

Medicinal Importance of *Allium* Species: A current review

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Abstract

Nature is a good friend of human. Plants are serving humanity from hundreds of the years. Herbal/ayurvedic medicines are used for the treatment of several diseases without any harm. *Allium* species are one of the remedial herbs with bioactive parts, that act as medicinal plant and cure diseases, their roots stems leaves and also juices are valuable for human health. *Allium* species like (*Allium cepa*, *Allium sativum*, *Zingiber officinale*) are studied for the treatment of cancer, cardiovascular diseases, inflammation, reducing blood sugar, baldness, gastric ulcer, colic diseases, oxidative damage, etc. These species are evaluated for their total phenolics, flavonoids, antioxidant activity, hepatoprotective and microbial study. Total phenolic content was examined spectrophotometrically with the Folin-Ciocalteu phenol reagent and total antioxidant activity were studied by the ferric reducing antioxidant power (FRAP) and diphenyl picryl hydrazyl (DPPH) methods. Watery and alcoholic concentrates in Pbs subjected to an antibacterial activity test using the agar well diffusion procedure against various contagious pathogenic microorganisms. HPLC and LC-MS/MS demonstrated the nearness of Gallic corrosive, ferulic corrosive, protocatechuic corrosive, kaempferol, curcumin and quercetin content can possibly contribute as a dietary supplement for controlling hyperglycemia, treatment of alopecia areata and oxidative anxiety connected diabetes complexities. The biological activities, chemical characteristics and used in pharmaceuticals are well studied. Some of its major chemical components reported are volatile oils, steroids, diterpinoids, flavonoids and phenolic compounds.

Keywords: *allium*, antioxidant, antibacterial, antifungal, insecticidal, flavonoids, alopecia areata

1. Introduction

Plants are the oldest friends of human beings. They are not only responsible to provide food and shelter, in fact also assist to humanity by averting as well as by treating from different ailments. Basils as well as spices have been proving helpful in different kind of ailments ^[1]. More than 100 herb and shrub species are used universally as vegetables, but only 20 species among them are developed worldwide ^[2]. Plants are to be found significant cradle for energetic natural products which fluctuate extensively in rappers of construction, biological characteristics and mechanism of act. They act as anti-bacterial, anti-oxidant, anti-fungal, anti-carcinogenic, analgesics,

Insecticides and development enhancer ^[3]. Plants are biosynthetic workshops which are responsible for the synthesis of various natural chemical compounds like alkaloids, flavonoids and glycosides that exhibit therapeutic as well as physiological effects. Composites which are to be accounted towards therapeutic belongings of medicine are generally secondary metabolites ^[4, 5]. The economically imperative *Allium spp.* (Onion, Garlic and Ginger) are to be employed globally as medicinal plants, vegetables as well as spices. Conventionally, they also show performance as essential ingredients in our daily food.

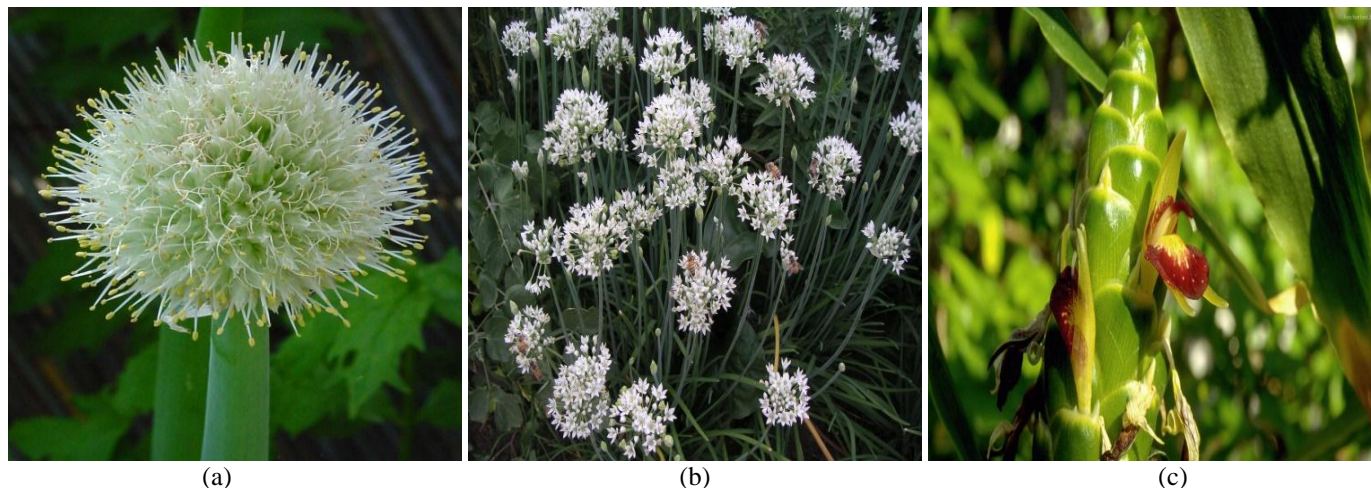


Fig 1: Species of *Allium* Species: *Allium cepa* (a), *Allium sativum* (b), *Zingiber officinale* (c)

They are employed lavishly in several Asian countries to flavor foods [6]. Garlic in Hindi is known as Lahsun. Its botanical name is "*Allium sativum*". Its family name is Liliaceae. As condiments, garlic bulb is castoff. Liquor which is obtained by extraction from the bulb of garlic is also therapeutically too much valuable. Ginger in Hindi is well known by the name Adrak and its name is "*Zingiber officinale*" in botanical world. These outbursts belong to the *Zingiberaceae* family. Species of *Z. officinale* natively belongs to South East Asia that had been employed for many years in China as well as in India. It's a perennial-herb which requires wet places for growing from its rhizome. Its rhizome contains essential oils, oleoresin, gum and starch. It also has tonic effect. It was crumpled to produce nectar that blends with honey which is cast-off as medicine for the treatment of diarrhea as well colic pain. Onion is known with the name Piyaz in Hindi. "*Allium cepa*" is its botanical name and Liliaceae or Alliaceae is its family. Onion bulbs are great source of essential oil that can be extracted from it. Paste of onion bulbs and extracted oil are blend together then practical on wounded parts of the body that deliver reprieve from tenderness. Onion has diuretic, stimulating, as well as expectorant goods [6, 7]. As a consequence, overall onion is also castoff as medication. *Zingiber officinale*, *Allium cepa*, as well as *Allium sativum* are often employed in different kind of medications like Unani as well ayurveda. They contain such chemical constituent's that can prevent the development of microorganisms [7]. Antioxidants play an imperative heroine act that shield against different ailments that affected by oxidant impairment. Antioxidants are those compounds that have ability to hinder the lipids oxidation and have ability to avert or patch-up the damages of oxygen on to the organism's cells. Request for the natural antioxidants is growing day by day to substitute the synthetic additives in the food stuff manufacturing industries. All parts of the higher plant have natural antioxidants in them [8]. *Allium* is the major illustrative of Liliaceae's family includes more than 450 species in it. Onion is an extensively produced in all areas of realm of the biosphere. It is ironic source of proteins, n (CH₂O), Na, K and P [9, 10]. Ginger contains garden-fresh or dehydrated roots of *Zingiber officinale*. In hominids, *Z. officinale* is supposed to deed straight on the stomach system to diminish vomiting. Conventionally, *Z. officinale* had been cast-off to delight the duodenal contaminations particularly that are associated with gastro intestinal complications. Likewise, its antibacterial potential that is active in contradiction of averting plentiful abdominal difficulties that yielded as a consequence of the modification of the duodenal vegetation. This is idyllic to evade the development of soresin stomach by eradicating the *Helicobacterpylori*. *Z. officinale* had capability to eradicate destructive bacteria i.e. *E. coli* that causing vomiting particularly in off springs. Ginger, hence forth would had great effect on the development of *Bacillus cereus* that mostly causes and nausea. Spreading of bacteriological medication confrontation is a world-wide community heal thinness task that damages the effectiveness of anti-microbial mediators. As a result of this, there is found substantial increased illnesses and death rate [11]. Several studies on it have been accompanied in diverse outdated medicinal schemes, for example in Thai traditional medication it is employed to extravagance the skin ailments. In the Indian traditional medication system, the tincture or dec-oction obtained from their leaves was employed for the curing of remittent and intermittent fevers. Juices of onion

(*Allium cepa* L.) and garlic (*Allium sativum*) expenditure for the treatment of alopecia areata patchy, non-scarring hair loss condition [12].

