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# A Comparative Study of Antidiabetic Activity of *Azadirachta Indica, Aloe Vera* and *Allium Cepa*

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***Abstract:*** ***Extract from medicinal plants are widely used to prevents various diseases due to presence of lots of phytochemicals. The extracts from different parts like leaf, stem, fruit, flower, bark, root of Azadirachta indica, Aloe vera and Allium cepa shows lots of pharmacological activity. Antidiabaetic property is most important of them. Various parts of Azadirachta indica, Aloe vera and Allium cepa were largely used in Ayurveda, Unani and Siddha medicines. Chemical investigation on all three plants explore the presence of different types of active compounds like azadirachtin , nimbolinin, nimbin, nimbidin, nimbidol, sodium nimbinate, gedunin, salannin, and quercetin from Azadirachta indica, enzymes, minerals, sugars, lignin, saponins, salicylic acids, amino acids and vitamins like vitamins A (beta-carotene), C and E, vitamin B12, folic acid, and choline from Aloe vera and Cyaniding glycosides, Prostaglandins, quercetin, flavonoids, Sterols, Phenol compounds, Catechol and Protocatechuic acid from Allium cepa. This review explore the details of traditional use, phytochemicals and comparative studies of antioxidant and antidiabetic properties among lots of pharmacological properties of Azadirachta indica, Aloe vera and Allium cepa.***
***Keywords:*** ***Azadirachta indica, Aloe vera, Allium cepa, Antidiabetic property, Quercetin***.

## I. INTRODUCTION

Neem is a medicinal plant, and its leaves and other parts are used to exhibit immunomodulatory, anti-inflammatory, antihyperglycaemic, antiulcer, antimalarial, antifungal, antibacterial, antiviral, antioxidant, antimutagenic, and anticarcinogenic properties[(1)]. Neem is a member of the mahogany family, Meliaceae, and its scientific name is Azadirachta indica [(2)]. Neem is mostly found in the Indian subcontinent and it is also found in a dry areas of South Asia [(2, 3)]. The most important part of Neem is its leaf & bark, which used in antioxidant and Antidiabetic agents [(4-7)]. The fruit of Neem is used for the treatment of leprosy, diabetes, a disorder of the urinary tract and eyes, etc. The flowers of Neem are used for reducing bile, treating intestinal worms, etc[(8)] .

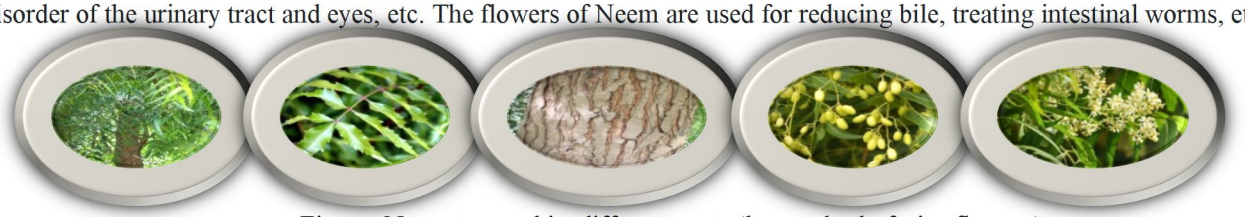


Figure: Neem tree and its different parts (leaves, bark, fruits, flowers)

Aloe vera is used as a topical gel to treat sunburn. It is mainly found in rocky areas and also found in the dry regions of Africa, Asia, Europe America and India(Rajasthan, Andhra Pradesh, Gujarat, Maharashtra and Tamil Nadu [(9)]. Aloe vera is a medicinal plant, which has antioxidant, antibacterial, antidiabetic, antiviral, antiseptic, etc. properties and it also helps in wound healing and skin disease[(10-15)]. It belongs to Asphodelaceae (Liliaceae) family, and is a shrubby or arborescent, perennial, xerophytic, succulent, pea-green colour plant and the botanical name of Aloe vera is *Aloe barbadensis miller*[(9)]

Figure: Aloe vera and its leaves

Onion is a round vegetable with a brown skin that grows underground in the soil which used as medicinal prospect[16]. Onion is one of the important condiments widely used in all households all the year round[17]. The botanical name of onion is *Allium cepa* herbaceous biennial plant in the amaryllis family which is called *Amaryllidaceae* grown for its edible bulb[18]. The green leaves and immature and mature bulbs are eaten raw or used in preparation of vegetables[19]. Onions are used in soups, sauces and for seasoning foods[17]. Onion mainly used as antioxidant but it also shows antiinflamatory, antidiabetic, etc. activities[20-22].

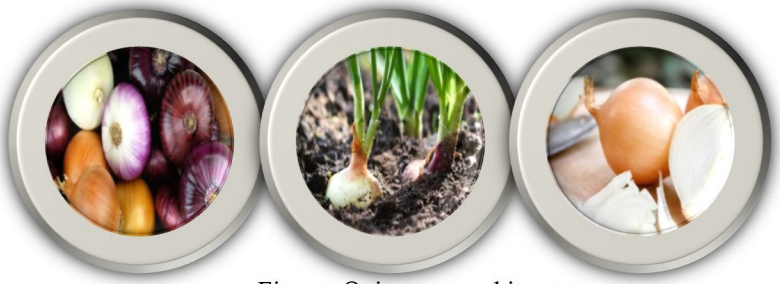


Figure: Onion tree and its parts

## II. TAXONOMICAL CLASSIFICATION:

Taxonomical classification of *Azadirachta indica, Aloe vera and Allium cepa* are discussed in Table 1.

| Plant Name | *Azadirachta indica* [23,24,25] | *Aloe vera*[26,27] | *Allium cepa*[28,29] |
|---|---|---|---|
| Kingdom | Plantae | Plantae | Plantae |
| Sub Kingdom | Tracheobionta | Tracheobionta | Tracheobionta |
| Class | Magnoliopsida | Liliopsida | Liliopsida |
| Sub Class | Rosidae | Lilidae | Lilidae |
| Order | Sapindales | Asparagales | Astaragales |
| Family | Meliaceae | Asphodelaceae | Amarymmidaceae |
| Subfamily | Melioideae | Asphodeloideae | Allioideae |
| Genus | Azadiracta | *Aloe* | Allium L. |
| Species | Azadiracta indica | *Aloe vera* | Allium cepa L. |

Table 1: Taxonomical classification of *Azadirachta indica, Aloe vera and Allium cepa*

### *A. Bioactive Constituent*

Bioactive constituent of *Azadirachta indica, Aloe vera and Allium cepa* are discuss in bellow mentioned table.

