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ZEA MAYS LINN AND CORN SILK: A PHYTO-PHARMACOLOGICAL REVIEW AND ITS UTILIZATION IN UNANI MEDICINE

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Keywords:

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ABSTRACT: Herbal medicine is the source of primary health care due to its cultural acceptability and better compatibility with the human body and lesser side effects. Resha-e-Makka (*Zea mays*) is an important medicinal plant in the Unani system of medicine (USM) due to its multiple therapeutic properties. The review has been reviewed, compiled, and analyzed using references from major databases like classical text and indexed journals. The plant is known to treat different systemic ailments due to the presence of Saponins 3%, Alkaloid, Bitter glycoside, Stearic acids, Tannins, Amine 0.05% *etc*. In USM, the pharmacological actions of Resha-e-Makka are anti-inflammatory, diuretic, Lithtontroptic, astringent, muhallil Balgham, *etc*. *Zea mays* is reported for its antibacterial, anti microbial, anti-deperssant, anti-diabetic, hypolipidemic, antioxidant, hepatoprotective, antimalarial, antipyretic, analgesic, anti-inflammatory, anti-cancer, *etc*. activity. The review explores the pharmacological, phytochemical, and therapeutic properties of *Zea mays* Lin. Many pharmacological activities mentioned in Unani medicine are validated and many activities need further exploration due to the immense therapeutic scope in this drug.

INTRODUCTION: *Zea mays* Lin. (Maiz) is a well-known plant and mostly consumed in India. It is introduced in India and is grown in cooler parts of Northern, central, and western India. Maiz plant furnishes the cereal food grain of a great portion of the American continent and Italy [1]. *Zea mays* Lin. is used medicinally in Europe, China, Cambodia, and the Philippine islands.

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The Silk (Stigma / Style) of *Zea Mays* Linn. is used in Belgium, France, Turkey, Spain, Portugal and starch of *Zea Mays* Linn. in Great Britain and the United States of America. In greech and Philippine Island, Silk Stigma decoction is used for the ailment of bladder and Kidneys; Mohomed physicians also used it as re-solvent [2].

Botanical Description: Species (Family): *Zea mays* Linn. (Graminaceae)

Varieties: Panch Mahals, Gokak, King Phillips (American), Evergreen Sweet-corn (American), Golden Bartom (American), Jawnpore, Poona local. In Holland and Hungary maize is called - Turkish Wheat, in Central France Spanish Corn, in

Turkey - Egyptian Corn, in Egypt - Syrian dhurra, and in South Africa colonies – Mealies [1].

Scientific /Taxonomical Classification [3, 4]:

Kingdom	:	Plantae
Subkingdom	:	Tracheobionta
Superdivision	:	Tracheobionta
Division	:	Mangoliophyta
Class	:	Liliopsida
Sub Class	:	Liliopsida
Order	:	Liliopsida
Family	:	Poaceae/Gramineae
Genus	:	Zea L.
Species	:	*Zea mays L.*
Botanical Name	:	*Zea mays*
Synonym	:	*Zea mays* subsp. Acumi nata Golosk

