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EC PHARMACOLOGY AND TOXICOLOGY

Review Article

Pharmacological Activity of Dawa-ul-Kurkum

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Received: August 02, 2022; **Published:** August 31, 2022

Abstract

Dawa-ul-Kurkum is a polyherbal formulation which has an edge over all these drugs in treating liver diseases. This formulation is composed of nine ingredients with different pharmacological activity. It's used as for Unani literature in cases of liver dysfunction, anorexia, ascites and abdominal pain.

Keywords: *Dawa-Ul-Kurkum; Pharmacological Activity; Hepatoprotective*

Introduction

Dawa-ul-Kurkum is a polyherbal formulation which has an edge over all these drugs in treating liver diseases [1,2]. In Unani system of medicine, a polyherbal formulation Dawa-ul-Kurkum is almostly used in cases of liver dysfunction, anorexia, ascites and abdominal pain. This polyherbal is composed of Sumbul-ut-Teeb (*Nardostachys jatamansi* DC.), Mur Makki (*Commiphora myrrha* Nees), Saleekha (*Cinnamomum cassia* Nees), Qust (*Saussurea lappa* C.B. Clarke), Shagufa-eIzkhir (*Cymbopogon schoenanthus* L.), Darcheeni (*Cinnamomum zylenicum* BL.), Zafran (*Crocus sativa* L.) with Sharab-e-musallas (Ethyl alcohol) and Qand Safaid (*Saccharum officinarum* L.) [3] (Table 1).

S. no	Scientific name	Common name
1	*Nardostachys jatamansi*	Sumbul-ut-Teeb
2	*Commiphora myrrha*	Mur Makki
3	*Cinnamomum cassia*	Saleekha
4	*Saussurea lappa*	Qust
5	*Cymbopogon schoenanthus*	Shagufa-eIzkhir
6	*Cinnamomum zylenicum*	Darcheeni
7	*Crocus sativa*	Zafran
8	*Ethyl alcohol*	Sharab-e-musallas
9	*Saccharum officinarum*	Qand Safaid

Table 1*: Dawa-Ul-Kurkum Unani composition.*

Dawa-ul-Kurkum is a novel remedy for the management of NAFLD. While modern system of medicine till date has no treatment for NAFLD, Dawa ul Kurkum can serve as a remedy for patients having NAFLD, based upon significant changes observed in Ultrasonography, though its results on liver enzymes and lipid profile were insignificant statistically [4].

Pharmacological activity of different constituents

Sumbul-ut-Teeb (*Nardostachys jatamansi*)

Sumbul-ut-teeb (*N. jatamansi* DC) is a perennial herb whose rhizome and roots are mostly utilised for medicinal purposes.

Pharmacological activity

Activity on CNS: An extract from *N. jatamansi* displayed strong antidepressant efficacy, according to limited results from behavioural studies. On male albino wistar rats, the effects of acute and subchronic treatment of an alcoholic extract of the roots of *N. jatamansi* DC on nor epinephrine (NE), dopamine (DA), serotonin (5-HT), 5-hydroxyindoleacetic acid (5-HIAA), gamma-amino butyric acid (GABA), and taurine were studied. The level of NE and DA did not alter after acute oral administration of the extract, however it did result in a considerable increase in 5-HT and 5-HIAA. When compared to the controls, the drug-treated groups had significantly higher levels of GABA and taurine [5].

Neuroprotective activity: Pretreatment with a 250 mg/kg alcoholic extract of *N. jatamansi* DC for 15 days protected rats from localised ischemia produced by blockage of the middle cerebral artery. The protective effect could be due to increased glutathione levels, lipid peroxidation inhibition and activity on the Na^+/K^+ ATPase and catalase enzyme systems.

Cardio protective activity: The protective and hypolipidemic effect of *Nardostachys jatamansi* against doxorubicin induced myocardial injury in rats was shown to be mediated through its anti-lipid peroxidative properties when rats were given an extract of *Nardostachys jatamansi* (500 mg/kg) orally for seven days. This suggests that the protective and hypolipidemic effect of *Nardostachys jatamansi* against doxorubicin Biochemical values were also in agreement with histopathological findings.

Hepatoprotective activity: Against thioacetamide-induced hepatotoxicity, a 50 percent ethanolic extract of *N. jatamansi* DC showed considerable hepatoprotective action.