2. Pharmacological potential of *Allium* species

2.1 Antioxidant activities

Zhou [13] *et al.*, (2016) conducted to evaluate moisture transfer and changes of thiosulfates, total phenolic compounds and antioxidant activity of garlic slices during infrared drying at temperatures from 50 to 80 °C and powers from 675 to 2,025 W. Drying time was significantly shortened with increasing infrared drying temperature. Thiosulfates showed no significant changes versus moisture content during the whole drying period at 50 °C, 60 °C and 70 °C, while a notable degradation of thiosulfates was observed at 80 °C. Total phenolic compounds in garlic slices all rapidly decreased versus moisture content initially at all investigated drying conditions. Whereas the total phenolic compounds in dried garlic slices significantly enhanced with drying temperature from 50 to 80 °C at 1,575 W. Antioxidant activity increased during infrared drying, which was contradictory with the changes of total phenolic compounds and thiosulfates.

Kim [14], (2016) was reported that ultraviolet (UV) irradiation generates reactive oxygen species (ROS) in the cells, which induces the cellular senescence and photo-aging. The present study investigated the protective effects of garlic on photo-damage and cellular senescence in UVB-exposed human keratinocytes, HaCaT cells. An in vitro cell free system was used to examine the scavenging activity of 2, 2-diphenyl-1-picrylhydrazyl (DPPH) free radicals and nitric oxide (NO). The effect of garlic extract on ROS formation, MMP-1 protein and mRNA expressions, cytokines such as interleukin (IL)-1 β and IL-6, senescence associated- β -galactosidase (SA- β -gal) activity, and silent information regulator T1 (SIRT1) activity were determined in UVB-irradiated HaCaT cells. Garlic exhibited strong DPPH radical and NO scavenging activity in cell free system exhibiting IC₅₀ values of 2.50 mg/mL and 4.38 mg/mL, respectively. Garlic pretreatment attenuated the production of UVB-induced intracellular ROS. MMP-1 level, which has been known to be induced by ROS, was dramatically elevated by UVB irradiation, and UVB-induced MMP-1 mRNA and protein expressions were significantly reduced by garlic treatment (50 μ g/mL) comparable to those of UV-unexposed control cells. UV-induced pro-inflammatory cytokine productions (IL-6 and IL-1 β) were significantly inhibited by pretreatment with garlic in a dose-dependent manner. SA- β -gal activity, a classical biomarker of cellular senescence, and SIRT1 activity, which has attracted attention as an anti-aging factor in recent years, were ameliorated by garlic treatment in UV-irradiated HaCaT cells. The present study provides the first evidence of garlic inhibiting UVB-induced photoaging as a result of augmentation of cellular senescence in HaCaT human keratinocytes.

Lisanti [15] *et al.*, (2016) were determined the total antioxidant activity (TAC) may vary considerably between onion cultivars. Immunological effects of onion phenolic compounds are still underestimated. The objective of this study is to determine the total phenol content (TPC) and the relative TAC of three *Allium cepa* L. (*Liliaceae*) onion cultivars cultivated in Cannara (Italy): Rossa di Toscana, Borettana di Rovato, and Dorata di Parma, and to evaluate the phenol extracts ability to induce human immune cell proliferation. TPC was determined by the Folin-

Ciocalteu method, TAC with FRAP, TEAC/ABTS, and DPPH methods. Peripheral blood mononuclear cells from healthy human donors were incubated for 24 h at 37 °C with 1 ng/mL of phenolic extract in PBS, immune stained, and then analyzed by 4-color flow cytometry for the phenotypic characterization of T helper cells (CD4+ cells), cytotoxic T lymphocytes (CD8+ cells), T regulatory cells (CD25high CD4+ cells), and natural killer cells/monocytes (CD16+ cells). *Rossa di Toscana* displayed the highest TPC (6.61 ± 0.87 mg GA equivalents/g onion bulb DW) and the highest TAC with the experienced methods: FRAP, 9.19 ± 2.54 μmol Trolox equivalents/g onion bulb DW; TEAC/ABTS, 21.31 ± 0.41 μmol Trolox equivalents/g onion bulb DW; DPPH, 22.90 ± 0.01 μmol Trolox equivalents/g onion bulb DW. Incubation with *Rossa di Toscana* extract determined an increase in the frequency of the antitumor/anti-infection NK CD16+ immune cells (23.0 ± 0.4%). Content of health-promoting phenols and the deriving antioxidant and immune stimulating activity vary considerably among the investigated cultivars. *Rossa di Toscana* can be considered as a potential functional food.

Nurwantoro^[16] *et al.*, (2015) has reported the cell fortifications limit of garlic associated in burger fat. Garlic's cell support's determination has the results in water submersion around 53, 66%. The study used a completely randomized verifiably diagram with 5x5 factorial. The essential component was the level of beat garlic (0, 3, 6, 9 and 12% in w/w) then the second variable for limit time (3, 6, 9 and 12 days) at refrigeration temperature (3-5 °C). Thiobarbituric destructive worth (TBA) and meat fat level rate were surveyed. Garlic crushed could decrease the level rate of meat fat and log stick the extending TBA values in the midst of limit at cooler temperature.

Kyoung^[17] *et al.*, (2014) revealed that to get prepared Onion (*Allium cepa* L.) peels were evacuated by ethanol, breaking point water and subcritical water (SW) extraction and their malignancy counteractive action operator activities were surveyed. Extraction yields of SW extraction were 4-fold higher than ethanol extraction. In any case, the ethanol extraction extended the total phenolics substance (327.5 mg GAE/g concentrate) and flavonoids substance (183.95 mg QE/g discrete) in the onion peel expel. The onion peels malignancy aversion specialist practices directed by ferric thiocyanate test than those by high temp water extraction and SW extraction at 165°C. Tumor avoidance specialist activity of onion peel separate by SW extraction at 110°C resembled that of ethanol extraction. HPLC profiles revealed that SW extraction at lower temperature (110°C) extended the meeting of quercetin. These results displayed that the onion peel removes conveyed by SW extraction framework have magnificent potential as a hotspot for important malignancy counteractive action operator.