*Azadirachta indica*:(Table 2)

| **Plant Name** | **Source** | **Bioactive Constituents** | **Reference** |
|---|---|---|---|
| *Azadirachta indica* | Seed Oil | Nimbidin | 30 |
| | | Azadirachtin | |
| | | Nimbin | |
| | | Nimbolide | |
| | | Gedunin | |
| | | Mahmoodin | |
| | Bark | Gallic Acid and Catechin | |
| | | Margolone, Margolonone and isomargolonone | |
| | | Polysaccharides G1A, G1B | |
| | | Polysaccharides G2A | |
| | | NB-2 Peptidoglucon | |
| | Leaf | Cyclic Trisulphide and Cyclic tetrasulphide | |
| | | Polysaccharides | |

Table 2: Bioactive constituent of *Azadirachta indica*

*Aloe vera*: (Table 3)

| Plant Name | Bioactive Components | References |
|---|---|---|
| *Aloe vera* | Vitamins | 31 |
| | Enzymes | 32,33,34 |
| | Minerals | 33 |
| | Sugars | 34,35 |
| | Anthraquinones | 32 |
| | Sterols | 31,33 |
| | Amino acids | 32 |
| | Lignin | 33 |
| | Saponins | 33 |

Table 3: Bioactive constituent of *Aloe vera*

*Allium cepa:* (Table 4)

| Plant Name | Bioactive compounds | References |
|---|---|---|
| *Allium cepa* | Cyaniding glycosides, Prostaglandins, quercetin, other flavonoids, Sterols, Phenol compounds, Catechol, Protocatechuic acid are present in dry brown outer scale, diosgenin in flowers and bulbs | 36 |
| | Selenium | 37 |
| | Quercetin | 38 |
| | Flavenols | 39 |
| | S-alk(en)yl cysteine sulfoxides | 40 |
| | Flavonoids, allylsulfides | 41,42 |
| | Organosulfur compounds | 43 |
| | Thiosulfinates | 44 |
| | Cycloallin | 45, |
| | Fructose, quercetin-3-glucoside and isohamnetin-4- glucoside | 46 |
| | Sulfur and seleno compounds | 47 |
| | Sulfinates, xylose, galactose, glucose and mannose | 48,49 |

Table 4: Bioactive constituent of *Allium cepa*

*B. Pharmacological Activity*

Pharmacological activity of *Azadirachta indica, Aloe vera and Allium cepa* are discuss in bellow mentioned table.

Pharmacological Activity of *Azadirachta indica*: (Table 5)

| Plant Name | Pharmacological Activity | Reference |
|---|---|---|
| *Azadirachta indica* | Antioxidant | 50,51 |
| | Free radical scavenging | 52 |
| | Wound healing | 53,54 |
| | Anti-inflammatory | 55 |
| | Anti-inflammatory | 56 |
| | Hepatoprotective | 57,58 |
| | Neuroprotective | 59,60 |
| | Immunomodulatory | 61 |
| | Antifertility | 62 |
| | Antifertility | 63 |
| | Reduction in plaque and gingival, Treatment of dental caries | 64,65 |
| | Antidiabetic | 66-74 |
| | Cardioprotective | 67 75 |
| | Antimicrobial | 76 |
| | Antimicrobial | 77 |
| | Antimicrobial | 78 |
| | Antitumor | 79,80,81 |

Table 5: Pharmacological Activity of *Azadirachta indica*

Pharmacological activity of *Aloe vera*: (Table 6)

| Plant Name | Pharmacological Activity | References |
|---|---|---|
| *Aloe vera* | Burn and wound healing property | 82 - 87 |
| | Moisturizing and anti-aging effect | 88 - 95 |
| | Immune System Restoration | 96 - 98 |
| | Anti inflammatory action | 88, 93, 99 - 101 |
| | Anti mutagenic effects | 99, 102 - 108 |
| | Effect on gastric acid secretion and Ulcers | 93, 109 |
| | Arthritis, Joint and Muscle Pain | 88 |
| | Antiseptic effect | 88 |
| | Anti-oxidant effects | 110,93 |
| | Immunomodulatory effects | 111 -114, 93 |
| | Anti bacterial/ anti fungal/ anti viral actions | 105,115,116 |
| | Antidiabetic Activity | 117-122 |

Table 6 : Pharmacological Activity of *Aloe vera*

Pharmacological activity of *Allium cepa:* (Table 7)

| Plant Name | Pharmacological Activity | References |
|---|---|---|
| *Allium cepa* | Antibiotic activity | 123-127 |
| | Antiviral activity | 128, 129 |
| | Antioxidant activity | 130-134 |
| | Anti-cancer activity | 135-140 |
| | Anti-inflammatory activity | 141-143 |
| | Antihyperlipidemic activity | 144,145 |
| | Anti-hypertensive activity | 146, 147 |
| | Anti-cancer activity | 148-153 |
| | Anti-arthritic activity | 154 |
| | Bronchodilator activity | 155 |
| | Anti-spasmolytic activity | 156-157 |
| | Expectorant activity | 158-160 |
| | Antiseptic activity | 161 |
| | Anticoagulant activity | 162-164 |
| | Fibrinolytic activity | 165-167 |
| | Anti-helminthic activity | 168 |
| | Anti-platelet activity | 169 |
| | Anti-diabetic activity | 170-180 |
| | Anti-genotoxic and anti-mutagenic activity | 181, 182 |
| | Anti-pyretic activity | 183-186 |
| | Analgesic activity | 187, 188 |
| | Hepatoprotective activity Methanolic extract of onion | 189, 190 |
| | Neuroprotective activity Methanolic extract of outer scales, | 191 |

