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THE COMPREHENSIVE REVIEW OF PUMPKIN SEEDS: A REVIEW

PRANALI S. KAPGATE, SHUBHANGI B. AURASE, SHRADDHA PIMPALKAR, VAIBHAV R. GARG

[1]STUDENT, [2]STUDENT, [3]STUDENT, [4]GUIDE

BACHELOR OF PHARMACY,

GONDIA COLLAGE OF PHARMACY, CHULOD ROAD, GONDIA, INDIA.

Abstract: Pumpkin belonging to the family Cucurbitaceae is a perennial plant and is consumed traditionally in a variety of foods such as fresh or cooked vegetables, as well as being stored frozen or canned. In some areas seeds are utilized as uncooked, cooked or roasted, although simply for the domestic purpose. Pumpkin seeds are in great demand for there pharmacological effect. Pumpkin seeds oil also confers many health benefit. Several types of unsaturated fatty acid are the dominant component in pumpkin seeds which can play a role in the disease prevention and promote health. Undoubtedly pumpkin seed are quite beneficial but still untapped potential of this seed is yet to be explored.

Keywords: Pumpkin seed oil, *Cucurbitaceace*, antioxidant, anthelmintic, pumkin seed.

1) INTRODUCTION

Pumpkin (Cucurbita) belongs to the family Cucurbitaceae generally grown in the regions of the globe as a vegetable. These are grown-up in the tropical and sub-tropical regions and including the cucumbers and squash. Worldwide there are three types of the pumpkins are present name as"Cucurbita pepo","Cucurbita maxima" and"Cucurbita moschata". For the purpose of vegetable and medicinal pumpkins are grown throughout world. In many countries the pumpkin has been conventionally used as remedy like China, Pakistan, India, Yugoslavia, Argentina, Mexican regions, America and Brazil. [1].

The pumpkin seeds are utilized for the cure of different diseases the herbal remedies separately or combine with medicines are used for the medical treatments The pumpkin is the one of the famous edible plant that is utilized as the cure of many disorders due to the occurrence of many edible components and phytochemicals. [3].

In USA, the pumpkins immensely used for the thanks giving feats and cravings. The majority of the plant flora is processed into caned pumpkins. On the other hand, the considerable oval, flat shaped seeds are generally discarded as an agriculture residue. The pumpkin seeds are unique in flavored and nutty in taste and consumed salted and roasted as a snack in few regions of Mexico, Canada, United States Chinaand Europe! Nowadays, these pumpkin seeds are selling as fermented, sprouted, baked, concentrated form of protein from pumpkins and pumpkin protein isolate, as the pumpkin seeds are rich in iron, protein, manganese, magnesium, zinc, potassium, copper, phosphorous, PUFA (polyunsaturated fatty acid), c-tocopherol and carotenoids. There is an emergent interest in unique formation of vegetable oil, and oil of the pumpkin seedsisa hopeful aspirant on this regard. Steam distillation or Cold pressis done for oil extraction. The dark greenish red colored pumpkin seed oil is used for cooking, marinade and dressing of salad. It is being utilized in many chocolates, epicurean delight, cereal bars, bread, cakes, soups, pesto, muffin, pasta garnish and garnish of stew. The butter of pumpkin seeds is taken into consideration as a marvelous peanut butter alternative.[2]

The many food shops of United State such as Walmart, Costco and Trader Joe, promote numerous food products primarily based on pumpkin seeds, like vegetable salad, granola chunks, breads, quinoa salad, tortilla chips and cookies. The Australia, Serbia, Hungary and Slovenia produced the maximum pumpkin seeds oil. The fame of the pumpkin seeds and pumpkin seeds oil is increasing day by day in many countries in the world that is a gathering momentum slowly but surely [4].

