Paramedical Assets of Arjuna: An Assessment

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Abstract

Terminalia arjuna (Roxb.) Wight &Arn. arjuna through different studies such as antioxidant, hypotensive, anti-atherogenic, anti-inflammatory, anticarcinogenic, anti-mutagenic and gastro-productive effect.
significant, the reduction varying from 23.49%, 42.47%, and 59.65% down to 12.32%, 28.00%, and 36.88% respectively at the highest dose T. arjuna for the three different durations viz., 24, 48 and 72 h. Similarly the number of sister chromatid exchanges got reduced from a higher level of 15.00 ± 1.40 per cell to 7.70 ± 0.50 per cell with liver microsomal metabolic activation system mix at 48 h of treatment. The replication index was enhanced from 1.33 to 1.55 in the in vitro experiment. Similar trends were noticed in the in vivo experiments that are effective reductions in clastogeny ranging from 15.22% to 54.82% from the mutagen treated positive control and the total frequencies in aberrant cells got reduced from 429 due to AFB1 to 141 due to 5th concentration of.

Keywords: Terminalia arjuna, Medicinal property, Phytochemistry, Coronary artery disease, Triterpenoids

Introduction

Among the plants, one of the medicinal plants indigenous to India is Terminaliaarjuna (Roxb.) Wight and Arn., of this plant for its cardio-protective function.17, 18, 19The aim of this review is to summarize the information and knowledge about the.

Pharmacological studies

Triterpenoids are essentially responsible for cardiovascular properties. Alcoholic and aqueous bark extracts of T. that alcoholic and aqueous bark extract of T. arjuna showed effective inhibition of all three enzymes in human liver microsomes with IC50 values less than 35 µg/ml. Enzyme kinetics studies suggested that the extracts of T. They have used human lymphocyte culture and bone marrow cells of albino mice as assay system. The role of T. arjuna extracts in reducing metaphase aberrations due to aflatoxin B1 (AFB1) is quite significant, the reduction varying from 23.49%, 42.47%, and 59.65% down to 12.32%, 28.00%, and 36.88% respectively at the highest dose T. arjuna for the three different durations viz., 24, 48 and 72 h. Similarly the number of sister chromatid exchanges got reduced from a higher level of 15.00 ± 1.40 per cell to 7.70 ± 0.50 per cell with liver microsomal metabolic activation system mix at 48 h of treatment. The replication index was enhanced from 1.33 to 1.55 in the in vitro experiment. Similar trends were noticed in the in vivo experiments that are effective reductions in clastogeny ranging from 15.22% to 54.82% from the mutagen treated positive control and the total frequencies in aberrant cells got reduced from 429 due to AFB1 to 141 due to 5th concentration of T. arjuna extracts at 32 h of exposure. Arjungenin and its glucoside are extracted from T. arjuna and exhibited a moderate free radical scavenging activity on the superoxide release from PMN cells. Arjungenin also exhibited greater inhibitory action on the hypochlorous acid production from human neutrophils.67Viswanatha et al69 investigated the antioxidant and antimutagenic activities of alcoholic extract of TA bark. The alcoholic extract of the stem bark of T. arjuna (ALTA) has shown potent antioxidant activity with EC50 in DPPH assay, superoxide radical scavenging activity and lipid peroxidation assay. In micronucleus test ALTA showed significant reduction in percentage of micronucleus in both polychromatic erythrocytes (PCE) and normochromatic erythrocytes (NCE) and also shown a significant reduction in P/N ratio. Singh et al68 investigated the effects of butanolic fraction of T. arjuna bark on Doxorubicin (Dox) induced cardiotoxicity using in vivo study with male Wistar rats and they found that T. arjuna bark has protective effects against Dox-induced cardiotoxicity and may have potential as a cardioprotective agent.

Dried pulverized bark of T. arjuna was administered orally to Wistar albino rats (120–150 g) in two doses (500 and 750 mg/kg in 2% carboxy methyl cellulose (CMC)), 6 days per week for 12 weeks. in vitro ischemic-reperfusion injury (IRI). of mortality and morbidity in diabetic patients. Therapeutic potential of T. observed in diabetic rats. It also reduced oxidative stress, ET-1, and inflammatory cytokine levels.72 Sinha et al73 has investigated the antioxidative properties of an ethanol extract of the bark of