Vernacular Names: Ayurveda: Mahaa-kaaya, [5] Afghanistan: Jaoari, Jaori, Jaorikhurdani, [2] Afrikaans: Mielie, Annam; Bap ngo, Lua ngo, [2] Arabic: Durahkizan, durahshami, Hintaherunu, Khalavan, Khandaruz, Zurratulmakkah, [2] Ashanti: Aburow, [2] Awuna: Akple, [2] Bengal: Bhutta, Janar-; [2] Bombay: Buta, Makai, [2] Brazil: Zaburro, [2] Burma: Pyaungbu, Combodia, Paut, Put, [2] Canarese: Goinjol, Mekkejola, Musukujola, [2] Cochin China: Bap ngo, Lua ngo, [2] Ceylon: Cholum, [2] Chinese: Yu Shu Shu, Jonar: Deccan, Makkajari, Makkajowari, [2] Dutch: Mais, [2] English: Indian Corn, Maize [5] Ewe: Akple, Blikple, Fanti; Aburow, [2] Rome: Ga; Able, Garhwa, junala, Mungari, [2] German: Tuerkische Korn, Tuerkisher Weizan, [2] Hindi: Barajowar, Bhutta, Jawdra, Junri, Kukri, Makai, Makka, [2] Hora: katsabotso, Katsamanga, Meliga, [2] Kashgar: Conae, [2] Italian: grano siciliano, Grano turco, Melicatto, Meliga, [2] Kashgar: Conae, [2] Kila Saifulla: Makai, Maki, [2] Konkani: Maeo, Zonallo, [2] Krepi: Adakple, Blikple, Kple, [2]. Krobo: Blaifo, [2] Kumaon: Bhutta, Junala, Mukni, [2] Languedoc: Artho, Avari Avati [2] Laos: Khao Phot, Khot, [2] Madagascar: Katsabazaha, Sako, [2] Malayalam: Cholam-; [2] Malta: Indian Corn KamhIrrum, Frumentone, Maize, [2] Marathi: Maka, Moldavia: Popusoiu, 2 Mundari: Gorajonra, Jonra, Loeongjonra, [2] Naguri: Jondra, [2] Noth-west Provinces: Barajuar, Bhutta, Junri, Maka, Makka, [2] Persian: Bajri Gaudumemakkah, [2] Philippines: Borona, Maiz, [2] Punjab: Barajuar, Chhale, Juar, Kukri, Kuthi, Mak, Makai, [2] Rajputana: Mukka, [2] Roumanian: Porumb, [2] Russian: Kukuruva, Mais-; [2] Sanskrit: Kandaja, Mahakaya, Makaya, samputantastha, Shikhalu, Yavanala, [2] Santal: Jondra, [2] Sarakhala: Makai, Maki, [2] Shahrig: Badagharjuari, [2] Sind: Barajuar, Makkai, [2] Sinhalese: Bada iringu, [2] South-Africa: mealies, [2] Suto: poone, [2] Tamil: Makkasholam, [2] Telugu: Makkazonnalu, Mokkajanna, Toba: Makai, [2] Tongking: Bap ngo, Lua ngo, [2] Twi: Aburow, [2] Unani: Makkaa, Zurraa Makkaa, [5] Urdu: Maka

FIG. 1: *ZEA MAYS* LINN. , SILK (STYLE)

Botanical Description of Plant: Tall, stout, annual grasses with large leaves, the axils of the lower bearing the female inflorescence (cobs), are tightly enveloped by large membranous bracts. Sexes in different inflorescences on the same plant. The male inflorescence is terminal or panicled Spike-like recemes with 2-nate spikelets, shortly unequally pedicelled or one sessile on the

inarticulate rhachis, both similar, 2-flowered, awnless. Glumes subequal, membranous, convex, obscurely 2-keeled, 9-10 nerved. Valves more or less hyaline, 3-5 nerved; valvules similar 2-nerved, obscurely keeled; lodicules 2 –fleshy. Stamens 3; anthers linear. Female Spikelets 2-nate in 4-11 longitudinal rows, slightly immersed in the spongy axis of the cob, with a lower baren and an upper fertile floret, awnless. Glumes similar, very broad, fleshy below, hyaline above, nerveless, ciliate. Lower valve resembling the glumes, but shorter and ciliate, with or without a similar but smaller valvule; upper valve similar to the lower with avalvule about as long as the ovary. Lodicules. ovary obliquely ovoid. Style very long, 2-fid at the tip, papillose upwards, exserted in long silky tassels from the sheathing bracts. Grain large, subglobulose or dorsally more or less flattened, surrounded by the dried up glumes valves and valvules; scutellum large, equaling or exceeding 2/3 of the grain [2].

Mizaj: Temperament: Cold Dry [6], Hot: Dry in 2nd degree [7, 8, 9].