The importance of utilization of pumpkin seeds and iron fortified ready to eat cereal as two dietary iron sources was studied and check the iron nutritional status of women at reproductive age. The 8 healthy women, non- pregnant or unmarried, 20-37 years old provide them ready to eat cereal 30 gram and pumpkin seeds 30 gram for 4 weeks. The pars, blood Specimens were collected on 20 day of menstruation period of before and after utilization of seeds and cereal and hematological index such as Hb, Fe, Hematocrit, Ferritin, TIBC (Total iron binding capacity) and transferrin were found. The response for iron level was better after consumption period. The results indicated that other sources of iron can improve iron status such as pumpkin seeds.Research on pumpkin increase progressively during the last decade ,especially focusing on its health benefits. Pubmed recorded more than 200 papers within 2007-2018 of pumpkin and it's covering on the field of chemistry, biology, pharmacology, and health. Among those of the researches, pumpkin seeds become the focus of interest due to it's complexity of the chemical ingredients as well as the health benefits. Pumpkin seeds are highly nutritional and rich Neutraceutical components such as unsaturated fatty acids especially palmitic acid, stearic acid, oleic acid and linoleic acid.[5]

Those essential fatty acids are belonging to the w-6 and w-3 family which exert amazing Neutraceutical functions and play important roles in many metabolic pathways.[8] phytoestrogen supplementation with pumpkin seeds extract has been reported to increase uterine weigh, mammary glands, bone density, and prevent hyperlipidemia, the indication of estrogen-like activities in ovariectomized female Sprague dawley rats.[6]

2) HISTORY

The oldest evidence of Cucurbita pepo are pumpkin fragments found in Mexico that are dated between 7,000 and 5,500 BC. Pumpkins and other squash species, alongside maize and beans, feature in the Three Sisters method of companion planting practiced by many North American indigenous societies. However ,larger modern pumpkin cultivars are typically excluded, as their weight may damage the other crops.[7] Within decades after Europeans began colonizing North America, illustrations of pumpkins similar to the modern cultivars Small Sugar pumpkin and Connecticut Field pumpkin were published in Europe.

Few horticultural crops signal the arrival of autumn more so than pumpkin. This fall, millions of Americans will make an annual pilgrimage to a retail outlet to purchase a vegetable they (unfortunately) are very unlikely to eat. While many people through out the world use pumpkin as a staple in their daily diet, in the United States this colourful member ofthe Cucurbitaceae (gourd) family is used primarily for decoration. Halloween and Thanksgiving just would not be complete without pumpkins to add a festive air to the observation of these two events. October is an appropriate month to take a closer look at this fall favourite.

Pumpkin derived its name from the Greek word "pepon" which ,literally interpreted, means "largemelon". The French word for "pepon" was "pompon" and the English changed the latter to "pumpion". American colonists are credited with changing "pumpion" to "pumpkin", the name which still is associated with this vegetable.

Pumpkin is somewhat of a generic name assigned to several members of the genus Curcubita. They include C. maxima, C. moschata and C. pepo. The names pumpkin and winter squash commonly are used for all of these species also. However ,most authorities place the large, orange fruit sold for autumn decoration in the species C. maxima, and assign winter squash as a common name to the other two species. Interestingly, the canned product sold for making pumpkin pies actually is C. moschata, a species of winter squash.

3) BOTANICAL DESCRIPTION

Fig no.1 Pumpkin and Pumpkin Seeds

3.1) Taxonomic classification

- Kingdom : *plantae–planets,planta,vegetal plant*
- Subkingdom : viridiplantae
- Division : *magnoliopyt*a
- Super division : tracheophyta- vascularplant
- Sub division : spermatophytia-seed plant
- Class : magnoliopsida
- Super order : rosanae
- Order : cucurbitales
- Family : cucurbitaceae
- Genus : cucurbita
- Relative species : *C.pepo,C.maxima,C.Moschata.*

3.2) Vernacular name

- English : pumpkin
- Hindi : kaddu
- Marathi : kohla
- French : citrouille,courge,courgette,patission
- Latin : peponem
- Sanskrit : kusmandaka

3.3) Description of pumpkin seeds

Fig no. 2 Dried pumpkin seeds in husks.

A pumpkin seed, also known in North America as apepita (from the Mexican Spanish: pepita de calabaza, "little seed of squash"), is the edible seed of a pumpkin or certain other cultivars of squash. The seeds are typically flat and asymmetrically oval, have a white outer husk, and are light green in colours after the husk is removed. Some pumpkin cultivars are huskless, and are grown only for their edible seed.[8]The seeds are nutrient- and calorie-rich, with an especially high content of fat (particularly linoleic acid and oleic acid), protein, dietary fiber, and numerous micronutrients. Pumpkin seed can refer either to the hulled kernel or unhulled whole seed, and most commonly refers to the roasted end product used as a snack.