Sharma^[18] *et al.*, (2014) were determined onion is undoubtedly one of the major sources of flavonoids. However, there exists a varietal difference in composition, concentration and beneficial activities of onion, on the basis of cultivars, day length sensitivity/ripening and types. To characterize such differences, 18 onion cultivars from Korean were evaluated for their total phenolic, flavonoids and antioxidant activity. Simultaneous quantification of quercetin, quercetin-3, 4'-O-diglucoside, quercetin-4'-O-monoglucoside and isorhamnetin-3-glucoside was made in methanol and 75% ethanol. Total phenolic content was examined spectrophotometrically with the Folin-Ciocalteu phenol reagent and total antioxidant activity were studied by the ferric reducing antioxidant power (FRAP) and diphenyl picryl

hydrazyl (DPPH) methods. The cultivar 'Sun-power' showed the highest level of total phenolic [5016 ± 30.0 μg Gallic acid equivalents g(-1) dry weight (DW)] and flavonoids (2873.95 ± 60.01 μg Q g(-1) DW) among the 18 cultivars in methanol. However, there were fewer total phenolic and flavonoids in ethanol extracts. The antioxidant activity for cultivar Sun-power was highest in ethanol extracts 24.12 ± 1.00 and 16.13 ± 0.35 μmol L(-1) Trolox equivalents g(-1) DW with FRAP and DPPH, respectively. Among the 18 cultivars, Sun-power is the most promising in terms of total phenolics, total flavonoids and antioxidant activity. Our results suggest that day length sensitivity/ripening among the cultivars do not play any significant role for high values of total phenolics, flavonoids and antioxidant activity.

Kallel^[19] *et al.*, (2014) reported the extraction technique of polyphenols from the currently orchestrated garlic husk (GH) using unmistakable pondered solvents (water, methanol, ethanol and half liquid courses of action of methanol and ethanol). The most important extraction yield was proficient with water (26.5%) and high bioactive potential was showed up by the examples evacuated with 50/50 methanol/water (25mg GAEs/g dry GH, 0.617mg QE/g dry GH, IC50 = 0.26 mg/mL for DPPH look at, RP 0.5AU - 2.8mg/mL for diminishing power, and IC50 - 0.45 mg/mL for hydroxyl radical measure). Each one of the concentrates indicated antimicrobial development against Gram-positive microorganisms, when associated at different obsessions (1–10mg/mL). Only 50/50 methanol/water and aggregate methanol expels impeded the advancement of *Pseudomonas aeruginosa* and *Klebsiella pneumonia*. These fascinating natural properties could be credited to the major perceived Phenolic blends, for instance, Caffeic, p-coumaric, Ferulic and Di-Ferulic acids. With this strategy, the GH waste polyphenols could be used as an unobtrusive wellspring of trademark blends, with potential applications in the support and prosperity divisions.

Ashwini^[20] *et al.*, (2013) evaluated the phytochemical portions and growth counteractive action operator ability of methanolic and hydrophilic gathers isolated from in *vivo* and in *vitro* social orders of onion combinations of Bellary and CO₃. Phytochemical parts like total flavonoids, phenolics, ascorbic destructive and anthocyanins were researched. The malignancy avoidance operator activities were broke down by DPPH and FRAP methods. The results demonstrated that the both the methanolic isolates showed radical seeking activity. The DPPH scrounging activity in Bellary and CO₃ onion groupings reached out from 6.5% - 11.8% while FRAP values kept running from 0.9-3.3 μM/100 μg FW. The total anthocyanins reached out from 9.9-29.9 mg/kg, vitamin-C 48.6-78.6 mg/kg, full scale phenolics and flavonoids substance was 15.7-34.7 mg/g GAE and 0.65-1.17 mg/g separately. Liberal measures of anthocyanins, phenols, flavonoids and ascorbic destructive were seen in both the combinations. Our study revealed that the possible segment of the natural activities in onion could be a direct result of the free radical scavenging and growth counteractive action specialist works out. The polyphenols present in the onion handles may be responsible for these valuable activities. This concentrate obviously displayed that both the onion groupings have uncommonly trademark tumor avoidance operator potential that will help us in keeping awesome prosperity.

Cheng^[21] *et al.*, (2013) contemplated the aggregate polyphenols (TP), flavonoid, proanthocyanidin (PAC) substance, and cancer

prevention agent limit of both onion varieties (red and yellow) were thought about. The substance of TP, flavonoids, and PAC was controlled by Folin-Ciocalteu colorimetric technique, AlCl_3 , and by DMAC colorimetric strategy, individually. The outcomes demonstrated that the substance of TP and flavonoids diminished from the external to the internal layers in both onions, yet there was no huge distinction in PAC content. The external layers had the most noteworthy cancer prevention agent action of concentrates took after by a constant diminishing towards the internal layers in both assortments. The substance of Phenolic acids and flavonoids were measured by HPLC. Gallic corrosive, ferulic corrosive, and quercetin, as the primary mixes in polyphenols, were recognized in every layer of both onions. The red assortment demonstrated preferable cell reinforcement movement over yellow onion as per the linoleic corrosive framework and DPPH measure. The higher substance of TP and flavonoids were connected with higher cancer prevention agent movement.

Panpatil ^[22] *et al.*, (2013) reported the spices like turmeric, ginger, Alliums are essential for the arranging of our consistently sustenance and are represented to have blends, which have varied important natural impacts furthermore keep the microbial waste of nourishment. This study assesses the cancer prevention agent and antimicrobial movement of zest concentrates, for example, ginger, turmeric and garlic by 2, 2'-Diphenyl-1-picrylhydrazyl (DPPH) Radical Scavenging Method furthermore to assess their antimicrobial impacts by Slant strategy. The cell reinforcement exercises when thought about among ginger, turmeric and garlic the strength of these flavors was observed to be in the request of Vitamin C > Ginger > Turmeric \geq Dry garlic > Fresh garlic. The antimicrobial action of these flavors was observed to be in the request of Turmeric > Ginger > Garlic. The study demonstrates that the flavors like ginger, garlic and turmeric have antimicrobial and cancer prevention agent action. Further studies are expected to examine the organic impacts of cancer prevention agent rich herbs and flavors on oxidative anxiety related sicknesses.

Lee ^[23] *et al.*, (2011) evaluated the antimicrobial and antioxidative impacts of the onion peels separate arranged by means of the subcritical water extraction (SWE) technique. To begin with, the quantity of cells treated with the concentrate was lessened by 0.7–1.1 log CFU/mL contrasted and the control. The SWE separate indicated 76.08% rummaging action and it was more compelling than butylated hydroxytoluene (BHT) at 61.3 ppm in lipid peroxidation inhibitory impacts. Also, the antioxidative impact of SWE concentrate measured through the ferric thiocyanate (FTC) strategy was 2-overlay that of BHT. The consequences of this study propose that the onion peels remove arranged by means of the SWE strategy may have potential option antimicrobial and antioxidative impacts as utilitarian substances.

Hala ^[8] *et al.*, (2011) considered the concentrates of ten palatable plants (flavors: cumin, stew, pepper, nutmeg, garlic, cloves, ginger, coriander, onion and thyme) were tried as extract ants of aggregate polyphenols, cell reinforcement exercises. Cell reinforcement exercises of the concentrates were assessed by 1, 1-diphenyl-2-picryl-hydrazyl (DPPH) examine and a β -carotene fading test. Methanol concentrate of cloves demonstrated the most elevated aggregate phenolics content (171.8 mg garlic corrosive counterparts/100 g dry weight cloves powder). All out cancer prevention agent exercises of the ten flavors dictated by radical searching (DPPH) were run from

(26.19-85.31%). The cancer prevention agent movement by β -carotene-lenoleic corrosive were extended from (36.55-85.43%). Methanol concentrate of cloves demonstrated the most elevated cancer prevention agent action by DPPH of β -carotene-lenoleic corrosive strategies were (85.31, 85.43% individually).