Chemical Constituents:

Corn Silk: Phenolics and terpenoids, polysaccharides and glycoproteins, fixed and volatile oils, tannins. Potassium _ Major chlorogenic acid: 4-O-caffeoylquinic acid (4-CQA), 5-O-caffeoylquinic acid (5-CQA) and p-coumaroylquinic acid (p-CQA).10 phenolic compounds: proteins, vitamins, carbohydrates, calcium, potassium, magnesium and sodium salts, and steroids such as sitosterol and stigmasterol, alkaloids, and saponins [11] C-glycosylflavone-maysin, 6 C-glycosylated derivatives of chrysoeriol, apigenin, Sorbitol [12]

Root: 3-galactosideo-cyanidol coumarate, 2-(2-hydroxy 7-methoxy-1, 4-benzoxazin-3-one)-β -D-glucoside [13].

Pharmacological Action as per Unani Literature: Muhallil (Anti-inflammatory), Mudir-e-Bowl (Diuretic), Mufatte hiss at (Lithtontroptic), Astringent (Qabiz), Muhallil Balgham (Resolvent of phlegm humour), *etc.* [14, 9, 15, 16, 15, 8, 9, 15, 17, 18]

Therapeutic uses: Anal fissure (Shuqaq al-Maq‘ad), Intestinal ulcer (Quruh alAm‘a’), Kidney stone (Hasah wa Raml al-Kulya), Renal diseases. [8, 9, 14, 15, 16, 17, 18, 19] asthma (Zeeq-un-Nafs), hypertension (Zaghtuddam Qawi), cystitis (Waram-e-Masana), edema (Waram), Diuretic, Prostate disorders and urinary tract infections (Tadiya Majr-e-baul), as well as bed wetting (Boul-Fil-Farash) and Obesity Saman-e- Mufrat [10]. *Zea mays*-In the traditional system of medicine, maize is found to be effective as an; analgesic (Musakkin), astringent (Qabiz), anti allergic, emollient, against skin rashes, against sore throat (Khushunat-e-Halaq), against Biliousness, in urinary disorders including dysuria, cystitis (Waram masana), Urethritis, in nocturnal enuresis (Boul fil farash), as an anti-angina (Vaja-ul-Qalb), anti-hypertensive (Zaghtuddam Qawi), anti-lithiasis, (Hissat-e-masana) anti diarrheal_(Ishaal), anti dysentery (Zaheer pechish), anti tumor, anti prostatitis, anti gonorrhoeal (Suzak) *etc.* [20]

Food Uses: Corn silk is listed as a natural source of food flavouring (aligery N_2) this category includes that corn silk can be added to foodstuff and in small quantities, with a possible elimination of an active principle (as yet unspecified) in the final product. In the U.S.A. corn silk is listed as GRAS (generally regarded as safe). The fruits are classified as category N1 with no restriction on their use. Corn oil and flour are commonly used in cooking [21].

Doses: 5-10 Gram, Muzir (Adverse effect): Qabiz (Astringent), Nifaq (Flatulent), Saqeel (heavy) [8, 9, 16, 17, 8, 9].

Musleh Correctives: Dar-e-Hald and Digestive drugs [8, 9], Badal (Substitute): Jadwar [9].

Reported Adverse Effect and Toxicity: Allergic reactions including contact dermatitis and urticaria have been documented for corn silk as its pollen and starch derived from corn silk. Corn starch is considered to be a known allergen. The toxicity of a methanol in the soluble fraction of an aqueous corn silk extract has been reported to be low in rabbits. The effective intra-venous dose for a diuretic action was documented as 1.5 mg/Kg body weight compared to the lethal intra-venous doses of 250 mg/Kg. Corn silk contains an unidentified toxic principle and is located as being capable of producing a cyanogenetic compound [22,23].