4) NUTRITIONAL COMPOSITION

With the global production of 27 million metric tons annually, pumpkin is one of the well- studied disease- preventing vegetables. Currently, the interest of public and health professionals towards the importance of functional foods in the prevention of diseases is gaining its grounds. Pumpkin seeds are densely packed with valuable functional nutrients. While nutrients in the pumpkin seeds serve as the principal metabolites that sustain life, functional ingredients in the seeds play key roles in disease prevention and health promotion in human beings.[9]

The nutritional composition of the pumpkin seeds is summarized in Table no. 1.

Table No. 1. Nutritional Composition

Nutrient	Nutritional value Dry Basis	Wet Basis
Moisture(mg)	56.74	6.96
Ash(mg)	3.54	3.47
Energy(kJ)	311.54	-
Carbohydrate(mg)	5.18	-
Total sugars(mg)	9.73	1.15
Protein(mg)	21.31	40.00

The seeds are rich in potassium (K) and relatively lower in sodium (Na), high in calcium (Ca), manganese (Mn), phosphorus (P), and magnesium (Mg). Pumpkin seeds are also good source of trace elements such as zinc(Zn) ,iron(Fe), not to mention copper(Cu). Minerals such as Zn, Cu, Mn, and Fe possess antioxidant potential hence serve as cofactors of vital anti oxidation- dependant biocatalyst . Similarly, the low sodium and high potassium contents in the pumpkin seeds translate to a significant clinical implication for improving cardiovascular health. Zinc is essential in male reproduction, structural proteins and cellular protection. These mineral concentrations may, therefore, make pumpkin seed a useful ingredient for food fortification, at least for bakery products.

4.1) Fattyacids

Principal fatty acids in pumpkin seed oil (PSO) are linoleic, oleic, stearic and palmitic that cover more than 95% of total fatty acids and about 75% of which are unsaturated fatty acids (UFAs). Small concentrations of arachidic and linolenic acid have also been reported. Fatty acidprofile of the PSO is presented in **Table 2.**

Table No. 2. Fatty Acids

Nutrient	Nutritional value
Capric acid(C10:0)	0.45
Lauric acid(C12:0)	1.34
Myristic acid(C14:0)	0.01–0.20
Palmitic acid(C16:0)	1.57–27.78
Stearic acid(C18:0)	0.78–13.46
Oleic acid(C18:1)	2.93-42.80
Linoleic acid(C18:2)	4.59-69.12
Linolenic acid(C18:3)	0.20-2.25
Palmitoleic (C16:1)	0.13-0.20
Arachidic acid(C20:0)	0.30-2.20

The unsaturated fatty acids have been extensively studied due to their protective effect against cardio vascular diseases. They are important for healthy growth and development of brain and nervous system, respectively; also they are reported to have health benefits in the amelioration of coronary heart diseases, hypertension and arthritis. not to mention inflammation, autoimmune-related disorders and cancer. Moreover, only two fatty acids are known to be essential for humans,linoleic and alpha-linolenic acids, because they cannot be synthesized in the human body and must, therefore, be supplied through diet. Pumpkin seed is high in crude protein, roughly 35%, and this translates to a significant and different amount of amino acids.

4.2) Amino acids

Amino acids play important roles both as building units of proteins and as intermediates in metabolism. The dietary supply of adequate quantity and quality essential amino acids is equally important for physiological functions in human body. [10] The amino acid composition of pumpkin seed's protein is given in the Table No. 3

Table No 3. Amino acid

Nutrient	Nutritional value
Alanine	0.74-6.9
Arginine	1.70-3.10
Aspartic acid	2.05-2.70
Cysteine	0.40-6.40
Glutamicacid	3.50-3.73
Glycine	1.50-6.80
Histidine	0.80-3.00
Isoleucine	0.81-4.90
Leucine	2.30-12.20
Lysine	1.50-4.00

Studies show that protein isolates from pumpkin seed resemble those of soybean with high values of bioavailability of amino acids. the globulin's structure of pumpkin seeds' protein is analogous to that of legume seeds. This pose an important note because this nutritional similarity may provide an approval of the pumpkin seed protein as a reliable ingredient in formulating nutritious food recipes, hence ameliorating the damaging effects linked to protein malnutrition facing the susceptible communities. Furthermore, protein isolates of pumpkin seeds have promising anti oxidative and chelating properties.