Table 7: Pharmacological Activity of *Allium cepa*

*C. Anti-diabetic activity of Azadirachta indica, Aloe vera and Allium cepa*

*1) Azadirachta indica*

The hydroalcholic extraction of neem, which produced anti-hyperglycemic activity in streptozotocin is used as the treatment of rats. In case, increase in glucose level absorption and glycogen deposition in isolated rat causes hemidiaphragm[66,67].Inspite of having anti-diabetic activity, it(neem) also shows anti-bacterial, antimalarial, antifertility, hepatoprotective and antioxidant effects[68]. In Indonesia, neem is used as a traditional medicine from the ancient times. Diabetes mellitus is a significant metabolic disease which has many types of complication that's are; diabetic nephropathy, coronary heart disease, and hypertension. The chemical constituents of neem are as tannins, saponins, sterols, flavonoids, terpenoids, anthraquinones, and alkaloids which mainly used in the disease of diabetes. Rutin and quercetin of neem shows the activity of anti-hyperglycemic effects also[69,70]. The evaluated study of neem root bark(70% alcoholic) in diabetes, shows the result of that significantly in 800mg/kg dose[71]. The other experiment which was performed to test the pharmacological hypoglycemic action of *Neem* in diabetic rats, the result shows that the glucose tolerance test with neem extract is 250 mg/kg which indicated glucose levels were significantly less as compared to the control group and neem remarkably reduce the glucose level in the diabetic rat at 15 days[72]. In in-vivo diabetic model, we studied A. *indica* & B. *spectabills* chloroform, methanolic, and aqueous extracts were explored and the results showed that *A. indica* chloroform extract and *B. spectabilis* aqueous, methanolic extracts, which showed a good oral glucose tolerance and remarkably decreased the intestinal glucosidase activity[73]. The other important study also suggested that leaves extract of neem and *Andrographis paniculata (*Kalmegh) also have significant antidiabetic activity and also helped in the treatment of diabetes mellitus[74]

*2) Aloe vera*

*Aloe vera* is known as a popular houseplant to use as a folk medicine from ancient time. Plant contain two types of basic product one is gel mostly known as leaf pulp and another one is latex known as aloe juice. In both normal and diabetic rats extract of aloe gum increase glucose tolerance effectively [117]. Aloes leaves extract shows effect on blood glucose levels in normal and alloxan diabetic mice through stimulation of insulin synthesis or release of insulin from pancreatic beta cells [118]. This plant also helps to improves wound healing in diabetic mice and also shows an anti-inflammatory activity in dose dependent manner [119]. Alcoholic extract of Aloe vera gel shows hypoglycemic activity and helps to control glucose homeostasis by controlling the carbohydrate metabolizing enzymes. When aloe vera extract administered orally in different types of models like; normal rats, oral glucose-loaded rats and streptozotocin induced diabetic rats at a concentration of 200 and 300 mg/kg body weight shows significant results[120,121]. Aloe vera extract (10 µl/l) shows beneficial effects in treatment of type II diabetes by stimulated insulin secretion from the isolated islets of pancreas. [122]

*3) Allium cepa*

The hypolipidemic and hypoglycemic activities of drinkable ripe onion juice product which name is "Black Onion Extract" the increasing dosage forms of onion aqueous extracts on alloxan- produced diabetic for likely used in the management of diabetic mellitus was explored [170-172]. The evaluation study of onion and garlic in experimentally produced diabetic rats by meta-analysis of related studies. National Center for Biotechnology Information database, the DBpia database, and the Koreanstudies Information Service System database conducted the ten systematic literature searches. We mostly studied the main three groups like; the normal group, the treated diabetic group, and the untreated diabetic group, it is compared for the various effect factors between two of the groups. Blood glucose concentration, body weight, and the concentrations of plasma total cholesterol, plasma triglycerides, plasma high-density lipoprotein-cholesterol, and liver glycogen are the effect factors [173]. The natural product which has antidiabetic properties is *Allium cepa*, generally known as garden onion. In onion there is a phenolic content that is quercetin, which help in inhibition of liberation of D- glucose from oligosaccharides and disaccharides by inhibiting a-glucosidase, that may result delay absorption of glucose from intestine and it is considered the responsible for controlling blood glucose levels in the body. The fresh bulb which content ether extract, administered to pancreatectomized dogs and rabbits by gastric intubation [174]. *Allium cepa* which have antidiabetic property is used for controlling type-II diabetes mellitus and it also used in our several life style diseases [175].Red onion which have hyperglycemic effects, is used for the treatment of Type 1 & Type ll diabetic patients [176].Dietary bulbs of onion which have antidiabetic effect in high fat diet streptozotocin produced diabetes rodent model [177-179]. The potency of onion in Hypoglycaemic also showed the antioxidant activities [180].