Lu ^[24] *et al.*, (2011) reported the aggregate phenolic content (TPC) and aggregate cancer prevention agent limit (TAC) of four onion assortments (red, white, yellow and sweet) and shallot from chose areas (Washington, Idaho, Oregon, Texas and Georgia) were resolved utilizing Fourier change infrared (FT-IR) spectroscopy (4000–400 cm^{-1}). The Folin-Ciocalteu (F-C) examine was utilized to measure TPC and three tests were utilized to decide TAC, including 2,2-diphenyl-picrylhydrazyl (DPPH) test, Trolox proportional cell reinforcement limit (TEAC) test and ferric diminishing cancer prevention agent power (FRAP) test. Fractional minimum squares relapse (PLSR) with cross-acceptance (forget one) was led on onion and shallot extricates (n = 200) and their relating F-C, DPPH, TEAC and FRAP qualities were utilized to acquire four free adjustment models for anticipating TPC and TAC for the concentrates. Spectra from an additional 19 free concentrates were utilized as an outer approval set for forecast. A relationship of $r > 0.95$ was gotten between FT-IR anticipated and reference values (by F-C, DPPH, TEAC and FRAP examine) with standard blunders of adjustment (SEC) and standard mistakes of cross-approval (SECV) under 2.85, 0.35 and 0.45 μmol Trolox/g FW of concentrates for TEAC, FRAP and DPPH test, individually; and 0.36 mg gallic corrosive/g FW of concentrates for the F-C test. Also, group investigation (important segment examination (PCA)) and discriminant capacity investigation (DFA) could separate assortments of onions and shallot based upon infrared unearthy components. Stacking plots for the different chemo measurements models showed that hydroxyl and Phenolic useful gatherings were most firmly related with cancer prevention agent limit. The utilization of mid-infrared spectroscopy to anticipate the aggregate cancer prevention agent limit of vegetables gives a quick and exact contrasting option to conventional wet science investigation.

Kim ^[25] *et al.*, (2010) assessed all out phenolics, phenolic profile, and oxygen radical absorbance limit (ORAC) of onion (*Allium cepa* L.). The inhibitory action of onion concentrates against porcine pancreatic α -amylase and rodent intestinal α -glucosidase was additionally examined. Ethyl liquor concentrate of onion skin had the most elevated α -glucosidase inhibitory action, ORAC esteem and aggregate phenolic content, trailed by water concentrate of skin, ethyl liquor concentrate of mash, and water concentrate of mash. The α -glucosidase inhibitory action of the concentrates was contrasted with chose particular phenolics distinguished in the concentrates utilizing elite fluid chromatography (HPLC). Quercetin, a noteworthy phenolic compound in onion separate had high α -glucosidase inhibitory movement. The α -glucosidase inhibitory movement of the onion removes connected to the phenolic substance and cell reinforcement action of the concentrates. These outcomes recommend that onion which has high quercetin content can possibly contribute as a dietary supplement for controlling hyperglycemia and oxidative anxiety connected diabetes complexities.

Prakash ^[9] *et al.*, (2007) researched four (red, violet, white and green) assortments of *Allium cepa* were examined for their

aggregate phenolic substance (TPC), cancer prevention agent (AOA) and free radical rummaging exercises (FRSA). The TPC shifted from 4.6 to 74.1 mg/g GAE, AOA fluctuated from 13.6% to 84.1% and FRSA indicated wide range as far as IC₅₀ (inhibitory focus) from 0.1 to 15.2 mg/ml, EC₅₀ (effective fixation) from 4.3 to 660.8 mg/mg and ARP (antiradical power) from 0.15 to 23.2. The external dry layers of red and violet assortments demonstrated better restraint of lipid peroxidation measured by ammonium thiocyanate than α -tocopherol. HPLC and LC-MS/MS demonstrated the nearness of Gallic corrosive, ferulic corrosive, protocatechuic corrosive, quercetin, and kaempferol. The unutilized external layers of the red assortment were a rich wellspring of quercetin (511 μ g/g) with high AOA, FRSA furthermore indicated noteworthy security of DNA harm brought on by free radicals.

Stoilova ^[26] *et al.*, (2007) examined cancer prevention agent impact and the aggregate phenols of ginger concentrates. The aggregate phenols of the liquor concentrate were observed to be 870.1 mg/g dry concentrate. 2, 2-Diphenyl-1-picryl hydrazyl radical (DPPH) searching achieved 90.1% and surpassed that of butylated hydroxytoluene (BHT), the IC₅₀ fixation for hindrance of DPPH was 0.64 μ g/ml. The cancer prevention agent action in a linoleic corrosive/water emulsion framework controlled by method for thiobarbituric corrosive responsive substances (TBARS) was most elevated at 37 °C – 73.2%, and 71.6% when the arrangement of conjugated dienes was hindered. At 80 °C the cell reinforcement action at the most noteworthy convergence of a ginger concentrate was less proficient: 65.7% for conjugated dienes arrangement and 68.2% for TBARS. The ginger concentrate restrained the hydroxyl radicals 79.6% at 37 °C and 74.8% at 80 °C, which demonstrated a higher cell reinforcement action than quercetin. The IC₅₀ focus for restraining OH at 37 °C was slower than that at 80 °C – 1.90 and 2.78 μ g/ml, separately. The ginger concentrate chelated Fe⁺³ in the arrangement.

Aoyama ^[27] *et al.*, (2007) were assessed Antioxidant action and flavonoid substance of Welsh onion (*Allium fistulosum*) (green-verdant and whites heath assortments) and the impact of warm treatment on them were concentrated on by contrasting and those of onion (*Allium cepa*) (yellow and red assortments). Cancer prevention agent movement was measured by Trolox comparable cell reinforcement limit (TEAC) and ferric diminishing cell reinforcement power (FRAP) tests. The request of these records of cancer prevention agent movement was red onion yellow onion green Welsh onion white Welsh onion. The request of the aggregate flavonoid substance was red onion yellow onion green Welsh onion white Welsh onion. Significant flavonoid of yellow and red onions was quercetin, and that of green Welsh onion was kaempferol. Cancer prevention agent action of green Welsh onion was expanded, yet that of the other three vegetables was diminished amid bubbling for over 15 minutes. Flavonoids in green Welsh onion were less steady than those in the other three vegetables amid the bubbling technique. These outcomes proposed that green Welsh onion, yet not the white one, is strong cancer prevention agent sustenance tantamount to yellow onion, and is a decent wellspring of kaempferol. Expanded cancer prevention agent movement and diminished flavonoid content amid bubbling were attributes of green Welsh onion.

Singha ^[28] *et al.*, (2009) decided cancer prevention agent action, the five concentrates/divisions of red onion peel were examined for their aggregate substance of phenolics (TPC), flavonoids

(TFC), cell reinforcement action (AOA), free radical searching action (FRSA), measured by DPPH radical in the terms of hostile to radical force (ARP) and diminishing force (RP), communicated as ascorbic corrosive reciprocals (ASE)/ml. High TPC (384.7 \pm 5.0 mg GAE/g), TFC (165.2 \pm 3.2 mg QE/g), AOA (97.4 \pm 7.6%), ARP (75.3 \pm 4.5) and RP (1.6 \pm 0.3 ASE/ml) were found for the ethyl acetic acid derivation (EA) division. EA part had especially higher cell reinforcement limit than butylated hydroxytoluene (BHT) in preventive or rummaging limits against FeCl₃-incited lipid peroxidation, protein fracture, hydroxyl (site-particular and non-site-particular), and superoxide anion and nitric oxide radicals. EA division additionally demonstrated measurement subordinate antimutagenic movement by taking after the restraint of tobacco-impelled mutagenicity in *Salmonella typhimurium* strains (TA102) and hydroxyl radical-prompted scratching in plasmid pUC18 DNA. HPLC and MS/MS examination demonstrated the nearness of ferulic, Gallic, protocatechuic acids, quercetin and kaempferol. The substantial measure of polyphenols contained in EA portion may bring about its solid cancer prevention agent and antimutagenic properties. This data demonstrates that EA portion of red onion peel can be utilized as common cell reinforcement as a part of nutraceutical arrangements.