Mandal et al77 investigated antioxidative and antimicrobial properties of methanolic extract of T. arjuna bark. The antimicrobial activity showed that higher inhibition against Gram negative bacteria than gram positive bacteria and showed a promising antioxidant activity, as absorption of DPPH radicals decreased in DPPH free radical scavenging assay. Methanol extract from bark of T. arjuna exhibited medicinal as well as physiological activities. Methanol, ethanol, acetone, aqueous both hot and cold extracts from the leaves and bark of T. arjuna were tested for their antimicrobial activity against Staphylococcus aureus, Acinetobacter sp., Proteus mirabilis, Escherichia coli, Pseudomonas aeruginosa and Candida albicans, pathogens causing ear infections. Three organic solvents evaluated, acetonic leaf extract was found to be best against S. aureus. Organic bark extract showed almost equal inhibition of all tested Gram negative bacteria except P. aeruginosa. Aqueous extract of T. arjuna bark exhibited good activity against S. aureus. 78 Devi et al81 evaluated the effect of methanolic extract of T. arjuna (100 mg/kg to 50 mg/kg body weight) on diclofenac sodium (80 mg/kg bodyweight in water, orally) induced gastric ulcer in rats. The gastroprotective effect of T. arjuna was assessed from volume of gastric juice, pH, free and total acidity, pepsin concentration, acid output in gastric juice, the levels of nonprotein sulfhydryls (NP-SH), lipid peroxide (LPO), reduced glutathione (GSH), and activities of enzymic antioxidants-super oxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), glutathione-Stransferase (GST) and myeloperoxidase (MPO) in gastric mucosa. The levels of DNA, protein bound carbohydrate complexes-hexose, hexosamine, sialic acid, fucose in gastric mucosa and gastric juice and the levels of RNA in gastric mucosa were assessed. The stomach tissues were used for adherent mucus content and also for the histological examination. A significant reduction in lesion index was observed in ulcer induced animals treated with T. arjuna (DIC + TA) compared to ulcerated rats (DIC). A significant increase was observed at pH, NP-SH, GSH, enzymic antioxidants, protein bound carbohydrate complexes, adherent mucus content, nucleic acids with a significant decrease in volume of gastric juice, free and total acidity, pepsin concentration, acid output, LPO levels and MPO activities in DIC + TA rats compared to DIC rats. It is proved that T. arjuna could act as a gastroprotective agent probably due to its free radical scavenging activity and cytoprotective nature.

Clinical studies

The therapeutic potential of T. arjuna on the inflammatory markers in subjects with stable coronary artery disease (CAD). In a placebo-controlled, randomized double-blind study, 116 patients with stable CAD who were on standard cardiac medications for more than three months were enrolled and received either placebo or 500 mg of T. arjuna from Himalayan Herbal Healthcare, Bangalore, India twice a day in addition to receiving the conventional treatment. A significant decrease in serum triglycerides as well as in various inflammatory cytokines such as hsCRP, IL-18 ($P < 0.001$), IL-6 and TNF-α ($P < 0.05$) was observed at 3 months in patients who were on drug treatment as compared to the placebo. The effects were maintained till 6 months follow-up and showed a further reduction in hyperlipidemia and inflammatory markers with time. An observational study was conducted to find out the effects of T. arjuna in patients with dilated cardiomyopathy (DCMP) of idiopathic and ischemic cause. Ninety three patients with DCMP receiving standard therapy and/or bark extract of T. arjuna 500 mg 8 hourly were enrolled. Three groups as standard therapy (ST, Group 1), T. arjuna therapy (TA, Group 2) and standard therapy with T. arjuna (ST + TA, Group 3) were formed. At the end of the study period, patients of group 3 showed significant improvement in percentage of left ventricular ejection fraction (LVEF%) (7 ± 1.6, $P < 0.00001$) compared to group 1 and 2 ($P < 0.00001$, $P < 0.0001$). Reductions in Left ventricular end systolic and diastolic diameters and volumes were most significant in group 3 (8.3 ± 4.7, $P < 0.0001$ and 3.1 ± 5.7, $P < 0.001$) and (11 ± 26, 9 ± 21 $P < 0.01$) respectively in comparison to other groups. Pulmonary artery pressure reduced significantly in group 1 and 3 ($P < 0.0001$). A similar reduction in diastolic score and mitral regurgitation ($P < 0.01$ and $P < 0.0001$) was observed in groups 1 and 3. From the results, dilated cardiomyopathy with reduced LVEF due to either idiopathic or ischemic cause receiving standard therapy with T. arjuna showed significant improvement in left ventricular parameters as well as functional capacity.

Conclusion

On the basis of the available literature evidences, T. arjuna is widely used for treatment of cardiovascular diseases, including heart diseases and related chest pain, high blood pressure and high cholesterol. It is also used for earaches and diseases of the urinary tract. The effectiveness T. arjuna as an anti-ischemic agent and as a potent antioxidant preventing LDL, reperfusion ischemic injury to the heart and its potential to reduce atherogenic lipid levels have been sufficiently demonstrated in different experimental and clinical studies. However, continuous research progress of using T. arjuna is very much needed in the regards of exact molecular mechanism, drug administration, drug-drug interactions and toxicological studies.

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