Anticonvulsant activity: In rats, the anticonvulsant activity and neurotoxicity of an ethanol extract of the roots of *N. jatamansi* DC were investigated alone and in combination with phenytoin. The results showed that *N. jatamansi* DC root extract increased the seizure threshold significantly as compared to the maximal electroshock seizure (MES) model, as indicated by a decrease in the extension/flexion ratio. However, the extract proved ineffective against seizures caused by pentylenetetrazole.

Anti-oxidant activity: In a rat liver model of iron-induced lipid peroxidation, the antiperoxidative property of *jatamansi* was studied, and it was discovered that the extract protected against lipid peroxidation. *N. jatamansi* has anti-oxidant properties both *in vivo* and *in vitro*. It has a scavenging function that is unrestricted. The presence of flavonoids and polyphenols may be responsible for its anti-oxidant activity, which in turn may be responsible for its anti-stress impact [5].

Anti-diabetic activity: In an experimental model of diabetic rats, the ethanolic extract of *N. jatamansi* has substantial antihyperglycemic activity. It lowers glucose levels in diabetic and non-diabetic rats considerably when compared to controls.

Antifungal: Fungistatic activity of *N. jatamansi* essential oil was observed against *Aspergillus flavus, Aspergillus niger, Fusarium oxysporum, Mucor fragilis* and *Rhizopus stolonifer*. Depending on the concentration, this oil was found to be fungistatic or fungicidal to one or both moulds.

Other activity: Jatamansone has been shown to have anti-estrogenic properties in animal investigations. Furthermore, anti-arrhythmic, anti-hypertensive, anti-asthmatic, nematicidal and antibacterial properties have been identified for jatamansone [5].

Mur makki (*Commiphora myrrha* Nees)

Myrrha is derived from the Arabic word murr, which meaning bitter and it has been used in incense and perfume throughout history.

Pharmacological studies

Cytotoxic activity: Due to the existence of two di-terpene resin acid compounds, *C. myrrha* was found to exhibit cytotoxicity activity on human gynecologic cancer cells in a clinical experiment, which substantially inhibited the proliferation of human ovarian cancer cells [6].

Emmenagogue activity: Murr, when combined with Muqil and Abhal, is efficacious in PCOD-related secondary amenorrhea, according to Khatoon., *et al*. Due to the presence of steroids and flavonoids, this combination caused withdrawal bleeding as well as menstrual regulation. Murr also includes phytosterols, saponins, terpenoids, lignans, and phenolic compounds, as well as glycosides and alkaloids in Abhal, which have a hormone-like effect on the body, resulting in menstrual regulation and the withdrawal of bleeding.

Anti-microbial activity: Due to the presence of broad spectrum antimicrobial chemicals that operate against gram negative bacteria, the methanolic extract of *C. myrrha* displayed antibacterial action against *E. coli, S. aureus, B. cereus, E. coli* and *K. pneumoniae*. Its petroleum ether extract had antibacterial activity against *S. aureus, E. coli* and *Pseudomonas aeruginosa*, as well as antifungal activity against *Aspergillus niger* and *Candida albicans*.

Anti-fungal activity: Due to the presence of furanoeudesma 1,3diene and menthofuran in myrrh oil and 2-tert-butyl-1,4-napthoquinone, benzene methanol, 3-methoxy-phenyl, and curzerene in myrrh 24 ethanol extract, the ethanolic extract and essential oil of *C. myrrh* were found to have antifungal effects against *T. rubrum, T. men* on an *in vitro* study, petroleum ether and methanol extracts of *C. myrrha* oleogum resins showed antifungal efficacy against the *Aspergillus* species *A. flavus, A. fumigatus, A. terreus* and *A. niger* [6].

Analgesic activity: The presence of bioactive chemicals in *C. molmol* extract resulted in analgesic efficacy in rats by depressing pain receptors centrally in the brain and decreasing the release of prostaglandins (Pgs). As a result, the analgesic activity of *C. molmol* extract appears to be mediated by both central and peripheral pathways.

Anti-hyperlipidemic activity: Because to the presence of guggulsterones, plant sterol and other compounds, *C. myrrha* considerably reduced body weight growth, corrected high blood cholesterol levels and decreased atherogenic index, low-density lipoprotein/high-density lipoprotein in obese hyperlipidemic rats.