Chung ^[29], (2006) reported that garlic separates, through their cell reinforcement exercises, to give insurance against free radical harm in the body. This study researched cancer prevention agent properties of garlic mixes speaking to the four principle substance classes, alliin, allyl cysteine, allyl disulfide, and allicin, arranged by synthetic amalgamation or sanitization. Alliin rummaged superoxide, while allyl cysteine and allyl disulfide did not respond with superoxide. Allicin stifled the arrangement of superoxide by the xanthine/xanthine oxidase framework, likely by means of a thiol trade instrument. Alliin, allyl cysteine, and allyl disulfide all rummaged hydroxyl radicals; the rate constants computed in light of deoxyribose focused test were 1.4–1.7 \times 10¹⁰, 2.1–2.2 \times 10⁹, and 0.7–1.5 \times 10¹⁰ M⁻¹ second⁻¹, individually. As opposed to past reports, allicin did not show hydroxyl radical searching action in this study. Alliin, allicin, and allyl cysteine did not anticipate affected microsomal lipid peroxidation, but rather both alliin and allyl cysteine was hydroxyl foragers, and allyl disulfide was a lipid peroxidation eliminator. In outline, our discoveries demonstrated that allyl disulfide, alliin, allicin, and allyl cysteine display diverse examples of cell reinforcement exercises as defensive mixes against free radical harm.

2.2 Total cholesterol levels decreasing activity

Schwingshack ^[30] *et al.*, (2016) were determined to gain further insight into the strength of evidence and extent of possible biases in the scope of studies investigating the impact of garlic and garlic supplement intake on biomarkers of cardiovascular disease, we performed an umbrella review of all published meta-analyses synthesizing data from both observational studies and randomized controlled trials. Nine systematic reviews investigated the effects of garlic on lipid parameters and eight systematic reviews analyzed the effects on blood pressure parameters were identified. Eight of nine meta-analyses synthesizing the effect of garlic on blood lipids reported significantly decreased total cholesterol levels. Inconsistent results could be detected for HDL-cholesterol, LDL-cholesterol, and triacylglycerols. The effect of garlic on systolic blood

pressure showed consistent results across publications with 7 out of 8 meta-analyses demonstrating a substantial decrease in systolic blood pressure. Similar results could be reported regarding the effect of garlic on diastolic blood pressure, i.e. 6 out of 8 meta-analyses detected significant reductions in diastolic blood pressure levels following interventions with garlic. According to the data summarized in the present umbrella review, garlic preparations as well as garlic exerted some positive effects on indicators and biomarkers of cardiovascular disease, typically without causing any serious side effects.

2.3 Antimicrobial activities

Amabye^[31], (2015) examined the *in vitro* antibacterial activities of the ethanol concentrate of new leaves of *Allium cepa* (onion) and to choose and measure the phenol blends of the looked into plant parts. Clinical strains of *Streptococcus pneumonia* and ethanol concentrates of the plant species was used for the counter microbial study. 30 grams of the example was pummeled, sieved, and 100 ml ethanol was to be included each filtrate and set for 48 h in a shaker. The ethanol was vanished from the illustration, weighed, and subjected to an antibacterial activity test using the agar scattering procedure. The better liquid chromatography was used than recognize and assess the phenol's concentrates of scrutinized tests. Ethanol concentrate of the scrutinized plant parts showed antibacterial activities against different pathogenic tiny living beings. Leaf concentrates of *Allium cepa* showed the most astonishing antibacterial development and contains more phenols. The ethanol concentrate of the attempted plants could be considered as an alternative wellspring of new antibacterial prescriptions. Hamza^[32], (2015) determined the antimicrobial movement of both watery and oil concentrates of garlic and onion separately and blended *in vitro*. Antimicrobial impacts of oceanic garlic, onion and garlic-onion blend remove then garlic oil, onion oil and garlic-onion oil mix against five Gram-positive and eight Gram-negative microscopic organisms disconnects and one yeast (*Candida albicans*) were resolved. Antimicrobial action of these fluid and oil removes by well-dispersion technique were portrayed by restraint zones of five Gram-positive, eight Gram-negative and one yeast pathogenic microorganisms. All creatures tried were exceedingly delicate to garlic-onion mix (watery and oil separate), then garlic (fluid and oil extricate), while all life forms tried were somewhat touchy to onion (watery and oil remove). Normal flavors of Garlic and Onion (fluid and oil remove) have antimicrobial movement against our regular foes like bacterial and contagious pathogens. Sable^[11] *et al.*, (2014) reported that the antibacterial activity of new (Onion) *Allium cepa* and (Ginger) *Zingiber officinale* juices against multidrug resistance was analyzed using agar well scattering method. The new presses of *Allium cepa* and *Zingiber officinale* have tremendous antibacterial power against multidrug safe microorganisms. Ginger concentrates were obtained using solvents Alcohol and Water. The concentrates were measured for antibacterial development and bacterial advancement deterrent activity. The results exhibited that both the concentrates the watery and alcoholic concentrates have antibacterial development and they furthermore quell bacterial advancement. The results furthermore exhibited that Ginger concentrate possess antibacterial characteristics and would be employed for the cure of bacterial illnesses. Islam^[33] *et al.*, (2014) were surveyed that *Zingiber officinale*

had been employed as naturopathy on account of their potential of antimicrobial development against different microbial pathogens. Likewise, in various countries like Bangladesh, ginger is used as a piece of different foamed support plans. This study was directed to choose the antimicrobial activity of soybean oil concentrate of dried ginger powder, using agar dispersal measure, against 24 isolates (4 of 6 unmistakable sorts) of sustenance borne pathogens including *Escherichia coli*, *Pseudomonas aruginosa*, *Staphylococcus aureus*, *Vibrio cholera*, *Kelbsiella spp.* additionally, *Salmonella spp.* The current research work showed the capable antimicrobial development of the ginger concentrate against the all attempted bacterial pathogens. Soybean oil concentrate of ginger demonstrated most imperative zone of limitation i.e. 11.67 ± 1.53 mm against *Salmonella* spp. besides, negligible zone of impediment (8.0 ± 1.73 mm) against *Escherichia coli*. Ginger focus in like manner exhibited lower zone of limitation (8.67 ± 2.52 mm) against *Staphylococcus aureus* stood out from the Gram-negative minute living beings. Soybean oil accumulate of ginger at percolating temperature has potential antimicrobial activity and could be used as a piece of food status to get the synergistic effect of soybean and ginger.

Anzabi^[34] *et al.*, (2014) revealed the motivation behind this research work that was to evaluate the antibacterial impact of palatable onion plant and various normal anti-infection agents on account of some essential microbes with respect to sustenance cleanliness. The affectability or resistance of standard strains of 9 vital types of transmissible pathogenic microorganisms, through nourishment in research facility Mueller Hinton agar medium and utilizing clear paper circles containing onion separate, 9 standard engineered chemicals, and antimicrobials by agar plate Diffusion strategy (circle dissemination agar), were examined. The discoveries of this study demonstrated that, of the 9 types of microscopic organisms tried, the watery concentrate of Onion just has generally little antibacterial movement on the 2 types of *Staphylococcus aureus* and *Clostridium perfringens*. Measurable examination of the outcomes additionally showed that there was no noteworthy relationship among the distinctive anti-infection agents utilized and the consumable onion fluid concentrate, and the resistance or vulnerability of disconnects. Besides, there was a distinction between various anti-infection agents tried in this study and fluid concentrate of onion, with respect to the quantity of safe microbes, and middle of the road and moderate powerlessness and helplessness to the antibacterial mixes. It appears that the fluid concentrate of onions can't be utilized as another option to normally utilized anti-infection agents to battle imperative microscopic organisms in wording nourishment cleanliness.