4.3) Phenolic Compound

The pumpkin seed oil has been reported as a good source of phenolic compounds thus attracting considerable attention to researchers due to their promising health benefits to humans. Phenolic compounds form a wide group of compounds synthesized as the secondary metabolic products in plants possessing key antioxidant properties. Thanks to the presence of a hydroxyl functional group that possesses radical scavengingabilitymakingitsuitableforreducingtherisk of some oxidation - induced degenerative diseases.[11]

Table No 4. Phenolic Compound

Nutrient	Nutritional value
Protocatechuic acid	3.66
Luteolin	1.98
p-Hydroxybenzoic acid	15.96
Vanillic acid	0.62-6.66
Caffeic acid	1.01-12.20
Ferulic acid	0.18-7.05
Vanillin	2.61
Trans-p-Coumaric	1.82
Tyrosol	17.69
Syringic acid	0.36

Studies found that dominant phenolic compounds in the pumpkin seeds are tyrosol, vanillin, p-hydroxybenzoic, caffeic, ferulic, andvanillic acids; and some small amounts of luteolin, protocatechuic, trans-p-coumaric and syringic acids. Nevertheless, the direct antioxidizing potential could be compromised by their low bioavailability. This is because phenolics are susceptible to metabolic Transformation to form complexes and some other simple compounds. These complexes are less effective than the parent compounds, due to blocking of the phenolic hydroxyl groups responsible for its antioxidizing role. Additionally, the lower aqueous solubility of the phenolic is reportedly contributing to their limited bioavailability. This problem could be solved by micro or nano-encapsulation of the PSO or PSE to impede its functional loss. Encapsulation of these bioactive is believed to keep their bioactivities against oxidation, metabolic influences and other destructive reactions within the digestive system and cellular components. This effective delivery system is not only limited to the phenolics but UFAS, tocopherols and other phytochemicals as well.

4.4) Vitamin E

Pumpkin seeds are also a good source of vitamin E. This vitamin in the seeds includes four tocopherol and tocotrienol isomers. Their only isomeric difference lies in the number and position of the methyl groups of the chromanol ring. Nevertheless, only one isomer (d-RRR-a-tocopherol) qualifies the criteria ofbeing a real vitamin E.While sunlight is aneffective trigger of synthesis of vitamin E in the human body, yet many plant species are good sources of the vitamin. Pumpkin seed, for example, is rich in tocopherols with y – tocopherol being the dominant isomer trailed by a- and 8-tocopherols.

Table No 5.Vitamin E

Nutrient	Nutritional value
α-Tocopherol	2.04-253.00
B-Tocopherol	5.4
y-Tocopherol	97.15-893.00
8-Tocopherol	2.32-22.5
a-Tocotrienol	15.5
y-Tocotrienol	145

It also contains small amount of a-tocotrienol, ß- and y-tocotrienols. Tocopherols and tocotrienols in pumpkin seeds are powerful antioxidants with the ability to deactivate highly- active radicals by releasing H+ ion from its ring. In so doing, they keep cell's lipids from peroxidation hence reduced risk of oxidative threats. Tocopherols may also serve as prooxidants and decrease some quantity of transition metals in the tissues. The mechanism for the action is, however, highly dependent on the tocopherol levels. In spite of the central role of tocopherols in plants being that of antioxidant, non-antioxidant functions have been delineated.