Hepatoprotective effect: In rats, *Commiphora myrrha* therapy improved liver histology toward greater normalcy, as seen by a dose-dependent drop in liver enzymes. By down-regulating essential key actors including TNF-, IL-6, IL-10, iNOS-2 and HO-1, it boosts hepatic antioxidant activity and reduces oxidative stress, which may be enough to battle cellular damage. *C. myrrha* extract may also protect parenchymal cells and enhance liver tissue regeneration, based on histological recovery toward normality. The presence of flavonoids, 36 terpenoids and alkaloids has a hepatoprotective impact [6].

Saleekha (*Cinnamomum cassia* Nees)

Cinnamomum comes from the Greek term kinnamomon, which meaning “sweet wood” and “spice”. *Cinnamomum cassia* Blume, sometimes known as *Cinnamomum aromaticum*, is a species of cinnamon. Cinnamon is an old spice that is utilised in a variety of cultures. It’s known as “Qasya” in the Unani medical system.

Pharmacological studies

Anti-inflammatory and analgesic activity: The anti-inflammatory benefits of *C. cassia*'s substantial inhibition of nitric oxide (NO) and cyclooxygenase have been proven. Carrageenan was used to generate paw edema in a mouse model. Cinnamaldehyde infusion was demonstrated to reduce edema by reducing NO, TNF- and PGE2. Cinnamaldehyde suppresses inflammation by inhibiting iNOS and COX-2 5 Shin., *et al*. confirmed in 2017 that an ethanol extract of *C. cassia* has anti-inflammatory properties [7].

Antimicrobial activity: The bacteriostatic effect of *C. cassia* was broad-spectrum. Total polyphenols in the non-volatile sections of *C. cassia* branches were reported to have antibacterial action *in vitro* against gram-positive (*Staphylococcus aureus* and *Streptococcus pneumonia*) and Gram-negative (*Escherichia coli* and *Pseudomonas aeruginosa*) bacteria, according to Zhong., *et al*. *Pseudomonas aeruginosa* has been proven to be resistant to an ethanol extract of *C. cassia*. Using the agar dilution technique, pure cinnamaldehyde and its oil extracts were found to be effective against *Staphylococcus aureus, E. coli, Enterobacter aerogenes*, *Proteus vulgaris, Pseudomonas aeruginosa, Vibrio cholerae* and *Salmonella typhimurium*.

Antioxidant activity: *C. cassia* flavonoids were shown to have high antioxidant activity. The flavonoids extracted from ethyl acetate and n-butanol *cassia* ethanol extract have considerable anti-oxidant effects.

Hepatoprotective activity: *C. cassia* extract has been reported to have hepatoprotective properties against alcohol and carbon tetrachloride-induced liver injury. Its ability to scavenge free radicals could account for its hepatoprotective properties. The carbon tetrachloride-induced increases in serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were corrected by oral therapy of 200 mg/kg of water and ethanolic extracts once daily for 7 days when compared to untreated rats (ALT). In addition, the ethanolic extract had a higher hepatoprotective impact than the water extract, reducing MDA levels and increasing ALT levels.

Antiulcer activity: *Cassia* possesses antiulcer activity, which is thought to be due to its ability to potentiate defensive mechanisms through improving circulatory disorder and gastrointestinal cytoprotection. Akira., *et al*. discovered that giving rats an aqueous extract of *C. cassia* at a dose of 100 mg/kg body weight avoided stress ulcers and greatly suppressed stomach ulcers caused by subcutaneous serotonin injection. The effects of cinnamon extracts in ethanol and methylene chloride on *H. pylori* growth and urease activity were studied. Methylene chloride extract prevented *H. pylori* growth at quantities equivalent to those found in conventional antibiotics, although ethanol extract decreased urease activity. As a result, it could be beneficial in the prevention of ulcers caused by *H. pylori* [7].

Qust (*Saussurea lappa* C.B. Clarke)

S. lappa is a significant medicine. *S. lappa* was developed for treating cardiovascular illness, as well as its anti-inflammatory, anticancer, anti-ulcer and antibacterial activities, as a result of increasing in-depth investigations on its chemical constituents, pharmacological activity, and clinical uses.

Pharmacological activities

Anti-cancer activity: *S. lappa* showed strong anticancer effect against malignant, leukaemia and lymphoma, according to Hubal (2005). Costunolide, Dehydrocostus lactone and Cynaropicrin were thought to be the main chemical ingredients. However, according to Umadevi., *et al*. (2013), the presence of Costunolide in water extract of *S. lappa* prevented the growth and spread of intestinal cancer. In leukemic cells, mokkolactone and an alkaloid derived from *S. lappa* caused apoptosis. Shikokiols extracted from *S. lappa* showed anticancer potential by inhibiting cancer cell growth and spread by halting cancer cell division in the G2 phase of the cell cycle and inducing apoptosis in cancer cells of the ovary, lung, colon, and central nervous system [8].