Bakht^[35] *et al.*, (2013) reported the investigation of the antimicrobial possibilities of *Allium cepa* uncovered that every one of the concentrates from both new and old examples demonstrated diverse scopes of antimicrobial exercises. Ethyl acetic acid derivation division indicated inhibitory exercises against all the 8 organisms tried including microscopic organisms and a growth. Chloroform took after by butanol portion additionally repressed the action of the considerable number of organisms aside from *Pseudomonas aeruginosa* that was exceptionally safe. Petroleum ether part was viable at both minimum and maximum focus. Ethanol and water sub-divisions were discovered minimum powerful or ineffectual. Among gram positive microorganisms, *Bacillus subtilis* had been found

the most vulnerable microscopic organisms repressed by all concentrates although the most safe gram positive microbes was *Staphylococcus aureus*. *Klebsella pneumoni* and *Erwinia caratovora* were the most vulnerable gram negative microbes while *Salmonella typhi* and *Pseudomonas aeruginosa* were the safest microscopic organisms.

Shinkafi ^[36] et al., (2013) carried out research on antibacterial movement of *Allium cepa*. Two unique concentrates were produced using *Allium cepa* (onion) utilizing refined water. The concentrates incorporate crisp onion concentrate and frosty water separate. Among the two concentrates, new onion removes displayed adversarial impacts on the test life forms running from watched zone of hindrance (normal quality) of 15 mm for *E. coli*, 20 mm for *Streptococcus pyogenes*, 17 mm for *Staphylococcus aureus* and 8 mm for *Streptococcus pneumoniae*. The anti-infection utilized as control was ciprofloxacin with zone of restraint of 17mm for *Streptococcus pneumoniae*, 17 mm for *Escherichia coli*, 19 mm for *Staphylococcus aureus* and 20 mm for *Streptococcus pyogenes* separately. The base inhibitory grouping of the strong onion separates demonstrates positive inhibitory impact when an undiluted concentrates was utilized.

Chang ^[6] et al., (2013) was examined that the concentrates from various tissues of *A. sativum* and *A. fistulosum* also were explored to assess their antimicrobial limit and cancer prevention agent. The most noteworthy yields of the *Allium* concentrates were set up from the extraction of 30% ethanol arrangement. The DPPH rummaging action was the most noteworthy in *A. fistulosum* L. leaves, which IC₅₀ is 14.61 µg·mL⁻¹. The most astounding cancer prevention agent action utilizing TEAC test and aggregate Phenolic substance were seen in *A. sativum* L. stems and *A. fistulosum* L. stems, where they are resolved to be 15.51 mM and 191.04 mg GAE·g⁻¹, and 14.59 mM and 182.60 mg GAE·g⁻¹, individually. Measurement investigation uncovered that the DPPH IC₅₀ worth was altogether corresponded with aggregate Phenolic substance and cancer prevention agent movement utilizing TEAC examine. The concentrates of *A. sativum* L. globules were found to show antimicrobial action against *Staphylococcus aureus* with the MIC and MBC of 0.2 mg·mL⁻¹ and 0.4 mg·mL⁻¹, individually. Moreover, the concentrate of *A. fistulosum* L. stems was more dynamic against *Bacillus subtilis*, with a MIC and MBC of 0.2 and 0.4 mg·mL⁻¹, separately. The inhibitory movement of different *Allium* removes against the test microscopic organisms was more noteworthy than that of 10 µg·mL⁻¹ Allicin. The outcomes showed that *Allium* spp. concentrates could be utilized as a potential wellspring of common cancer prevention agents and antimicrobial specialists.

Eltaweel ^[37], (2013) utilized the methanol and fluid suspensions of the dried *Allium cepa* (*Liliaceae*) knobs concentrate was screened for its hostile to microbial action utilizing the agar-well dispersion strategy. It is tried against Gram-positive microbes (*Staphylococcus aureus*). The suspensions were tried at centralizations of 1, 10, 100 and 1000 µg/ml. All suspensions demonstrated an inhibitory impact against tried microscopic organisms. The most astounding zone of restraint was assessed with the most noteworthy convergence of methanolic suspension (29 mm). The most elevated impact of the watery suspensions came to 23 mm with the grouping of 1000 µg/ml. Alternate fixations either methanolic or fluid demonstrated different inhibitory consequences for the tried microorganisms. Khusro ^[38] et al., (2013) conducted studies to examine the

antibacterial action of ordinarily utilized flavors and vegetables against two new strains secluded from poultry ranch. Both the bacterial strains were observed to be vulnerable against the garlic (*Allium sativum*). Watery concentrates of *Zingiber officinale*, *Allium cepa* and *Momordica charantia* were less successful when contrasted with *Allium sativum*. The strains were impervious to watery concentrates of *Beta vulgaris*. The most extreme zone of restraint was found in *Bacillus licheniformis* strain 018 of 27 mm and 20 mm through Agar well dispersion technique and Agar well dissemination strategy individually against *Allium sativum*. *Bacillus tequilensis* strain ARMATI were delicate to watery concentrates of garlic indicating 18 mm and 17 mm of zone of hindrance through Agar well dispersion and Agar plate dissemination strategy individually. Garlic was discovered more viable against *B. licheniformis* strain 018 contrasted with *B. tequilensis* strain ARMATI. These outcomes propose that *Allium sativum* is a potential flavor for controlling these two bacterial strains.

Yousufi ^[7], (2012) explored that the viability of chloroform, ethanol and fluid concentrates of *A. sativum*, *Z. officinale* and *A. cepa* was recognized against *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Enterococcus faecalis*, *Proteus mirabilis* and *Salmonella* spp. alongside a correlation with an anti-toxin, streptomycin. The strategy embraced in the present study was the Kirby-Bauer technique. The most extreme antimicrobial action was shown by chloroform concentrate of *A. sativum* i.e. 24 mm against *E. coli* though the base antimicrobial action was displayed by watery concentrate of *A. cepa* 0.5 mm against *Enterococcus faecalis*.

Ahmed ^[39] et al., (2012) decided in his study watery concentrate of ginger (*Zingiber officinale*) Roots were utilized for antibacterial action against different Gram-negative and Gram-positive microscopic organisms (*Klebsiella pneumoniae*, *Proteus vulgaris*, *Streptococcus pyogenes* and *Staphylococcus aureus*). Development restraint was assessed by the plate dispersion. Antimicrobial action of ginger concentrate was contrasted and various anti-infection agents (A) that known for their capacity incorporate nalidixic corrosive, trimethoprim, chloromphenicol, gentamicin and erythromycin by utilizing antibiogram test. Antimicrobial action of most recent convergence of ginger was superior to that to Chloromphenicol, Gentamicin against *Klebsiella pneumoniae*, *Proteus vulgaris*, *Streptococcus pyogenes* and *Staphylococcus aureus*.