4.5) Phytosteroles

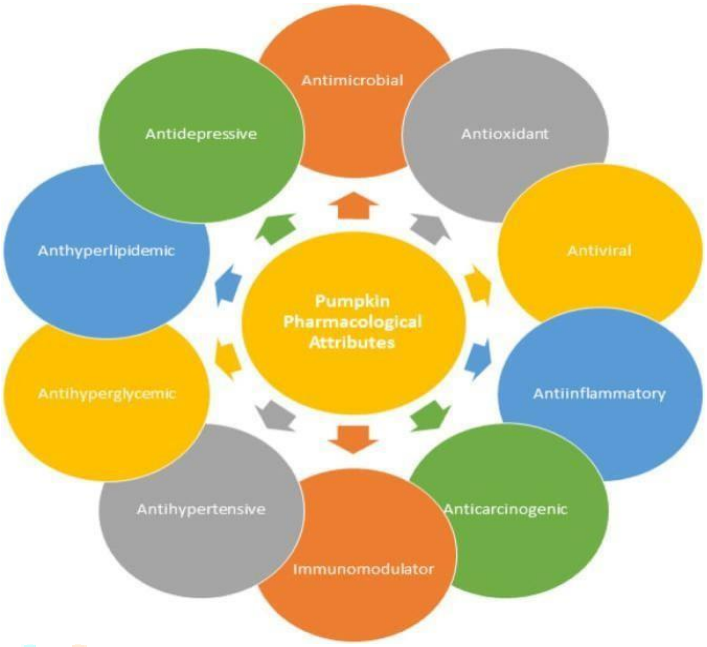
Pumpkin seeds and PSO are valuable source of phytosterols .Although there are more than 100 different types of phytosterols identified in plant species, the dominant phytosterols reported in PSO are A7-sterols, contrary to most vegetable oils. This dominancy is succeeded by sitosterol, A7,22,25-stigmastatrienol, A7-stigmastenol, spinasterol.[12] **Table No 6.**

Table No 6.Phytosteroles

Nutrient	Nutritional value
Desmosterol	86.7
Campesterol	2.56-53.35
Campestanol	2.91
Brassicasterol	10.67
Stigmasterol	38.7-134.83
Cholesterol	7.76-12.88
24-methylenecholesterol	2.43
B-Sitosterol	12.8-100.00
Spinasterol	26.81-745.00
A7,22,25-Stigmastatrienol	26.24-815.00

Phytosterols have been intensively and extensively studied for their lowering effects of blood low-density-lipoprotein cholesterols ,which then translate to a reduced risk of cardiovascular threats. Moreover, a number of studies have concluded that phytosterols lower the risk of some forms of cancers , and ameliorate the treatment of prostate complications. This level of phytosterols in the pumpkin seed make it a suitable alternative nutraceutical in the management of some non-communicable diseases in human. [13]

5) PHARMACOLOGICAL ACTIVITIES



5.1) ANTI-CANCER EFFECT

The rapidly prevailing health problem is the cancer. There is a biggest challenge for the investigators, professionals and researchers to select preventive and therapeutics strategies to prevent and cure the cancer. There are many fruits and vegetables have been found to minimize the risk factor of the cancer. The diet having high amount of pumpkin seeds have been identified asloweringthecancerrisks.Thepumpkinseedsoilhasbeenfoundtoreducetherisksofcanceras it contained the high amount of the various carotenoid's pigments .The Gossell William and colleagues determine the role of oil of pumpkin seeds in chemical (testosterone) induced hyperplasia rats. The rats were feed with pumpkin seeds oil and corn oil during the hyperplasia inductionfortheduration oftwentydays.Atthe21stdaytheprostatewasweightafterkilledand analyzed. They were found that the increased prostate growth inhibition occurred in rats that were served with oil of pumpkin seeds (2mg per 100g). The protecting effects of the oil of pumpkin seeds were more considerable at high dose. The result of research study develops the hope for cancer management.

Hong and colleagues have been conducted a double-blinded place control randomized trial on hyperplasia patients. The task continued for 3 month they observed that symptoms and signs of the cancer have been decreased and also improved overall quality of life of the people . There was a food frequency developed and group of women vulnerable to cancer was fed with pumpkin seeds and sunflower seeds. At the end of the period of consumption and study it was concluded that the pumpkin seeds and sunflower seeds are associated with significantly postmenopausal risks of breast cancer.[15]