Anti-inflammatory activity: TNF- and nitric oxide (NO) levels in mouse macrophage cells were measured *in vitro* to assess anti-inflammatory efficacy.

Damre., *et al*. (2003) used the cotton pellet granuloma assay in rats to evaluate the sesquiterpene lactone fraction of *S. lappa* roots for their effect on the transudative, exudative and proliferative phases of inflammation. They found that fraction (25 - 100 mg/kg, p.o.) showed significant dose-dependent inhibition of the increase in wet weight of the cotton pellet at 3 hours (transudative phase). Thus, the sesquiterpene lactone portion of *S. lappa*'s anti-inflammatory activity could be attributable to the stability of lysosomal membranes and an antiproliferative effect.

Immunomodulatory activity: The immunomodulatory effect of hydroalcoholic *S. lappa* root extract was studied at doses of 100 and 200 mg/kg, with no significant effect on humoral immunity or the number of antibody-producing cells in the spleen at 250 mg/kg, indicating that *S. lappa* had no effect on such responses in the short term. The immunomodulatory action of *S. lappa* extract was potentiated at higher doses in both the humoral and cellular arms of the immune system [8].

Costunolide suppressed the killing activity of CTL by blocking the increase in tyrosine phosphorylation in response to the crosslinking of T cell receptors, according to a study conducted on Costunolide and Dehydrocostus lactone, which were extracted from an extract of *S. lappa* [8].

Cardiovascular diseases: The cardioprotective activity of an aqueous extract of *S. lappa* root against isoproterenol (85 mg/kg)-induced myocardial damage in rats was discovered. The rats were given an oral dose of the aqueous extract of *S. lappa* in three separate doses (100, 200 and 300 mg/kg). Only 200 mg/kg of AESL significantly decreased oxidative stress, while lower (100 mg) and higher (300 mg) dosages provided no significant protection from oxidative stress. The mechanism of such protection by prolonged oral administration of AESL could be related to myocardial adaptation, where oxidative stress is mediated by a decrease in the TBARS level [8].

Langendorff technique was employed to assess the cardiac activity of *S. lappa* roots in an isolated perfused rabbit heart. In the presence of different quantities of methanolic extract of *S. lappa*, digoxin and diltiazem, heart rate, contractility and coronary flow were measured. It was discovered that the methanolic extract of *S. lappa* has cardiotonic effects, which could be attributed to the presence of flavonoids, sesquiterpene lactones, calcium channel blockers, and cholinergic components in the extract [8].

Anticonvulsant: The anticonvulsant efficacy of petroleum ether, alcoholic and aqueous extracts of *S. lappa* was tested in mice using the maximum electroshock (MES) test and pentylenetetrazole and picrotoxin-induced convulsions. The petroleum ether extract of *S. lappa* roots was discovered to have strong anticonvulsant efficacy against pentylenetetrazole and picrotoxin-induced convulsions in mice by raising the seizure threshold via a GABAergic mechanism [8].

Shagufa-e-Izkhir (*Cymbopogon schoenanthus*)

Pharmacological activities

Antimicrobial, antiparasitic and insecticidal effects: Antiparasitic activity of chemicals isolated from the EO of *C. schoenanthus* against *Trypanosoma brucei brucei*. The essential oil of *C. jwarancusa* was found to have anti-*Anopheles stephensi* action. *C. schoenanthus* EO was also found to have insecticidal action against *Anopheles gambiae* [9]. *C. schoenanthus*'s piperitone-rich EO was found to be efficient against *Callosobruchus maculatus* [9].

Effect on cardiovascular system: *C. ambiguous* dichloromethane extract showed antiplatelet action *in vitro*, which was attributed to its eugenol concentration. *C. citratus* EO was also found to have antiplatelet properties. A dose-dependent relaxant activity on endothelial

vasoconstriction via the nitric oxide (NO) route and involvement of prostacyclin was discovered in a methanolic extract of *C. citratus* and its active component, citral. EO of *C. winterianus* and methanolic extract of *C. schoenanthus* subsp. proximus induced dose-dependent hypotension. In rats, citronellol, one of the primary chemicals in EO, caused hypotension and tachycardia. Its hypotensive effect seems to be mediated by calcium channel blockade [10]. Through lowering of cardiac markers in serum and heart tissue, ethanolic extract of *C. citratus* showed cardioprotective effect against isoproterenol-induced cardiotoxicity [9].