Contraindications: Cornsilk may cause an allergic reaction in susceptible individuals. Excessive doses

may interfere with hypoglycemic drug therapy (*in-vivo* hypoglycemic activity has been documented) or with hypertensive or hypotensive therapy (*in-vivo* hypotension activity reported), and prolong use may result in hypokalaemic because of the diuretic action. Corn silk has been documented to stimulate uterine contraction in the rabbit. In view of this, doses of corn silk greatly exceeding the amount used in foods should be taken during pregnancy and lactation [23, 24].

Reported Pharmacological Activity of Stigma of *Zea Mays*: In animal study Corn silk is stated to possess cholinergic diuretic, hypoglycemic and hypotensive activities in laboratory animal [23]. Utilizing aqueous extracts, a methanolin-soluble fraction has been reported to exhibit diuretic activity in rabbits [21]. and an isolated crystalline component has been documented to stimulate uterine contraction in the rabbit. The latter two actions were thought to involve a cholinergic mechanism. The action of corn silk extract on experimental periodentalysis in hamsters has been documented [25]. Cryptoxanthin is stated to possess vitamin A activity, and tannins are known to possess astringent properties [21]. Human studies have stated that aqueous extract is strongly diuretic in humans and that clinical studies have indicated corn silk to be effective in kidney and other diseases [2, 14, 21].

Antibacterial Activity: Saleh RH *et al.* of study *Zea mays* L. hair extract exhibited strong antibacterial activities toward bacteria. The dealing of bacteria with the extract show inhibition of bacterial adherence. Gram positive bacteria including *S. aurous*, *S. saprophytic* us, *S. epidermidis*, *S. pneumonia*, *S. progenies*, *S. agalactia*, *S. mutants*, *E. feacalis* and gram negative bacteria including *S. typhi*, *K. pneumonia*, *E. coli*, Serratia spp *etc* [26].

Antimicrobial Activity: Nessa F. *et. al.,* study antimicrobial activities of different solvent extracts of corn silk, it can be seen that extracts exhibited wider range of antimicrobial activity, petroleum ether and methanol extracts were more active than chloroform extracts. The difference in activities of extracts can be ascribed to their different chemical constituents. Therefore, it can be concluded that extracts of corn silk can protect the body from different disease condition related to the pathogenic organisms, twelve pathogenic bacteria such as *Bacillus cereus*, *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Enterobacter aerogenase*, *Salmonella typhi*, *Salmonella paratyphi*, *E. coli*, *Shigella sonneii*, *Shigella flexneri*, *Proteus vulgaris*, *Proteus mirabilis*, *Candida albicans* [27].

Antidepressant Activity: Jude E Okokon *et al.*, study, the husk extract possesses significant anti-depressant activity, which is due to its rich phenolic content. It will be interesting to isolate and characterize the active ingredient in this extract [28].

Antidiabetic and Hypolipidemic Activities: Okokon JE *et al.*, study husk extract and fractions further lowered the serum lipids levels with increased HDL-cholesterol level in the treated diabetic rats. Histology of the pancreas revealed absence or reductions in pathological signs in the treated diabetic rats [29]. Wang KJ *et al.* studied the antioxidant capacity of corn silk, ethyl acetate fraction and n-butanol fraction exhibited anti-oxidant activity and strongest scavenging activity against DPPH and hydroxyl radicals and also *in-vitro* anti-diabetic activity by inhibition of α-amylase and α-glucosidase enzymatic assays. Also displayed nephropathy activity by significant inhibition of production of Col IV, FN and IL-6 in high-glucose stimulated mesangial cells at 200 μg/mL [30] Cornsilk extract on HFD / STZ-induced diabetic C56BL/6J mice displayed a significant reduction in fasting blood glucose level FBG and enhanced glucose tolerance with the reduction in TC, TG, LDL-C, and increased HDL-C and also prevented liver tissue morphological change in T2DM [31].