5.2) ANTI-OXIDANT EFFECT

Pumpkin seeds oil has been proven to contain high antioxidant vitamins like tocopherol and carotenoid by several studies along with sufficient oxidative stability. In vivo experiment was conducted by Bardaa et. al using the cutaneous wound healing rats and revealed that oil from pumpkin seeds extracted by cold pressure was better in macroscopic, morphometric and histological data of rat skin than the untreated group. The potent antioxidant effect and protective activity against genotoxic chemicals of pumpkin seeds has performed by Elfiky . Those findings have been consistently and strongly demonstrated that pumpkin seeds oil was accepted as Antioxidant and free radical scavenger .observed that treatment with pumpkin seeds oil decreased free radicals and was helpful for arthritis. In addition,reported that extract of pumpkin seeds exhibited antioxidant and genoprotective effects. Overall, the high amount of tocopherol present in the pumpkin seeds might be considered as playing a protective role against toxic substances and free radicals

5.3) ANTI-MICROBIAL EFFECT

The major cause of deaths of many people is the bacteria, parasites, viruses and fungi that develop many diseases and lead to death despites of the hygienic environment and foods The pumpkin seed oil contains the components that are antimicrobial components and have been isolated from oil of pumpkin seeds. The oil of pumpkin seeds at the concentration of the 2% inhibit the growth of Aeromonas veronii, Candida albicans, Enterociccus feacalis, Escherichia coli, Salmonella enterica, Typhimurium, and Staphylococcus .

The basic protein of pumpkin seeds MAP2, MAP11 and MAP4 had been explored to stop the yeast cell's growth. Among all basic proteins the MAP11 showed the more inhibitory effects than other proteins. The MAP2 and MAP4 did not inhibit the growth of the G-ve (gram negative) bacteria Escherichia coli . Moreover, it has been reported that from pumpkin seeds the phloem exudates having the anti-fungal properties and inhibit the pathogenic fungus. Park and his colleagues isolated the new protein known as pr-1 protein form pumpkin seeds that have anti- fungal potential with no toxicity in human erythrocytes (RBCs). It is the heat stable protein and stable at 70°C temperature without its growth inhibiting activity towards E. Coli and Staphylococcus bacterial

5.4) ANTI-DIABETIC EFFECTS

The diabetes mellitus is the one of the most prevailing affecting all aged people. The diabetes mellitus is the disorder of metabolic system in which the body does not construct the enough in insulin or insulin produce but body do not repose properly to insulin. Type I diabetes and Type II diabetes are the two main types of the diabetes. There are many researches that stated that pumpkin seeds and pumpkin contained the components that lower the blood glucose level. Many diabetic people avoid the pumpkin use because of high carbohydrate content while there is no threat from pumpkin consumption. It has been determined that the hypoglycemic and antioxidant effects of pumpkin seeds and flax seeds combination in diabetic rats. The characteristics of histopathological alterations have 'CAT (Chloramphenicol acetyltransferase), GSH(Growth stimulatinghormone)and SOD (superoxidedismutase)and decreased MDA (malondi aldehyde And antioxidant enzyme).The increasing glucose ,overall lipid, triglycerides and overall Cholesterol in plasma were substantially unresponsive. It has been determined that oil of pumpkin seeds food regimen decrease the elevated level of the enzymes alanine aminotransferase (ALT) in plasma and a spartate amino transferase that reverse the risks of diabetes occurrence, It is consumed in normal food may be useful for the diabetes prevention and complications of diabetes.

5.5) ANTI-DEPRESSANT EFFECT

Depression is a common illness that involves episodes of suppressed psychosocial functioning and diminishes quality of life with such symptoms as disturbed sleep and appetite, reduced concentration, excessive guilt and sometimes suicidal thoughts . Practically, detection, diagnosis, and management of depression usually pose some notable challenges to psychotherapists due to its unpredictable presentations, prognosis, and variable response to treatment. In 2001, over 4 million people reportedly had depression-related problems; and in 2008, depression was ranked as the third cause of global burden of disease and is now projected to rank first by 2030 . Unless effective and immediate measures are taken, depression would claim many lives.Some plants have been reported to possess antidepressant compounds. Recently, La Chance and Ramseypro filed the antidepressant foods and reported that pumpkin seeds had an antidepressant food score (AFS) of 47%. This means that the pumpkin seeds possess antidepressant potential. Another study examined the activity of pumpkin seed extracts (PSE) through forced-swimming and tail-suspension tests compared with imipriamine- standard drug in rats. The study concluded that pumpkin seeds possess significant anti depressive potential. Though the mode of action of PSE is still blurred, Hibbeln and Eby and Eby linked the antidepressant effect to tryptophan (an essential amino acid) and 5-hydroxytryptophan (a tryptophan intermediate metabolite in the formation of the neuro- transmitter serotonin), both being promoted as remedy for