## III. CONCLUSION

*Azadirachta indica*, *Aloe vera and Allium cepa;* these three household plants can be used to control or treat diabetes. Different part extracts of all three plants are used as a medicine to treat the disease. All three types of plants are available all year round. *Azadirachta indica* contains tannins, saponins, sterols, flavonoids, terpenoids, anthraquinones, rutin and quercetin which shows anti-hyperglycemic effects and methanolic extracts of *Azadirachta indica* shows good oral glucose tolerance and remarkably decreased the intestinal glucosidase activity.*Allium cepa* extract, have hyperglycemic effects, used as a medicine for Type l & Type ll diabetic patients and it also used in our several life style. *Allium cepa* extract contain quercetin a phenolic content is responsible for controlling blood glucose levels in the body by inhibiting liberation of D- glucose from oligosaccharides and disaccharides by inhibiting a-glucosidase. Aloe vera extract (10 µl/l) stimulated insulin secretion from the isolated islets of pancreas and pancreatic beta cells which shows beneficial effect to reduce blood glucose levels and used to treat type II diabetes. Hypoglycemic activity shown in alcoholic extract of Aloe vera gel which helps to control glucose homeostasis by controlling the carbohydrate metabolizing enzymes. Among the all of three plants *Allium cepa* which is known as onion is highly acceptable in respect of *Azadirachta indica (Neem)*, *Aloe vera* due to its bitter taste. But all of them are quite good for human.

CONFLICT OF INTEREST: Nil

## REFERENCES

[1] Subapriya R[1], Nagini S., Medicinal properties of neem leaves: a review, Curr Med Chem Anticancer Agents., 2005 Mar;5(2):149-6.DOI: 10.2174/1568011053174828
[2] "Azadirachta indica". Germplasm Resources Information Network (GRIN). Agricultural Research Service (ARS), United States Department of Agriculture (USDA). Retrieved 9 June 2017
[3] Alternate titles: Azadirachta indica, margosa tree, nim By Melissa Petruzzello
[4] Nunes P. X., Silva S. F., Guedes R. J., Almeida S. Phytochemicals as Nutraceuticals—Global Approaches to Their Role in Nutrition and Health. InTech; 2012. Biological oxidations and antioxidant activity of natural products.
[5] Rahmani A. H., Aly S. M. Nigella sativa and its active constituents thymoquinone shows pivotal role in the diseases prevention and treatment. Asian Journal of Pharmaceutical and Clinical Research. 2015;8(1):48–53.
[6] Patil P. R., Patil S. P., Mane A., Verma S. Antidiabetic activity of alcoholic extract of Neem (Azadirachta indica) root bark. National Journal of Physiology, Pharmacy and Pharmacology. 2013;3(2):142–146. doi: 10.5455/njppp.2013.3.134-138.
[7] Dholi S. K., Raparla R., Mankala S. K., Nagappan K. Invivo antidiabetic evaluation of Neem leaf extract in alloxan induced rats. Journal of Applied Pharmaceutical Science. 2011;1(4):100–105.
[8] NEEM Reviewed on 6/11/2021, https://www.rxlist.com/neem/supplements.htm
[9] Surjushe A., Vasani R., Saple DG., ALOE VERA: A SHORT REVIEW, Indian J Dermatol. 2008; 53(4): 163–166.
[10] Chithra R Sajithlal GB, Chandrakasan G. Influence of aloe vera on collagen characteristics in healing dermal wounds in rats. Mol Cell Biochem. 1998;181:71–6.
[11] Roberts DB, Travis EL. Acemannan-containing wound dressing gel reduces radiation-induced skin reactions in C3H mice. Int J Radiat Oncol Biol Phys. 1995;32:1047–52.
[12] Sydiskis RJ, Owen DG, Lohr JL, Rosler KH, Blomster RN. Inactivation of enveloped viruses by anthraquinones extracted from plants. Antimicrob Agents Chemother. 1991; 35: 2463–6.
[13] Noor A., Gunasekaran S., Vijayalakshmi M.A. Improvement of insulin secretion and pancreatic β-cell function in streptozotocin-induced diabetic rats treated with Aloe vera extract. Pharmacogn. Res. 2017;9:99. doi: 10.4103/pr.pr_75_17.
[14] Wang H.C., Brumaghim J.L. Oxidative Stress: Diagnostics, Prevention, and Therapy. American Chemical Society; Washington, DC, USA: 2011. Polyphenol compounds as antioxidants for disease prevention: Reactive oxygen species scavenging, Enzyme regulation, and metal chelation mechanisms in E. coli and human cells; pp. 99–175.
[15] Ramasubramanian TS, Sivakumar VT, Thirumalai AV. Antimicrobial activity of Aloe vera (L.) Burm. f. against pathogenic microorganisms. J Bio Sci Res. 2010;4:251–8.
[16] Chandrasekara A.[1], Kumar TJ.,[1] , Roots and Tuber Crops as Functional Foods: A Review on Phytochemical Constituents and Their Potential Health Benefits; Int J Food ScI. 2016; 2016:363164
[17] Deming, Linda (August–September 2014). "Homemade Onion Powder". Mother Earth News. Retrieved September 18, 2015
[18] Green Onion Plant;By The Editors of Encyclopaedia Britannica, Updated: May 9, 202
[19] Horticulture Industry Onion, Introduction and importance; https://agrihunt.com/articles/horti-industry/onion-introduction-and-importance
[20] Bonaccorsi, P., Caristi, C., Gargiulli, C., & Leuzzi, U. (2008). Flavonol glucosides in Allium species: A comparative study by means of HPLC–DAD–ESI-MS–MS. Food Chemistry, 107(4), 1668–1673
[21] O'Byrne KJ, Dalgleish AG.. 2001. Chronic immune activation and inflammation as the cause of malignancy. Br J Cancer. 85(4):473–483.
[22] Sable PA., Pawar Y., H. Dave PH., Anti-diabetic potential of onion:a review; National Webinar on Approaches Toward Onion Cultivation, 26-27 May, 2020