Antioxidant Activity: The obtained data highlight the abundance of bioactive compounds, primarily esters of hydroxycinnamic acids and luteolin derivatives, in corn silks. Corn silks at the silking stage are much more suitable for use as a source of phenolic compounds than silks at the R4 dough stage, as well as *Mentha piperita* and *Ginkgo biloba*. Following of green tea and *Melissa officinalis*, pinky silk of ZP 341 hybrid had the highest content of total phenolic compounds. According to our results, there were no significant differences between corn silks at the silking stage

and medicinal herbs for average antioxidant activity. Due to their high antioxidant activity, our research indicates a possibility to apply corn silks extract or tea in the therapy of diseases caused by oxidative stress. In addition to tea, corn silk could be novel and a potent source of natural antioxidants used as dietary supplements, as well as ingredients for functional foods. Our research also confirms the high level of potassium in corn silk which is associated with its diuretic effect. In contrast to the fresh silk, silk at the R4 dough stage is much more suitable for use as a source of micro- and macro-minerals [32].

Hepatoprotective Activity: *Zea mays* L. (Poaceae) used traditionally by the Ibibios of Southern Nigeria to treat stomach ulcer, malaria, inflammatory diseases and as an antidote, was evaluated for hepatoprotective properties against experimentally-induced liver injuries to ascertain the folkloric claim of its usefulness in the treatment of poisoning. The husk extract of *Zea mays* (187-748 mg/kg) was investigated for hepatoprotective potential against carbon tetrachloride (CCl4)-induced liver injuries in rats. Assays of liver function parameters as well as his to the pathological study of the liver were used to assess HEPA to protective activities of husk extract.

Administration of the husk extract (187-748 mg/kg) caused significant ($p < 0.05$-0.001) reductions in the levels of liver biomarker enzymes (ALT, AST, and ALP), direct and total bilirubin and elevation of serum level of total protein in all the models. The effects were dose-dependent in most cases. Histology of the liver sections of extract and silymarin-treated animals showed reductions in the pathological features compared to the organotoxic-treated animals. The chemical pathological changes were consistent with his to pathological observations suggesting marked hepa to protective potentials. The results showed that husk extract of *Zea mays* has hepa to protective potentials against injurious agents which may be due to the activities of its phytochemical components [33].

Antimalarial and Antipyretic Activity: To evaluate the antiplasmodial and antipyretic activities of *Z. mays* L. (Family- Poacae) cornsilk extract and fractions, to ascertain the folkloric claim of its anti-malarial and antipyretic activities. The cornsilk extract (170-510 mg/kg) and fractions (hexane, dichloromethane, ethyl acetate and methanol; 340 mg/kg) were investigated for suppressive, prophylactic and curative anti-plasmodial activities against chloroquine-sensitive Plasmodium berghei infections in Swiss albino mice and for antipyretic activity against D-amphetamine, 2, 4-dinitrophenol and yeast-induced pyrexia. chloroquine (5 mg/kg) and pyrimethamine (1.2 mg/kg) were used as positive controls for anti-plasmodial models and Acetyl salicylic acid, ASA, (100 mg/kg) was used as standard for antipyretic models.

Thin films made from the tail blood of each mouse were used to assess the level of parasitemia of the mice. The extract/fractions progressively reduced parasitemia induced by chloroquine-sensitive *P. berghei* infection in prophylactic (46.16-86.80%), suppressive (48.59-71.95%), and curative (22.4–82.34%) models in mice. These reductions were statistically significant ($p<0.01$–0.001). They also improved significantly ($p<0.01$–0.001) the mean survival time (MST) from 18.91 to 23.66 d in suppressive, 17.33 to 28.00 in prophylactic, and 20.25 to 26.75 d in curative models relative to control (13.75 d). The activities of extract/fractions were comparable to that of the standard drugs used (pyrimethamine) in the prophylactic model only. The extract exerted prominent inhibition of pyrexia on amphetamine, dinitrophenol, and yeast-induced pyrexia (5 h). Inhibition was significant ($p<0.05$–0.001) from 2 to 5 h post-administration of extract and in a dose-dependent fashion. The plant may possess antiplasmodial and antipyretic effects which may in part be mediated through the chemical constituents of the plant [34].