depression. Furthermore, researches focusing on animal and clinical trials are needed to reveal and affirm the ameliorative effect of pumpkin seed on depression. There is a limited source of information on the potential of pumpkin seed in this area.

5.6) ANTHELMINTIC EFFECTS

Gastrointestinal parasites are serious pathogens in humans and animals .Intestinal helminthes, in particular, are known to be highly rampant in global populations ,with more than 3.5 billion people being infected annually .Helminthic infections are widely distributed in East Asia ,the Americas ,China, and sub-Saharan Africa .In fact about 32 African countries had high- risk areas with a prevalence of over 50%. The helminth problem may impose huge health and socioe-conomic burden in the community. While there is low and selective deworming coverage for prevention of geohelminthes using available synthetic anthelmintics in the developing countries, studies report a growing resistance to these drugs in helminths in both humans and animals. Effective anthelmintics are then necessary to combat this deadly pandemic health problem. To resolve the problem, significant efforts are being put to exploit the naturally- occurring compounds that are produced by plants in helminths' metabolic pathways. There is increasing evidence that pumpkin seeds possess anthelminthic properties on various gastrointestinal nematodes . Pumpkin seed extracts demonstrated lethal activity in Heligmosoides bakeri in infected mice by 80% ,Ascaridia galli in chicken over 65%, Heterakis gallinarum, and Raillietina spp. By 80% and 88% ,respectively, adult Hymenolepis nana in female mice, Pumpkin seed extract induced a significant suppression on the number of adult H. nana worms and their egg production reported that the extract of combined or uncombined pumpkin seeds and areca nut has demonstrated ability to exterminate Taeniasaginata and Taeniasolium. Same researchers stated that the effectiveness of pumpkin seed alone was relatively far better than areca nut alone, although the combined extract was more effective. In another comparative study, pumpkin and papaya seed extracts were evaluated for anthelmintic activity on Pheretima posthuman- earthworms resembling ntestinal roundworms. Both extracts showed anthelmintic effect, but papaya seed extract paralyzed and killed the worm slowly relative to PSE.

5.6) ANTI-CARCINOGENIC EFFECT

It is a significant issue for researchers, investigators, and medical professionals to selecthealth-preventative and therapeutic techniques to prevent and treat cancer disorders since cancer is a problem that is gradually becoming more widespread in the world. Many veggies and fruits contain phytochemicals and nutraceuticals that can reduce the risk of developing cancer. The carotenoid pigments found in pumpkin seeds have been linked to a lower risk of developing cancer.

6) OTHER NEUTRACEUTICAL ROLES AND FUTURE PROSPECTIVE

In addition to thematic nutraceutical functions discussed above, the PSO and PSE showed to possess ameliorative effect on hepato-inflammation and lipotoxicity, healing wounds; high-fat- diet-induced obesity in animal models, and recurrent aphthous stomatitis (RAS) in clinical trials. Although the mode of action of PSO in treatment of RAS is still unclear, the probable mechanism of action is thought to be through its anti-inflammatory and antioxidant activities . Furthermore, Ramak and Mahboubi recorded that PSO had significant anti-androgenic (hair growth promoting) effect than the placebo group they examined while the self-rated improvement score was significantly higher than the placebo group. The inhibitory effect of pumpkin seed oil on androgen in rats is reportedly grounded to its phytosterol and phenolic content . Only a few experimental evidences have provided conclusive statements on the anti-inflammation ,healing, anti-RAS, anti- androgenetic and anti-obese activities of PSO and PSE. Therefore, further studies in these directions are warranted to test and affirm the activity of PSO and PSE in reliable experimental models.