[23] Barstow, M.; Deepu, S.,"Azadirachta indica". IUCN Red List of Threatened Species. 2018: e.T61793521A61793525. Retrieved 19 November 2021
[24] Role of neem leaves in diabetes and obesity - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Taxonomy-of-neem-plant-Alzohiry-2016_tbl1_347833814 [accessed 20 May, 2022]
[25] Uzzaman S., Pharmacological activities of neem (Azadirachta indica): A review , International Journal of Pharmacognosy and Life Science 2020; 1(1): 38-41
[26] Aloe". Drugs.com. 30 December 2020. Retrieved 1 July 2021
[27] Shrestha A*1 ,Acharya A2 and N.C. Nagalakshmi NC. Aloe vera as traditional medicinal plant: a review on its active constituents, biological and therapeutic effects . World Journal of Pharmaceutical Research SJIF Impact Factor 5.990 Volume 4, Issue 6, 2146-2161.
[28] Brewster, James L. (1994). Onions and other vegetable Alliums (1st ed.). Wallingford, UK: CAB International. p. 16. ISBN 978-0-85198-753-8
[29] Pareek S.,Sagar NA.,Sharma S.,Kumar V.,Onion (Allium cepa L.),Fruit and Vegetable Phytochemicals: Chemistry and Human Health, Volume II, Second Edition. Published 2018
[30] Gupta A, Ansari S, Gupta S, Narwani M, Gupta M and Singh M. Therapeutics role of neem and its bioactive constituents in disease prevention and treatment .Journal of Pharmacognosy and Phytochemistry 2019; 8(3): 680-691
[31] Coats BC, The Silent Healer, A M odern Study of Aloe vera, Texas, Garland, 1979.
[32] Joseph B, Raj SJ, Pharmacognostic and phytochemical properties of Aloe vera linn –an overview, International Journal of Pharmaceutical Sciences Review and Research, 4(2), 2010, 106-110.
[33] Surjushe A, Vasani R, Saple DG, Aloe Vera: A short review, Indian Journal of Dermatology, 53(4), 2008, 163-166.
[34] Kumar KPS, Bhowmik D, Chiranjib and Biswajit, Aloe vera: A Potential Herb and its M edicinal Importance, Journal of Chemistry and Pharmaceutical Research, 2(1), 2010, 21-29.
[35] Chandegara VK, Varshney AK, Aloe vera L. Processing and products: A review. International Journal of M edicinal and Aromatic Plants 3(4), 2013, 492-506.
[36] Battagani D.*, Jada NL., Rayadurgam N., Review on Phytochemicals and Pharmacological Studies of Allium cepa (Onion); Int. J. Pharm. Sci. Rev. Res., 68(1), May - June 2021; Article No. 15, Pages: 85-91
[37] Arnault I., Auger J. , Seleno-compounds in garlic and onion. J. Chromatogr.2006;1112(1-2): 23-30. Doi: 10.1016/j.chroma.2006.01.036.
[38] Hubbard G P., Wolffram S., de Vos R., Bovy A., Gibbins J M., Lovegrove J A., Ingestion of onion soup high in quercetin inhibits platelet aggregation and essential components of the collagen-stimulated platelet activation pathway in man: a pilot study. Br. J. Nutr. 2006;96(3):482-488. Doi:10.1079/BJN20061831.
[39] Noroozi M., Burns J., Crozier A., Kelly I E., Lean M E., Prediction of dietary flavonol consumption from fasting plasma concentration or urinary excretion. Eur. J. Clin. Nutr.2000; 54(2):143-149. Doi: 10.1038/sj.ejcn.1600908.
[40] Rose P., Whiteman M., Moore P K., Zhu Y Z.. Bioactive S-alk(en)yl cysteine sulfoxide metabolites in the genus Allium: the chemistry of potential therapeutic agents. Nat. Prod. Rep. 2005;22(3):351-368. Doi: 10.1039/b417639c.
[41] Sengupta A, Ghosh S, Bhattacharjee S. Allium vegetables in cancer prevention: an overview. Asian Pac. J Cancer. Prev.2004;5(3):237- 245. PMID: 15373701.