Mukhtar ^[40] et al., (2012) evaluated a large portion of the flavors utilized every day have been archived to be antimicrobial and have therapeutic worth also. Most microscopic organisms are touchy to the concentrates from plants, for example, clove, garlic, mustard, onion, oregano, turmeric and so forth flavors, for example, garlic turmeric and cinnamon has been utilized as antimicrobial operators as a part of their crude structure for the treatment of wounds and wounds and joint torments and so forth. The present study was directed to examine the antibacterial action of garlic, cinnamon and turmeric. Distinctive convergences of concentrates were prepared by utilizing two solvents water and ethanol. The antibacterial action was tried against *Bacillus subtilis* (DSM 3256) and *E. coli* (ATCC 25922) at various concentrations of concentrates of flavors by utilizing circle dissemination technique. As indicated by the outcomes among the chose flavors garlic had the best inhibitory action demonstrating most extreme zone of 26mm against *Bacillus subtilis* DSM and a zone of 22mm

against *E. coli* ATCC 25922. The fluid concentrates of garlic were more successful than ethanolic remove. On account of cinnamon and turmeric, the ethanolic concentrates were more successful displaying zones of 16mm against *B. subtilis* DSM 3256 and 17 mm against *E. coli*, which demonstrated that the cinnamon ethanolic concentrates are similarly viable against both Gram negative and Gram positive microscopic organisms. The most extensive zones shaped by ethanolic concentrate of turmeric against *B. subtilis* were measured as 14mm and it was 11mm for *E. coli* ATCC 25922. The outcomes demonstrated that *B. subtilis* is more powerless to test flavors when contrasted with *E. coli*.

Ebrahimi^[41] et al., (2012) reported the antibacterial action of onion concentrate on *Streptococcus mutans*, and *Streptococcus sanguinis* was measured by circle dispersion and stock microdilution examines. Positive and negative controls were considered. Vancomycin was utilized as a list for antibacterial movement. The information was measurably dissected by applying Fisher's accurate test. Onion extricates had more antibacterial action against *Streptococcus mutans* than *Streptococcus sanguinis* ($p < 0.002$). The antibacterial action of red onion was more than yellow and green onions ($p < 0.001$). Green onion had the slightest antibacterial movement. As the convergence of the onions expanded, the antibacterial movement likewise indicated increment.

Kyung^[42], (2012) described the antimicrobial activity of *Allium* species has long been recognized, with Allicin, other thiosulfates, and their transformation products having antimicrobial activity. Alliums are inhibitory against all tested microorganisms such as bacteria, fungi, viruses, and parasites. Alliums inhibit multi-drug-resistant microorganisms and often work synergistically with common antimicrobials. Allium-derived antimicrobial compounds inhibit microorganisms by reacting with the sulfhydryl (SH) groups of cellular proteins. It used to be thought that Allicin reacts only with cysteine and not with non-SH amino acids, but evidence has accumulated that Allicin and other thiosulfates also react with non-SH amino acids.

Adeshina^[43] et al., (2011) proclaimed that anti-infection safe microbes are one of the real issues testing the medicinal services framework as a rule. The antibacterial action of new red and white *Allium cepa* (Onion) and *Zingiber officinale* (Ginger) juices against multidrug safe microscopic organisms viz: *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Escherichia coli* and *Salmonella typhi* detached from serving of mixed greens was researched utilizing agar well dispersion and agar weakening techniques. Every one of the microbes aside from *Staphylococcus aureus* were helpless to the new red and white onion juices with the width of zones of hindrance extending from 15 mm–35 mm while the test microscopic organisms separates were not delicate to the new ginger juice. The Minimum Inhibitory Concentration (MIC) and the Minimum Bactericidal Concentration (M. B. C) estimations of the new onion juices against the test microbes were low extending from 3.125% v/v – 25.0% v/v. This study shows that the new squeezes of *Allium cepa* have critical antibacterial strength against multidrug safe microscopic organisms.

Kim^[44] et al., (2011) reported the concentrated on the antimicrobial impacts of an onion peel remove arranged utilizing subcritical water extraction (SWE) were surveyed for conceivable improvement into new bio-useful materials. The extraction temperatures were controlled to 110 and 160°C. At

0.15, 0.3, 0.6, and 1.2 mg remove/mL of soup, the development hindrance and bactericidal action of SWE concentrates against *Bacillus cereus* KCCM 40935 and KCCM 11341 were contrasted and those of ethanol and high temp water separates. On account of *B. cereus* KCCM 40935, it gave the idea that more than 0.6 mg/mL of SWE (110°C) remove applied a bactericidal impact, and 1.2 mg/mL of SWE (160 °C) separate applied a bacteriostatic impact amid refined, furthermore that *B. cereus* KCCM 11341 was more safe than *B. cereus* KCCM 40935. Moreover, our outcomes exhibited that the passing time of 107 CFU/mL of *B. cereus* KCCM 40935 treated with SWE (110°C) separate at 1.2 mg/mL was 60 min at greatest in 0.8% NaCl. Moreover, the cells harmed by SWE concentrate were seen with a SEM. It was proposed that a concentrate of onion peels arranged by means of SWE (110°C) could be utilized as a utilitarian biomaterial for the nourishment or pharmaceutical commercial ventures.

Santas^[45] et al., (2010) reported the cancer prevention agent and antimicrobial movement of the ethyl acetic acid derivation and water sub-fractions of methanolic concentrates of three Spanish onion assortments were measured. Flavonoids were fundamentally present in ethyl acetic acid derivation sub-fraction being 34.92 ± 0.75 , 7.95 ± 0.16 , 0.38 ± 0.01 μmol of rutin eq. g^{-1} D.W. furthermore, its cancer prevention agent limit was 74.86 ± 1.77 , 24.59 ± 0.67 , 4.55 ± 0.44 μmol Trolox g^{-1} D.W. of Grano de Oro, Fuentes de Ebro and Calc, ot de Valls assortments, individually. The antimicrobial action of flavonol models and onion concentrates was assessed against some nourishment spoiler microorganisms. Quercetin and kaempferol were inhibitory against gram positive microscopic organisms, for example, *Bacillus cereus*, *Staphylococcus aureus*, *Micrococcus luteus* and *Listeria monocytogenes*. Gram negative microorganisms *Escherichia coli* and *Pseudomonas aeruginosa* were less sensible to the antimicrobial impact of both flavonol principles and *Candida albicans* was absolutely safe. Among the onion separates tried just ethyl acetic acid derivation sub-fraction demonstrated antimicrobial restraint.

Hannan^[46] et al., (2010) had examined the antimicrobial capability of onion against thirty-three clinical disengages of *Vibrio cholerae*. The concentrate was set up by reflux extraction technique. Antibacterial screening of clinical confines of *V. cholerae* was finished by agar well dissemination strategy. Agar weakening technique was utilized to survey the Minimum Inhibitory Concentration (MIC). Every tried strain of *V. cholerae* was delicate to onion (*Allium cepa*) concentrates of two sorts (purple and yellow). Purple sort of concentrate had MIC scope of 19.2–21.6 mg/ml. The concentrate of yellow sort onion had a MIC scope of 66– 68.4 mg/ml. The outcomes showed that onion (*Allium cepa*) inhibitorily affects *V. cholerae*. Keeping in perspective the counter bacterial movement of this compound can be abused as a remedial operator in a creature model.

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a MIC scope of 66– 68.4 mg/ml. The outcomes showed that onion (*Allium cepa*) inhibitory affects *V. cholera*. Keeping in perspective the counter bacterial movement of this compound can be abused as a remedial operator in a creature model.

