins or adrenalins. Since none of the organs studied during the study showed any significant change in cytoarchitecture suggestive of inflammatory reaction, and since the drug was administered over a long period, the increased count does not seem to be of inflammatory origin. Perhaps it reflect direct effects on blood cell–forming organs. Further, the observed values are within the normal range.[16] If the overall picture is taken into consideration, the data profile clearly indicates that the test formulation is not likely to produce any serious hematological changes. The effects of Amalakyadi churna on serum biochemical parameters are presented in Out of 15 parameters studied a significant decrease was observed in urea and LDL-cholesterol and an increase observed in HDL–cholesterol at a dose level of 450 mg/kg of Amalakyadi churna At a dose level of 900 mg/kg of Amalakyadi churna significant decrease was observed in urea, creatinine and ALP and increase was observed in HDL–cholesterol and potassium.

Total protein (g/dl)	8.23±0.51	8.09±0.64	7.63±0.45
Albumin (g/dl)	4.22±0.16	4.08±0.13	4.27±0.14
Globulin (g/dl)	4.11±0.61	4.01±0.69	3.36±0.46
Urea (mg/dl)	69.30±3.83	42.83±3.57[a]	49.05±4.45[c]
Bilirubin (mg/dl)	0.673±0.089	0.94±0.16	0.92±0.15
Creatinine (mg/dl)	1.26±0.15	0.91±0.13	0.81±0.04[a]
Glucose (mg/dl)	109.00±05.57	93.64±06.81	88.57±10.28
ALP (µM phenol released/ mg protein/min)	25.27±1.19	27.32±3.18	17.66±2.16[a]
AST (µM pyruvate released/mg protein/min)	6.01±0.56	5.24±0.54	5.78±0.54
Total cholesterol (mg/dl)	70.47±2.56	63.06±3.86	60.40±4.31
HDL–cholesterol (mg/dl)	18.04±0.57	24.70±2.25[c]	22.50±1.31[a]
Triglyceride (mg/dl)	79.09±09.95	99.85±21.83	58.39±8.94
LDL–cholesterol (mg/dl)	38.57±3.16	19.39±5.69[b]	27.14±5.27
Sodium (meq/L)	43.63±0.85	39.88±2.64	42.57±2.66
Potassium (meq/L)	44.61±1.93	51.03±4.01	57.50±2.54[c]

Fig No 4: Effect of Amalakyadi churna on biochemical parameters recorded in rats

Urea is the main product of protein metabolism in the body. Normally, increased level of urea in the blood has diagnostic value as a parameter indicating impairment in the functioning of the kidney. Low urea level in the normal course has no diagnostic value. The observed decrease in both groups in the present study may be due to low turnover of nitrogenous materials, the reason for which remains to be determined. Alkaline phosphatase is found in most tissues. Serum ALP level increases in various liver diseases and it is a conventional indicator of liver injury. In the present study significant decrease in the level of this enzyme was observed at 900 mg/kg of Amalakyadi churna. Since elevated levels are more important from a pathological point of view it can be suggested that the observed decrease does not indicate any serious toxic effects. Creatinine is normally produced from creatine in tissue containing high amounts of creatine phosphate. Its blood level depends on its production and excretion. In both the drug–treated groups the creatinine level was decreased. However, the decrease in creatinine was still within the normal range. Thus, it can be suggested that these changes have no serious pathological implications, especially in clinical settings. At both the dose levels, a significant increase in HDL–cholesterol level and a decrease in LDL–cholesterol level were observed. Total cholesterol level remained un-affected. This activity can have a good therapeutic application because elevation of HDL–cholesterol level with concomitant decrease in LDL–cholesterol level will be quite useful in patients with hypercholesterolemia conditions. Elucidation of the mechanism underlying this effect deserves attention and should be the subject of future investigations. Significant increase in serum potassium in the present study may be due to mobilization of potassium from intracellular sources and decreased secretion from the kidney, or could simply be an expected statistical fluctuation from making 30 measurements. Protein catabolism does not seem to be involved since there was no increase in the serum urea level, on the contrary a decrease in its level was observed.

DISCUSSION:

Owing to the medicinal properties attributed to an herbal drug, it is necessary to maintain its quality and purity for its proper use. In the recent past, it has become possible to suggest a practicable quality assurance profile for a herbal drug or its bioactive constituent(s), given the advent of new analytical tools and sophisticated instrumental technology. The crude drugs are subjected to a suitable method of extraction and purification for the isolation of phytopharmaceuticals. Extractive values also help in estimation of specific constituents soluble in particular solvents. Microscopic evaluation helps in proper identification of source materials. Macroscopic characters, ash values and extractive values serve as diagnostic parameters and help in evaluation of purity of drugs. The pharmacognostical evaluation showed that the sample drug was brown in color, sour, pungent in taste along with a sweet after taste; aromatic in odour and fine powder in consistency. Sourness is due to Amlaki and a sweet after taste is due to Amlaki & Haritaki and pungent due to presence of Pippali and Chitraka. The palatability of the drug is good. In microscopic evaluation, no significant changes or appearance of the powdered material was seen. Foreign matters were limited to (0.8%-1%). The phytochemical analysis showed positive presence of proteins, saponins, phenols, glycosides, tannins, alkaloids and fixed oil. It was also noted that carbohydrates and steroids were absent in the sample drug. The quantitative standards were well within normal limits. The alcohol soluble extractive value is more than water soluble extractive value, which indicates the presence of more alcohol soluble contents in the drug. The pH value of the sample drug is 6.1. This indicates its acidic nature. The TLC showed 5 spots and Rf value of each spot was calculated. The Rf values were then compared with literature and found to be same. The Rf values were found to be of 0.17, 0.48, 0.58, 0.66, & 0.83 values respectively.Acute toxicity test results showed that Amalakyadi churna did not effect any behavioral changes or affect other parameters measured in the acute toxicity test. Amalakyadi churna did not produce any signs or symptoms of toxicity or mortality up to a dose of 2000 mg/kg. This dose is more than 20 times the therapeutic equivalent dose in rats, clearly indicating that the formulation is unlikely to induce any drastic toxic effect in spite of which is known for cardio–toxic potential.

CONCLUSION:

The compound preparation of Amalakyadi churna contains Amalaki, Haritaki,. Chitraka, Pippali, Saindava lavana as is very much useful in the management of Anorexia. By the above studies we can conclude that the parameters defined for the standardization of Amalakyadi churna are efficient enough to consider for quality control department for ensuring the consistency of the finished product from batch to batch is maintained.

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