[42] Heber D, Bowerman S. Applying science to changing dietary patterns. J. Nutr.2001; 131(11 Suppl):3078S-3081S. Doi: 10.1093/jn/131.11.3078S.
[43] Fukushima S, Takada N, Hori T, Wanibuchi H. Cancer prevention by organosulfur compounds from garlic and onion. J. Cell Biochem. Suppl. 1997; 27:100-105. PMID: 9591199.
[44] Augusti K T. Therapeutic values of onion (Allium cepa L.) and garlic (Allium sativum L.). Indian J. Exp. Biol. 1996;34(7):634-640. PMID: 8979497.
[45] Agarwal R K, Dewar H A, Newell D J, Das B. Controlled trail of the effect of cycloalliin on the fibrinolytic activity of venous blood. Atherosclerosis.1977;27(3):347-351. Doi: 10.1016/0021- 9150(77)90044-2.
[46] Boyle S P, Dobson V L, Duthie S J, Collins A R. Absorption of DNA protective effects of flavonoid glycosides from an onion meal. Eur. J. Nutr.2000;39(5):213-223, Doi: 10.1007/s003940070014.
[47] Baraboi V A, Shestakova E N. Selenium: the biological role and antioxidant activity. Ukr.Biokhim.Zh.2004;76(1):23-32. PMID: 15909414.
[48] Lanzotti V. The analysis of onion and garlic. J. Chromatogr A.2006;1112(1-2):3-22. Doi: 10.1016/j.chroma.2005.12.016.
[49] Gibson G R. Dietary modulation of the human gut microflora using prebiotics. Br. J. Nutr.1998;80(4): S209-S212. PMID: 9924286.
[50] Rahmani AH, Almatroudi A, Alrumaihi F, Khan AA. Pharmacological and Therapeutic Potential of Neem (Azadirachta indica). Pharmacognosy Reviews, Volume 12, Issue 24, July-December 2018;250-255
[51] Sithisarn P, Supabphol R, Gritsanapan W. Antioxidant activity of Siamese neem tree (VP1209). J Ethnopharmacol 2005;99:109-12.
[52] Nahak G, Sahu RK. Evaluation of antioxidant activity of flower and seed oil of Azadirachta indica A. juss. J Appl Nat Sci 2011;3:78-81.
[53] Chundran NV, Husen IR, Rubianti I. Effect of neem leaves extract (Azadirachta indica) on Wound Healing. AMJ 2015;2:199-207.
[54] Osunwoke EA, Olotu EJ, Allison TA, Onyekwere JC. The wound healing effects of aqueous leave extracts of Azadirachta indicaon wistar rats. J Nat Sci Res 2013;3:181-6.
[55] Ilango K, Maharajan G, Narasimhan S. Anti-nociceptive and anti-inflammatory activities of Azadirachta indica fruit skin extract and its isolated constituent azadiradione. Nat Prod Res 2013;27:1463-7.
[56] Naik MR, Bhattacharya A, Behera R, Agrawal D, Dehury S, Kumar S. Study of anti-inflammatory effect of neem seed oil (Azadirachta indica) on infected albino rats. J Health Res Rev 2014;1:66-9.
[57] Bhanwra S, Singh J, Khosla P. Effect of Azadirachta indica (Neem) leaf aqueous extract on paracetamol-induced liver damage in rats. Indian J Physiol Pharmacol 2000;44:64-8.
[58] Kale BP, Kothekar MA, Tayade HP, Jaju JB, Mateenuddin M. Effect of aqueous extract of Azadirachta indica leaves on hepatotoxicity induced by antitubercular drugsin rats. Indian J Pharmacol 2003;35:177-80.
[59] Abdel Moneim AE. Azadirachta indica attenuates cisplatin-induced neurotoxicity in rats. Indian J Pharmacol 2014;46:316-21.
[60] Abdel Moneim AE, Othman MS, Aref AM. Azadirachta indica attenuates cisplatin-induced nephrotoxicity and oxidative stress. Biomed Res Int 2014;2014:647131.
[61] Durrani FR, Chand N, Jan M, Sultan A, Durrani Z, Akhtar S. Immunomodulatory and growth promoting effects of neem leaves infusion in broiler chicks. Sarhad J Agric 2008;24:655-9.
[62] Gbotolorun SC, Osinubi AA, Noronha CC, Okanlawon AO. Antifertility potential of neem flower extract on adult female Sprague-Dawley rats. Afr Health Sci 2008;8:168-73.