Analgesic and Anti-inflammatory Activity: The extract (170-520 mg/kg) inhibited inflammation and pains caused by different phlogistic agents used in a dose-dependent fashion.

The various degree of inhibitions was statistically significant ($p < 0.05$, 0.01, 0.001), though incomparable to that of the standard drugs used (ASA and indomethacin). The GC-MS revealed the presence of polyunsaturated fatty acids and phenolic compounds, which may be responsible for the observed activities of the extract [35].

Anticancer Activity: Reported study focuses on the ability of the different extracts (aqueous, methanol, and chloroform) of the leaves of *Zea mays* in influencing the process of apoptosis induced by hydrogen peroxide (H_2O_2) in Hep2 (laryngeal carcinoma) cells. Various apoptosis-related parameters, such as cell viability, morphological changes, nuclear changes, and apoptotic index were characterized. sulforhodamine B and MTT assays were used to quantify the extent of cell death in the group exposed to H_2O_2, plant extracts, and their combination. Treatment with H_2O_2 caused cytotoxicity in cancer cells. The administration of leaf extract also caused an increase in the death of cancer cells. Oxidatively stressed cancer cells co-treated with all the *Z. mays* leaf extracts (except the chloroform extract) demonstrated cytotoxicity on a par with the H_2O_2-treated groups. This indicated that the aqueous and methanol leaf extracts did not influence the cytotoxic action of H_2O_2 in the cancer cells. Thus, various apoptosis-related events in Hep2 cells exposed to leaf extract throw light on the potential anticancer activity of the *Z. mays* leaves.

The maximum activity was exerted by the methanolic extract followed by the aqueous and chloroform extracts Tao H studied that S1, a crude polysaccharide from corn silk, can significantly inhibit pancreatic cancer cell proliferation *in-vitro* and *in-vivo*. The study also reveals that S1 can induce pancreatic cancer cell apoptosis, arrest the cell cycle in S phase and impede pancreatic cancer cell migration and invasion. S1 may block the EGFR/PI3K/AKT/CREB signaling pathway to exert its anti-pancreatic cancer activity [36, 37].

Diuretic and Kaliuresis Effect: D.V.O. Velazquez *et al.* studied *Zea mays* L. extracts modify glomerular function and urinary potassium excretion in conscious rats. The CS aqueous extract showed kaliuresis effects (K+ urinary excretion) at doses of 350 mg/kg body wt. (100.42 µEq/5 h/100 g body wt.) and 500 mg/kg body wt. (94.97 µEq/5 h/100 g body wt.) While, diuresis (urinary volume) increase was observed at a dose of 500 mg/kg body wt. (1.98 mL/5 h/100 g body wt.) compared to its water control ($p < 0.05$). The effect of urine volume, sodium, potassium, uric acid excretions, and glomerular and proximal tubular function *via* creatinine and lithium clearance was studied at 500 mg/kg body wt. dose of CS extract. The potassium excretion is significantly increased (0.2289 µEq/min/100 g body wt.) but there is no change in urine volume, sodium, lithium, and uric acid excretions [38].

Lithotripic Activity: Cornsilk infusion has diuretic activity and lithotriptic activity. Corn silk infusion has the activity of dissolve of Ca renal salt stone. After using of corn silk infusion, increase in Ca level in urine volume of 24 h. The levels of Ca dissolved in the infuse of 2%, 4%, 6%, 8% and 10%, respectively, were 2.2600 µg/ml, 5.5733 µg/ml, 7.9267 µg/ml, 10.9233 µg/ml, and 8.7667 µg/ml [39].

Anti Hypertensive Activity: HTN can lead to heart disease, stroke, and death and is a major global health concern. Corn silk tea has many benefits to human health, such as decreasing inflammation, reducing edema, improving obesity and lowering BP. Recently, there has been a focus on the role that CS can play in the treatment of hypertension. [40] Corn silk tea (boiling water extract) significantly reduced systolic blood pressure in spontaneously hypertensive rats and inhibited the ACE activity. ACE inhibitor phytopeptide identified in corn silk was CSBp5 [41].