Anticancer and antimutagenic effects: The EO of *C. schoenanthus* showed significant anti-proliferative action against the colorectal cancer cell line HCT116.

Effects on glucose and lipid profiles: The alpha-glucosidase and pancreatic lipase inhibitory actions of *Cymbopogon schoenanthus* were discovered. Furthermore, in diabetic mice, its aqueous extract returned increased blood glucose levels to normal levels. In rats fed a high fat diet, the essential oil of *C. nardus* lowered feed consumption, percentage weight gain and blood cholesterol levels [9].

Effects on respiratory tract: The antimuscarinic and/or Ca^{2+} channel blocking activity of C. martini methanolic extract has a relaxing effect on isolated rabbit tracheal muscles. The essential oil of *C. schoenanthus* inhibited histamine and serotonin receptors, resulting in bronchodilation [9].

Cinnamomum zeylanicum

The herb that people use in their everyday food is the best source for treating or preventing various disorders.

Pharmacological activity

Antioxidant activity

The human body requires antioxidants to counteract free-reactive oxidant species. The antioxidant activity of acetone and methanol extracts of fresh and dried bark of *Cinnamomum zeylanicum* verum, as measured by DPPH, ABTS and hydroxyl radical scavenging activities, was investigated in this work. Experiments on the total phenolic content, metal chelation capability, and reducing power of extracts were also carried out. Using a linoleic acid emulsion technique, the lipid peroxidation capacity of extracts was measured and the results were excellent. MCF 7 cells were used to test the extracts' cytotoxic potential. Furthermore, phenolic compounds found in cinnamon extract, such as hydroxyl cinnamaldehyde and hydroxycinnamic acid, act as peroxide radical scavengers, preventing oxidative damage. The total phenolics content of the extracts of dried fruit of cinnamon were found to be the highest water extract and showed strong anti-mutagenicity.

Cinnamon could also be used as a dietary source of natural antioxidants to help people eat better and live longer [10].

Anti-inflammatory activity: Cinnamaldehyde suppresses nitric oxide generation, which has been linked to inflammatory illness, as well as prostaglandin E2 manufacturing catalysed by cyclooxygenase-2. Cinnamon ethanolic extract (70%) proved efficient against acute inflammation in mice. In rabbits, an herbal ophthalmic medication called ophtha care, which contains 0.5 percent cinnamon, was found to be useful as an anti-inflammatory drug.

Antidiabetic activity: Ethanolic extract of *C. zeylanicum* leaves has substantial anti-diabetic properties, since it lowers fasting blood sugar levels in alloxan-induced rats significantly more than diabetic control rats. Cinnamon has been studied as a possible therapy for type 2-diabetes for nearly 20 years. Cinnamon contains an unexplained component known as insulin potentiating factor (IPF). This IPF could play a role in reducing the signs and symptoms of diabetes, as well as other disorders linked to insulin resistance. Cinnamon

aqueous extract potentiated insulin activity in epididymal fat cells more than 20-fold, greater than any other substance evaluated at equivalent dilutions *in vitro*. Cinnamon extracts improved insulin receptor function by activating the enzyme that causes insulin to bind to cells (insulin receptor-kinase) and inhibiting the enzyme that blocks this process (insulin-receptor phosphatase), resulting in maximum phosphorylation of the insulin receptor and increased insulin sensitivity. In 3T3-L1 adipocytes, the unidentified component contained in cinnamon as methylhydroxychalcone polymer (MHCP) was described and its ability to serve as an insulin mimic was studied. In 3T3-L1 adipocytes, MHCP enhanced insulin receptor (IR) autophosphorylation, elevated glucose uptake, glycogen synthesis, and glycogen synthase (GS) activity, and downregulated glycogen synthase kinase-3 (GSK-3) activity. A class I phosphatidylinositol (PI) 3-kinase-dependent pathway stimulates glycogen production. All of these actions are typical of 3T3-L1 adipocytes' insulin response.