In the recent years, pumpkin seeds have a large range of application as a food or herbal medicine. Those waste streams are valuable and can be utilized for food products and/or nutraceutical products. They can be consumed as a snack, salads or breakfast cereal in the roasted form (salted or not). In addition, they could be used in baking as the excellent ingredients of

bread or cakes. Moreover, their oil is excellent and could gain acceptance as edible oil and additive component in food, pharmaceutical and cosmetic industries. Pumpkin seeds oil is useful for frying, cooking, baking and salad dressing. Supplement from pumpkin seeds could be developed in the form of a soft capsule. In cosmetic industries, they usually use for skincare products such as anti- aging, free-radical scavenging, skin protection and hair care products such as hair growth stimulants and emollients. The consumption of pumpkin seeds in the oil form or roasted pumpkin seeds is proved to exhibit several positive health effects.

7) MARKETED PRODUCT

7.1) Pumpkin seeds oil

Pumpkin seed oil

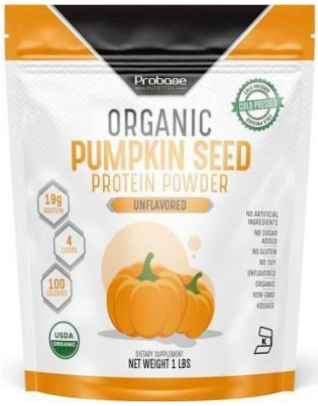
Horbaach pumpkin seeds oil is the perfect beauty oil for your daily routine. Pumpkin seeds is a notorious source of maturity occurring omega fatty acids and other beneficial nutrients. Now This convenient liquid help to moisturize and hydrate hair, skin and nails, leaving you with a long lasting desired glow.

7.2) Pumpkin seeds capsule

Pumpkin seed capsule

In life pumpkin seeds extract capsules contain safe, natural ingredients and is manufactured to high -quality standards . It is an excellent support for prostrate gland And urinary tract issues . It support a regulated bladder and urinary control. Pumpkin seeds are also called pepitas and are natural source of vitamins, minerals and essential fatty acids. Antioxidant present in the pumpkin seeds extract is essential for the regrowth of skin and wound healing. It is required to assist the epithelial cell both externally and internally.

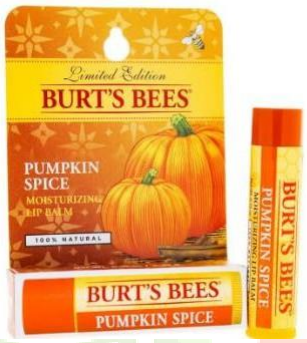
7.3) Pumpkin seeds protein powder



Pumpkin seed protein powder

Pumpkin seeds protein powder is made directly from the teardrop- shaped seeds of the pumpkin plant. While pumpkins as a whole are full of vitamins ,minerals and fibres their seeds are particularly concentrated source of these helpful nutrient.

7.4) Lip balm



Pumpkin seed lip balm

The lip balm is moisturizing, hydrating, and nourishing for dry lips, and is made from natural ingredients. It is free from harmful ingredient like parabens, phthalates, petroleum or SLS and it is not tested on animals.

8) CONCLUSION

The general conclusion of this literature study is that pumpkin seeds have emerging bioactive composition that promote health and human life. All of these finding brings us to the new idea in developing and innovating Neutraceutical, pharmaceutical, and cosmeceuticals products from pumpkin seeds for the large range application.

The pumpkin seeds have nutritional and therapeutic properties as well as these are also served as delicious food in many regions of the globe. The pumpkin seeds is cultivated in tropical and subtropical areas. There are three types are cultivated such as cucurbita Pepo, cucurbita maxima, and cucurbita moschata. The nutrients composition analysis of pumpkin seeds showed that these are very nutritious and provide many essential nutrients for health. However the pumpkin seeds have been used for medicinal purpose and these possess also nutritional and therapeutic value. The pumpkin seeds play a significant role in providing of micronutrients and also used in treatment and management of diabetes, inflammation, hyperlipidaemia, hypertension, cancer management and protect heart etc.

In Pakistan the pumpkin seeds are used for the cultivation and thrown out as a waste. There should be further studies and awareness about their nutritional and therapeutic value so that people make these a part of their daily meal.

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