Anti-fatigue Activity: The anti-fatigue activities of CS were investigated using swimming exercises in mice orally administered with 100 and 400 mg/kg of flavonoids CS (FCS) for 14 days. The swimming times of the FCS treated group was increased by 39.6% (100 mg/kg) and 115.9% (400 mg/kg) compared to the control group. The results indicated that FCS can sustain exercise for longer periods and has significant anti-fatigue activity in mice [11].

Nephrotoxicity Reduction Activity: Nephro-toxicity is one of the most common kidney problems and occurs when body is exposed to chemical or biological products that are injected, ingested, inhaled or absorbed that causes damage to kidney. The uses of CS methanol extract (80%) at concentrations of 200 and 300 mg/kg showed a significant decrease of serum creatinine levels of 0.55 and 0.58 mg/dL, respectively, in GM-induced nephrotoxicity. This indicates a reduction in GM-induced nephrotoxicity [42].

Neuroprotective Activity: To evaluate the Neuroprotective Activity of corn silk ethyl acetate (EtOAc) and ethanol extract (EtOH) from four corn varieties (var. intendata, indurata, everta and saccharata) was investigated by measuring acetylcholine esterase (AChE) and butrylcholin esterase (BChE) inhibition. AChE and BChE are enzymes that break down the neuron transmitter acetylcholine. The EtOAc extract of var. Intendata (200 µg/mL) had the highest AChE inhibition (96.69%), while at the same concentration, EtOAc extract of var. Everta exhibited the highest BChE inhibition (41.46%). High inhibition of AChE by EtOAc extract of CS showed that CS extracts have a potential effect on neuroprotective activity [43].

Anti-obesity Activity: Cornsilk extracts (CSEs) can be a good drug in the prevention of obesity due to anti-adipogenesis and lipolysis induction activity in biofunctional phytocompound of sweet and waxy corn *viz*. quercetin glucoside, p-coumaric acid, ferulic acid, gallic acid, and derivatives [44].

The study conducted by Lee CW *et al.* to investigate anti-obesity effects of maysin, a major flavonoid of corn silk, *in-vitro* and *in-vivo* using 3T3-L1 preadipocyte cells and C57BL/6 mice, decreased the levels of intracellular lipid droplets and triglycerides (TG) and down-regulated the protein expression levels of C/EBP-β, C/EBP-α, PPAR-γ and a P2 in 3T3-L1 preadipocyte cells. Maysin in a dose of 25 mg/kg body weight displayed a decrease in weight gain and epididymal fat weight in high-fat diet (HFD)-fed C57BL/6 mice with a reduction in serum levels of TG, total cholesterol, LDL-cholesterol, and glucose [45].

Improvement in Benign Prostatic Hyperplasia: Cornsilk extract in Wistar rats experimental group in which BPH was induced through injection of testosterone and corn silk extract treatment group displayed improved BPH symptoms by inhibiting the mRNA expression of 5α-R2 and decreasing the amount of 5α-R2, DHT, and PSA in serum and prostate tissue [46].

Effect of Dietary Corn Silk Extract on Ultraviolet B-induced Skin Damage: Ultraviolet B (UVB) irradiation causes unpleasant effects on skin health. Flavonoids and other bioactive compounds may prevent skin photo-aging through antioxidant and anti-inflammatory effects. The study showed that Cornsilk (CS) extract treatment and UVB irradiation in HaCaT cells showed the same results in Nrf2 and NF-κB target genes. An LC-MS/MS analysis displayed the presence of anti-oxidants CS extract may reduce UVB-induced skin damage [47].

DISCUSSION AND CONCLUSION: The review explores Zea mays Lin's pharmacological, phytochemical, and therapeutic properties. The review clearly revealed immense beneficial pharmacological activities in the drug.

Many pharmacological activities mentioned in Unani medicine are validated and many activities need further exploration due to the immense therapeutic scope in this drug.

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