Furthermore, the results reported after the dual therapy were greater than additive, implying that the two substances work together. The *in vitro* insulin-potentiating effect of cinnamon was observed in the aqueous fraction, according to Anderson., *et al*. They believe the main active ingredients in cinnamon are water soluble doubly-linked procyanidin type - A polymers, which were previously mistaken as MHCP. *In vitro* insulin boosting action in epididymal fat cells is attributed to polyphenolic substances that exist as monomers or oligomers. Cinnamon has been shown to lower blood glucose levels in diabetics who are not insulin-dependent. Cinnamaldehyde's promise as an anti-diabetic drug has been demonstrated in clinical trials. Aldose reductase, a crucial enzyme in the 'polyol' pathway, is inhibited by cinnamaldehyde. This enzyme catalyses the conversion of glucose to sorbitol in diabetic patients' insulin-insensitive tissues. As a result, sorbitol builds up in chronic diabetes problems such cataracts, neuropathy, and retinopathy. Aldose-reductase inhibitors stop glucose from being converted to sorbitol, reducing a number of diabetes problems.

Antibacterial activity: *Bacillus subtilis, Escherichia coli, Staphylococcus aureus, Salmonella typhimurium*, and *Pseudomonas aeruginosa* are all active *in vitro* against the bacteria *Bacillus subtilis, Escherichia coli*, *Staphylococcus aureus, Salmonella typhimurium* and *Pseudomonas aeruginosa*. Cinnamaldehyde and eugenol (essential oil components) were found to be antibacterial against *Paenibacillus larvae*. Cinnamon bark's proanthocyanidins-(epi)catechins had potent antibacterial activity. Cinnamaldehyde was found to have potent antibacterial action against *E. coli, P. aeruginosa, E. faecalis, S. aureus, Staphylococcus epidermidis*, methicillin-resistant *S. aureus* (MRSA), *Klebsiella pneumoniae, Salmonella* spp and *Vibrio parahaemolyticus*. Cinnamon bark oil inhibited Gram-positive bacteria *Bacillus cereus, Micrococcus luteus*, and *Enterococcus faecalis*, as well as Gram-negative bacteria *Alcaligenes faecalis, Enterobacter cloacae*, *Escherichia coli* and the fungi *Aspergillus niger* and *Rhizopus oligosporus*, as well as the yeast *Candida albicans*.

Anti- fungal activity: Cinnamon's antifungal qualities have also piqued the interest of many scientists. The impact of medicinal plant extracts on *Phytophthora capsici* and *Rhizoctonia solani* mycelium development. *Aspergillus niger, Aspergillus fumigatus, Aspergillus nidulans* and *Aspergillus flavus* are fungi that cause respiratory tract mycoses. *Cinnamomum zeylanicum* bark oil possesses fungitoxic effects against these fungi. *Aspergillus flavus, Aspergillus ochraceus*, *Aspergillus niger, Aspergillus terreus, Aspergillus citrinum*, and *Penicillium viridicatum* have all been shown to be inhibited by cinnamaldehyde and eugenol. Cinnamon essential oil is potent against *Aspergillus* spp., *Cladosporium werneckii*, *Geotrichum candidum*, *Kloeckera apiculata, Candida lipolytica* and *Candida albicans in vitro* [10].

Insecticidal activity: Cinnamaldehyde, derived from *Cinnamomum cassia* extract, is an effective pesticide against *Sitophilus oryzae* and *Callosobruchus chinensis* adults. Essential oils derived from the leaves of *Artemisia princeps* and the seeds of *Cinnamomum camphora* (L.) Presl were tested for their repellent and insecticidal properties against storage pests *Sitophilus oryzae* L. and *Bruchus rugimanus* Bohem. The two individual oils had good repellent properties, but their combination had far better repellent properties. Cinnamon oil was found to be fumigant to adults of *Acanthoscelides obtectus*, inhibiting reproduction via ovicidal and larvicidal effects. Cinnamaldehyde and cinnamyl alcohol were found to have ovicidal and larvicidal properties. *Ceratitis capitata*, a pest that damages fruit crops, was found to have antifeedant effects in cinnamaldehyde.

Antipyretic and analgesic activity: In mice, a decoction of dried cinnamon twigs has an antipyretic effect. Cinnamaldehyde, or sodium cinnamate, produced hypothermic and antipyretic effects in anaesthetized dogs and guinea pigs, according to studies. It also has a hypotensive effect, which is primarily due to peripheral artery dilatation. Cinnamaldehyde was found to have analgesic properties in mice. The activation of the complement system causes nephritis, an autoimmune illness. *In vitro*, cinnamon cortex and oil suppressed complement formation. Cinncassiol C1 and its glucoside, cinncassiols C2 and C3, and cinncassiol D and its glucoside have all been found to have anticomplementary properties. The complement system was activated by a water-soluble polysaccharide isolated from cinnamon extract. 2- Hydroxycinnamaldehyde and 2-benzyloxycinnamaldehyde, both extracted from cinnamon stem bark, had immunomodulatory properties [10].