[63] Upadhyay SN, Dhawan S, Talwar GP. Antifertility effects of neem (Azadirachta indica) oil in male rats by single intra-vas administration: An alternate approach to vasectomy. J Androl 1993;14:275-81.
[64] Bhambal AB, Kothari SK, Saxena SS, Jain MJ. Comparative effect of neem stick and toothbrush on plaque removal and gingival health – A clinical trial. J Adv Oral 2011;2:51-6.
[65] Lekshmi PN, Sowmia N, Viveka S, Brindha RJ, Jeeva S. The inhibiting effect of Azadirachta indica against dental pathogens. Asian J Plant Sci Res 2012;2:6-10.
[66] Patil P, Patil S, Mane A, Verma S. Antidiabetic activity of alcoholic extract of neem (Azadirachta indica) root bark. Nat J Physiol Pharm Pharmacol 2013;3:142-6.
[67] Chattopadhyay R.R., Chattopadhyay R.N., Nandy A.K., Poddar G., Maitra S.K. Preliminary report on antihyperglycemic effect of fraction of fresh leaves of Azadiracta indica (Beng neem) Bull. Calcutta. Sch. Trop. Med. 1987;35:29–33. [Google Scholar]
[68] Chattopadhyay R.R., Chattopadhyay R.N., Nandy A.K., Poddar G., Maitra S.K. The effect of fresh leaves of Azadiracta indica on glucose uptake and glycogen content in the isolated rat hemidiaphragm. Bull. Calcutta. Sch. Trop. Med. 1987;35:8–12. [Google Scholar]
[69] Biswas K., Chattopadhyay I., Banerjee R.K., Bandyopadhyay U. Biological activities and medicinal properties of neem (Azadiracta indica) Curr. Sci. 2002;82:1336–1345.
[70] Gautam S*, Thakur M, Aggarwal M and Esha V, Azadirachta Indica - A Review as a Potent Anti- Diabetic Drug,Vol.1 Issue-10, JUNE 2021 (e-ISSN: 2582-8223)
[71] Novitasari PR.,1*, Gemantari BM. 2, , Mufidah S.3 , Kartika Sari PA.4, Potential Effects of Neem Plants (Azadirachta indica A. Juss.) as an Antidiabetic Agent Potensi Tanaman Mimba (Azadirachta indica A. Juss.) sebagai Antidiabetes, J.Food Pharm.Sci. 2021, 9(2), 422-430
[72] Dholi S. K., Raparla R., Mankala S. K., Nagappan K. Invivo antidiabetic evaluation of Neem leaf extract in alloxan induced rats. Journal of Applied Pharmaceutical Science. 2011;1(4):100–105.
[73] Joshi B. N., Bhat M., Kothiwale S. K., Tirmale A. R., Bhargava S. Y. Antidiabetic properties of Azardiracta indica and Bougainvillea spectabilis: In vivo studies in murine diabetes model. Evidence-Based Complementary and Alternative Medicine. 2011;2011:9.
[74] Akter R., Mahabub-Uz-Zaman M., Rahman M. S., et al. Comparative studies on antidiabetic effect with phytochemical screening of Azadirachta indicia and Andrographis paniculata . IOSR Journal of Pharmacy and Biological Sciences. 2013;5(2):122–128. doi: 10.9790/3008-052122128.
[75] Peer PA, Trivedi PC, Nigade PB, Ghaisas MM, Deshpande AD. Cardioprotective effect of Azadirachta indica A. juss. on isoprenaline induced myocardial infarction in rats. Int J Cardiol 2008;126:123-6.
[76] Ghonmode WN, Balsaraf OD, Tambe VH, Saujanya KP, Patil AK, Kakde DD, et al. Comparison of the antibacterial efficiency of neem leaf extracts, grape seed extracts and 3% sodium hypochlorite against E. feacalis – An in vitro study. J Int Oral Health 2013;5:61-6.
[77] Natarajan V, Venugopal PV, Menon T. Effect of Azadirachta indica (neem) on the growth pattern of dermatophytes. Indian J Med Microbiol 2003;21:98-101.
[78] Tiwari V, Darmani NA, Yue BY, Shukla D. In vitro antiviral activity of neem (Azardirachta indica L.) bark extract against herpes simplex virus type-1 infection. Phytother Res 2010;24:1132-40.
[79] Elumalai P, Gunadharini DN, Senthilkumar K, Banudevi S, Arunkumar R, Benson CS, et al. Induction of apoptosis in human breast cancer cells by nimbolide through extrinsic and intrinsic pathway. Toxicol Lett 2012;215:131-42.
[80] Sharma C, Vas AJ, Goala P, Gheewala TM, Rizvi TA, Hussain A, et al. Ethanolic neem (Azadirachta indica) leaf extract prevents growth of MCF-7 and HeLa cells and potentiates the therapeutic index of cisplatin. J Oncol 2014;2014:321754.
[81] Metwally FM, El-Mezayen HA, Moneim AE, Sharaf NE. Anti-tumor effect of Azadirachta indica (Neem) on murine solid Ehrlich carcinoma. Acad J Cancer Res 2014;7:38-45.
[82] Sharma P1 ,Kharkwal AC1*, Kharkwal H3 , Abdin M Z 2 , Varma A1. A Review on Pharmacological Properties of Aloe vera. Int. J. Pharm. Sci. Rev. Res., 29(2), November – December 2014; Article No. 07, Pages: 31-37
[83] West, Dennis P, Ya Fen Zhu, Evaluation of Aloe vera gel gloves in dry skin associated with occupational exposure, American Journal of Infection Control, 31(1), 2003, 40-42.
[84] Chithra R Sajithlal GB, Chandrakasan G, Influence of Aloe vera on collagen characteristics in healing dermal wounds in rats, M olecular and Cellular Biochemistry, 181, 1998a, 71-76.
[85] Heggers J, Kucukcelebi A, Listengarten D, Stabenau J, Ko F, Broemeling LD, Robson M C, Winters WD, Beneficial effect of aloe on wound healing in an excisional wound model, Journal of Alternative and Complementary M edicine, 2(2), 1996, 271-277.
[86] Chithra P, Sajithlal G, Chandrakasan G, Influence of Aloe vera on the glycosaminoglycans in the matrix of healing dermal wounds in rats, Journal of Ethnopharmacology, 59, 1998b, 179-186.
[87] Choi SW, Son BW, Son YS, Park YI, Lee SK, Chung M H, The wound healing effect of a glycoprotein fraction isolated from Aloe vera, British Journal of Dermatology, 145(4), 2001, 535-545.
[88] Surjushe A, Vasani R, Saple DG, Aloe Vera: A short review, Indian Journal of Dermatology, 53(4), 2008, 163-166.
[89] West DP, Zhu YF, Evaluation of Aloe vera gel gloves in the treatment of dry skin associated with occupational exposure, American Journal of Infection Control, 31, 2003, 40-42.
[90] Stanic S, Anti-genotoxic effect of Aloe vera gel on the mutagenic action of ethyl methanesulfonate, Archieves of Biological Sciences, 59 (3), 2007, 223-226.
[91] Boudreau M D, Beland FA, An evaluation of the biological and toxicological properties of Aloe barbadensis (miller), Aloe vera, Journal of environmental science and health, Part C, Environmental carcinogenesis and ecotoxicology reviews, 24 (1), 2006, 103–154.
[92] Steenkamp V, Stewart M J, M edicinal applications and toxicological activities of Aloe products, Pharmaceutical Biology, 45, 2007, 411-420.
[93] Hamman JH, Composition and Applications of Aloe vera Leaf Gel, M olecules, 13, 2008, 1599-1616.
[94] Kim HS, Lee BM , Inhibition of benzo [a] pyrene-DNA adduct formation by Aloe barbadensis M iller, Carcinogen, 18(4), 1997, 771-776.
[95] Kim HS, Kacew S, Lee BM , In vitro chemopreventive effects of plant polysaccharides (Aloe barbadensis M iller, Lentinus edodes, Ganoderma lucidum, and Coriolus vesicolor), Carcinogen, 20(8), 1999, 1637-40.