Ramos ^[48] *et al.*, (2006) were studied four new quercetin-derived oxidation products (1–4) and lunularin-4-*O*- β -D-glucoside (5) were isolated from a water extract of onion (*Allium cepa*) skin, together with 17 other known compounds. Antibacterial assays for the isolated compounds showed that 2-(3,4-dihydroxyphenyl)-4,6-dihydroxy-2-methoxybenzofuran-3-one (1) presented selective activity against *Helicobacter pylori* strains and 3-(quercetin-8-yl)-2,3-epoxyflavanone (4) showed antibacterial activity against MRSA and *H. pylori* strains at the same time that it increased susceptibility of MRSA to β -lactams. Evaluation of antioxidant activity against DPPH for the isolated compounds showed that the new derivative compounds (1–4) and 2,5,7,3',4'-pentahydroxy-3,4-flavandione (6) are more active than quercetin.

Indu ^[49] *et al.*, (2006) were considered antibacterial movement of concentrates of *Allium sativum* (garlic), *Myristica fragrans* (nutmeg), *Zingiber officinale* (ginger), *Allium cepa* (onion) and *Piper nigrum* (pepper) has been assessed against 20 diverse serogroups of *Escherichia coli*, 8 serotypes of *Salmonella*, *Listeria monocytogenes* and *Aeromonas hydrophila*. Garlic remove indicated amazing antibacterial movement against all the test living beings, aside from *L. monocytogenes*. Nutmeg indicated great hostile to listerial movement, despite the fact that action against *E. coli* and *Salmonella* were serotype subordinate. Both garlic and nutmeg concentrates were successful against *A. hydrophila*. Concentrates of ginger indicated inhibitory movement against two serogroups of *E. coli*: as O8 (enterotoxigenic *E. coli*) and O₈₈ as it were. Concentrates of onion and pepper did not demonstrate any antibacterial movement against the test living beings.

Azu ^[10] *et al.*, (2006) watched that the antimicrobial properties of different concentrates of *Allium cepa* (onions) and *Zingiber officinale* (ginger) against *Escherichia coli*, *Salmonella typhi* and *Bacillus subtilis* that are basic reason for gastrointestinal tract diseases were researched utilizing the cupplate dissemination technique. The outcome got uncovered that ethanolic concentrate of ginger gave the broadest zone of restraint against two out of the three test living beings at the convergence of 0.8gml-1. Be that as it may, *Escherichia coli* and *Salmonella typhi* were more delicate to the concentrate of onion globules contrasted with *Bacillus subtilis* which was transcendently safe. It was additionally watched that the dissolvable of extraction and its shifting fixations influenced the affectability of two of the test life forms to the plant materials. The base inhibitory focus (MIC) of ginger concentrates on the test living beings ran from 0.1gml-1 - 0.2gml-1, demonstrating that ginger was more compelling and delivered amazing inhibitory impact on the two out of the three test life forms when contrasted with the onion separates. This examination demonstrates that, however both plants had antimicrobial exercises on the two gram negative test creatures yet not compelling on the gram positive test living being, ginger had more inhibitory impact therefore affirming their utilization in society drug.

2.4 Antialopecia activity (anti hair fall)

Ornelas ^[50] *et al.*, (2014) studied the alopecia, which is defined as the loss of hair from the body, encompasses a wide range of

hair loss disorders, including alopecia areata and androgenetic alopecia. There is a growing use of botanical sources in dermatology. Accordingly the interest in the use of botanical and natural products for the treatment of alopecia is growing. Here we present a systematic review of natural and botanical products that have been examined as potential treatment options for alopecia. Our results yielded 13 studies that examined 11 different natural and botanical products for the potential treatment of alopecia areata. Studies pertaining to alopecia areata and androgenetic alopecia were found. These results are promising as they signal increasing investigation into the use of natural and botanical products for the treatment of alopecia.

Maluki ^[51] *et al.*, (2009) were reported that alopecia areata is a non-scarring localized hair fall, probably of autoimmune etiology, that responds to treatment with many topically applied irritant substances. Garlic had been known for a long time by its unique chemical composition that has many pharmacological implications. Ten patients complaining of single or multiple patches of alopecia areata on the scalp region (total of 18 patches) were enrolled in this study from July 2006 to July 2007, in the outpatient clinic in Najaf city. All patches were treated by topical garlic extract twice daily, for two months. Re-growth of terminal coarse hairs was evaluated every two weeks. RESULTS: Four females and six males were studied, their ages ranged from 10 – 45 years (mean 27 yrs.). Total of 18 patches of alopecia areata were treated. All patients (100%) responded to this treatment. Hair growth started by the end of second week in eight patches (44.4%), within four weeks in seven patches (38.9%), and within six weeks in three patches (16.7%). Erythema was observed in all patients, in addition to itching in 8 patches (44.4%) and burning sensation in 5 patches (27.7%). Garlic is an efficient and rapid topical treatment for alopecia areata. It is cheap, available and with negligible side effects.

Sharquie ^[52] *et al.*, (2004) Alopecia areata is a patchy, non-scarring hair loss condition. Any hair-bearing surface may be involved, and different modalities of treatment have been used to induce hair regrowth. This study was designed to test the effectiveness of topical crude onion juice in the treatment of patchy alopecia areata in comparison with tap water. The patients were divided into two groups. The first group [onion juice treated] consisted of 23 patients, 16 males (69.5%) and 7 females (30.5%). Their ages ranged between 5-42 years with a mean of 22.7 years. The second group [control; tap-water-treated] consisted of 15 patients, 8 males (53.3%) and 7 females (46.6%). Their ages ranged between 3-35 years with a mean of 18.3 years. The two groups were advised to apply the treatment twice daily for two months. Re-growth of terminal coarse hairs started after two weeks of treatment with crude onion juice. At four weeks, hair re-growth was seen in 17 patients (73.9%), and, at six weeks, the hair re-growth was observed in 20 patients (86.9%) and was significantly higher among males (93.7%) compared to females (71.4%) $P < 0.0001$. In the tap-water treated-control group, hair re-growth was apparent in only 2 patients (13%) at 8 weeks of treatment with no sex difference. The present study showed that the use of crude onion juice gave significantly higher results with regard to hair re-growth than did tap water ($P < 0.0001$), and that it can be an effective topical therapy for patchy alopecia areata.

2.5 Isolation of natural compounds from allium species

Valle ^[53] *et al.*, (2008) had evaluated Garlic (*Allium sativum* L.) and garlic removes have helpful properties that stem from their

sulfur-containing mixes, principally allicin. The fundamental target of this work was to look at routine and "premium" garlic removes as far as yield and quality, with the last being gotten utilizing supercritical carbon dioxide (SC-CO₂) as the dissolvable. Yield ran somewhere around 0.65 and 1.0% and expanded with extraction weight (150-400 bar) at a steady temperature of 50 °C. Extraction temperature (35-60°C), then again, had little impact at a consistent weight of 300 bar. Taking into account yield and quality contemplations, the best extraction conditions utilizing SC-CO₂ were 35-50 °C and 300-400 bar. A yield of 5.5% was gotten by traditional extraction utilizing ethanol as the dissolvable, yet ethanol gave off an impression of being less specific for significant segments than SC-CO₂. The utilization of new garlic brought about concentrates that all the more nearly looked like business items, perhaps due to warm and oxidative debasement of significant miniaturized scale constituents amid drying.

3. Conclusion

It can be concluded that precise miniature exertion had been conceded out for the investigation of pharmaceuticals potential of the plant species. As a result, this review would resolve the inquiries of investigators and will emphasis on the exact activities that are associated with the plant. All over the world, herbal medication embodies its utmost significance as well as reveals its vibrant role in the arena of traditional medication system. Because of request escalation of herbal medicines day by day due to its operative rectification, plants are employed broadly for the production of new-fangled medicines that are usually less harmful as compared to the other medication systems.

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