Antimicrobial activity: Cinnamon essential oils have been discovered to have antibacterial effects. *Bacillus cereus* growth is inhibited *in vitro*. Cinnamon alcoholic extracts were shown to be the most effective in suppressing *Helicobacter pylori* development. 29th. Cinnamon oil and extracts have antibacterial properties against a variety of bacteria, fungus and other microorganisms. The influenza virus was suppressed by an aqueous extract of (*C. zeylanicum*, Blume) [10].

Zafran (*Crocus sativa* L)

Saffron or *Crocus sativus* L. (Iridaceae), is a perennial stemless herb grown extensively in Iran and other countries such as India and Greece. The dried crimson stigma and a little amount of the yellowish style are used to make commercial saffron [11].

Pharmacological actions

Antihypertensive activity: Fatehi and colleagues looked studied the effects of *C. sativus* petals extract on blood pressure in anaesthetized rats, as well as the reactions of isolated rat vas deferens and guinea pig ileum to electrical field stimulation (EFS). Blood pressure was decreased in a dose-dependent manner by aqueous and ethanol extracts of *C. sativus* petals. This decrease could be attributed to the extracts from *C. sativus* petals having an effect on the heart or total peripheral resistance, or both. Extracts' impact on peripheral resistance appears to be more significant. The petals' extracts reduced contractile responses to EFS in isolated rat vas deferens. A combination of noradrenaline and ATP produced as co-transmitters from sympathetic neurons mediates contractions of the vas deferens in response to EFS. In the rat isolated vas deferens and guinea-pig ileum, the ethanol extracts elicited higher alterations in EFS than the aqueous extract [11].

Anticonvulsant activity: The anticonvulsant properties of safranal and crocin, two stigma components of *C. sativus*, were tested in mice utilising pentylenetetrazole (PTZ)-induced convulsions. Safranal (0.15 and 0.35 ml/kg body weight, i.p.) decreased seizure length, delayed the beginning of tonic convulsions and prevented mortality in mice. Crocin (22 mg/kg, i.p.) was found to have no anticonvulsant properties.

Antitussive activity: The antitussive action of *C. sativus* stigma and petal extracts, as well as its components safranal and crocin, was tested in guinea pigs using a nebulized solution of citric acid (20%). Cough was minimised by using an ethanolic extract of *C. sativus* (100 - 800 mg/kg) and safranal (0.25 - 0.75 ml/kg). The antitussive effect of the ethanolic and aqueous extracts of petal and crocin was not found.

Antigenotoxic and cytotoxic effects of saffron: The Ames/*Salmonella* test system, two well-known mutagens (BP, 2AA), the *in vitro* colony-forming assay and four distinct cultured human normal (CCD-18LU) and malignant (Hela, a-204 and Hepg2) cells were used to investigate the antimutagenic, comutagenic and cytotoxic effects. Saffron showed non-mutagenic and non-antimutagenic action against BP-induced mutagenicity and a dose-dependent co-mutagenic effect on 2-AA-induced antimutagenicity when solely utilising the

TA98 strain in the Ames/*Salmonella* test system. Safranal, a component of saffron, was found to be responsible for this uncommon co-mutagenic action. Saffron had a dose-dependent inhibitory effect exclusively against human cancer cells in an *in vitro* colony-forming test system. Saffron's separated carotenoid components all showed cytotoxic effect against malignant cells *in vitro*. The tumour cell colony formation was inhibited more effectively by saffron crocin derivatives. Overall, our findings indicate that saffron, as well as its carotenoid components, could be employed as cancer chemopreventive drugs [11].

Effect on sexual behavior: In male rats, the aphrodisiac effects of *C. sativus* stigma aqueous extract and its components, safranal and crocin, were tested. Male rats were given intraperitoneally the aqueous extract (80, 160 and 320 mg/kg body weight), crocin (100, 200 and 400 mg/kg body weight), safranal (0.1, 0.2 and 0.4 ml/kg), sildenafil (60 mg/kg body weight, as a positive control) and saline. The sexual behaviour study looked at mounting frequency (MF), mount latency (ML), intromission latency (IL) and ejaculation delay (EL). Crocin and the extract, particularly at doses of 160 and 320 mg/kg body weight, increased MF, IF and EF behaviours while decreasing EL, IL and ML parameters. Safranal had no aphrodisiac properties. The aphrodisiac action of saffron aqueous extract and its component crocin was discovered in this study.

Anxiolytic activity: The purpose of this study was to see if crocins have any anxiolytic qualities in rodents. The light-dark test was used for this purpose. In rats, either crocins (50 mg/kg) or diazepam (1.5 mg/kg) enhanced the latency to enter the dark compartment and lengthened the duration spent in the illuminated chamber. Lower doses of crocins (15 - 30 mg/kg) had no effect on the behaviour of the animals. The current findings show that administering these active ingredients of *C. sativus* L. to rats causes anxiolytic-like effects [11].

Effect on coronary artery disease: Human volunteers were given 50 milligrammes of saffron dissolved in 100 millilitres of milk twice a day and the considerable reduction in lipoprotein oxidation susceptibility in patients with coronary artery disease (CAD) suggests that saffron has antioxidant potential.

Antinociceptive and anti-inflammatory effects: The presence of flavonoids, tannins, anthocyanins, alkaloids and saponins in saffron stigma and petal extracts resulted in antinociceptive and acute and/or chronic anti-inflammatory activity in a chemically induced pain test. These effects may be due to the presence of flavonoids, tannins, anthocyanins, alkaloids, and saponins [11].

Qand safaid (*Saccharum officinarum* L.)

It is also employed in traditional medicine, both internally and outwardly, as its specific name (*officinarum*, "of dispensaries") implies.

Antioxidant activity: The presence of phenolic chemicals in sugar cane (*Saccharum officinarum* L.) juice has been discovered. The phenolic extract produced from sugar cane juice showed a protective effect against *in vivo* MeHgCl intoxication as well as a robust suppression of *ex vivo* lipoperoxidation of rat brain homogenates, suggesting that it could be used for good health benefits and/or medicinal applications.

Immunotherapeutic effects: The protective immunological responses of industrial broiler chickens against coccidiosis were studied using aqueous and ethanolic extracts of sugar cane (*Saccharum officinarum* L.) juice and bagasse, respectively. The results showed that both ethanolic and aqueous sugar cane extracts have immune-enhancing effects and that giving them to chickens boosts their protective immunity against coccidiosis.

Anti-inflammation: In two models of inflammation, a mixture of fatty acids derived from sugar cane (*Saccharum officinarum* L.) wax oil (FAM), in which the principal ingredients are palmitic, oleic, linoleic and linolenic acids, was examined. FAM's anti-inflammatory properties could be attributed to its inhibition of arachidonic acid metabolism. This is the first data we've seen on the anti-inflammatory effects of sugar cane by-products in arthritis and psoriasis models [12].

Hepatotoxicity: The effects of *Saccharum officinarum* L. juice on INH-induced oxidative liver damage in mice were studied. The findings revealed that INH-induced liver injury is linked to oxidative stress and that co-administration of *Saccharum officinarum* L. juice (15 ml/Kg bw) to mice can significantly prevent this damage.

Anti-obesity: The effects of a polysaccharide fraction of *Saccharum officinarum* on glucose and lipid metabolism in normal rats and those fed a high sugar diet were investigated. Endothelial cell enlargement in the ascending aorta was seen in one third of the rats given the high sugar diet control, but no pathological changes were seen in all of the animals given the polysaccharide fraction at the same time.

Anti-malaria: The effect of modifying the vegetation structure and composition of wetlands and related larval habitats on malaria transmission was investigated using phosphorus input from sugarcane, *Saccharum officinarum* L., production in northern Belize. The findings show that wetlands near agricultural areas are favourable for Typha growth, providing habitat for the more effective malaria vector [12].

Conclusion

It concludes Dawa-Ul-Kurkum can be used in various types of alignments as for the pharmacological activity of Dawa-Ul-Kurkum. It can be the best Unani medicine to treating liver diseases.

Acknowledgement

The research was supported by grants from the CCRUM, Ministry of AYUSH, New Delhi, which is duly acknowledged. The authors wish to thank CRIUM, Hyderabad for providing standardized Dawa-Ul-Kurkum preparations.

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