[96] Roberts DB, Travis EL, Acemannan-containing wound dressing gel reduces radiation-induced skin reactions in C3H mice, International Journal of Radiation Oncology Biology Physics, 32, 1995, 1047-1052.
[97] Sato Y, Ohta S, Shinoda M , Studies on chemical protectors against radiation XXXI: Protective effects of Aloe arborescens on skin injury induced by x-irradiation, Yakugaku Zasshi, 110(11), 1990, 876-884.
[98] Byeon S, Pelley R, Ullrich SE, Waller TA, Bucana CD, Strickland FM , Aloe barbadensis extracts reduce the production of interleukin-10 after exposure to ultraviolet radiation, Journal of Investegative Dermatology, 110, 1988, 811-817.
[99] Reynolds T, Dweck AC, Aloe vera leaf gel: a review update, Journal of Ethnopharmacology, 68, 1999, 3- 37.
[100]Vazquez B, Avila G, Segura D, Escalante B, Antiinflammatory activity of extracts from Aloe vera gel, Journal of Ethnopharmacology, 55, 1996, 69-75.
[101]Prabjone R, Thong-Ngam D, Wisedopas N, Chatsuwan T, Patumraj S, Anti-inflammatory effects of Aloe vera on leukocyte-endothelium interaction in the gastric microcirculation of Helicobacter pylori-infected rats, Clinical Hemorheology and Microcirculation, 35, 2006, 359- 366.
[102]Habeeb F, Shakir E, Bradbury F, Cameron P, Taravati MR, Drummond AJ, Gray AI, Ferro VA, Screening methods used to determine the anti-microbial properties of Aloe vera inner gel, M ethods, 42(4), 2007, 315-320.
[103]Cera LM , Heggers JP, Robson M C, Hagstrom WJ, The therapeutic efficacy of Aloe vera cream (Dermaide Aloe) in thermal injuries: Two case reports, Journal of American Animal Hospital Association, 16, 1980, 768-772.
[104]Azghani AO, Williams I, Holiday DB, Johnson AR, A betalinked mannan inhibits adherence of Pseudomonas aeruginosa to human lung epithelial cells, Glycobiology, 5, 1995, 39-44.
[105]Heggers JP, Pineless GR, Robson M C, Dermaide aloe/ Aloe vera gel: Comparison of the antimicrobial effects, The American Journal of M edical Technology, 41, 1979, 293- 294.
[106]Saoo K, M iki H, Ohmori M , Winters WD, Antiviral activity of aloe extracts against cytomegalovirus, Phytotherapy Research, 10, 1990, 348-350.
[107]Sydiskis RJ, Owen DG, Lohr JL, Rosler KH, Blomster RN, Inactivation of enveloped viruses by anthraquinones extracted from plants, Antimicrobial Agents and Chemotherapy, 35, 1991, 2463-2466.
[108]Alves DS, Pérez-Fons L, Estepa A, M icol V, M embranerelated effects underlying the biological activity of the anthraquinones: emodin and barbaloin, Biochemical Pharmacology, 68(3), 2004, 549-561.
[109]Bhuvana KB, Hema NG, Patil RT, Review on aloe vera, International Journal of Advanced Research, 2(3), 2014, 677-691.
[110]Langmead L, M akins RJ, Rampton DS, Anti-inflammatory effects of Aloe vera gel in human colorectal mucosa in vitro, Alimentary Pharmacology and Therapeutics, 19(5), 2004, 521-527.
[111]M adan J, Sharma AK, Inamdar N, Rao HS, Singh R, Immunomodulatory properties of Aloe vera gel in mice, International Journal of Green Pharmacy, 2(3), 2008, 152- 154.
[112]Zhang L, Tizard IR, Activation of a mouse macrophage cell line by acemannan: The major carbohydrate fraction from Aloe vera, Immunopharmacol, 35(2), 1996, 119-128.
[113]Chow JTN, Williamson DA, Yates KM , Goux WJ, Chemical characterisation of the immunomodulating polysaccharide of Aloe vera L, Carbohydrate Research, 340(6), 2005, 1131- 1142.
[114]Im SA, Oh ST, Song S, Kim MR, Kim DS, Woo SS, Jo TH, Park YI, Lee CK, Identification of optimal molecular size of modified Aloe polysaccharides with maximum immunomodulatory activity, International Immunopharmacology, 5, 2005, 271-279.
[115]Heggers JP, Kucukcelibi A, Stabenou CJ, Ko F, Broemeling LD, Robson M C, Winters WD, Wound healing effects of aloe gel and other topical antibacterial agents in rat skin, Phytotherapy Research, 9, 1995, 455-457.
[116]Robson M C, Heggers JP, Hagstrom WJ, M yth, magic, witchcraft or fact? Aloe vera revisited, Journal of Burn Care and Rehabilitation, 3, 1982, 157-163.
[117]Al-Awadi F.M., Gumaa K.A. Studies on the activity of individual plants of an antidiabetic plant mixture. Acta Diabetologica. 1987;24:37–41.
[118]Ajabnoor M.A. Effect of aloes on blood glucose levels in normal and alloxan diabetic mice. J. Ethnopharmacol. 1990;28:215–220.
[119]Davis R.H., Maro N.P. Aloe vera and gibberellins, Anti-inflammatory activity in diabetes. J. Am. Pediat. Med. Assoc. 1989;79:24–26.
[120]Rajasekaran S[1], Sivagnanam K, Ravi K, Subramanian S. Hypoglycemic effect of Aloe vera gel on streptozotocin-induced diabetes in experimental rats. J Med Food. Spring 2004;7(1):61-6.doi: 10.1089/109662004322984725
[121]Noor A[1], Gunasekaran S[2] , Manickam AS[2] · Vijayalakshmi M. A[1]*. Antidiabetic Activity Of Aloe Vera And Histology Of Organs In Streptozotocin-Induced Diabetic Rats ,Current Science, Vol. 94, No. 8, 25 April 2008
[122]Amira Mourad Hussein Abo-Youssef , Basim Anwar ShehataMessiha, Beneficial effects of Aloe vera in treatment of diabetes: Comparative in vivo and in vitro studies, Bulletin of Faculty of Pharmacy, Cairo University, Volume 51, Issue 1, June 2013, Pages 7-11
[123]Richa Shri, Kundan Singh Bora. Neuroprotective effect of methanolic extracts of Allium cepa on ischemia and reperfusion-induced cerebral injury. Fitoterapia. 2008;79(2): 86-96. Doi: 10.1016/j.fitote.2007.06.013
[124]Bindu B and Podikunju B. “Performance evaluation of onion (Allium cepa L. Var. Cepa) varieties for their suitability in kollam district”. International Journal of Research in Agricultural Sciences 1.1 (2015): 1
[125]Sivam G P. Protection against Helicobacter pylori and other bacterial infections by garlic. J. Nutr. 2001; 131(3s):1106S-1108S. Doi: 10.1093/jn/1
[126]Zikora Anyaegbunam K, Ogara Amaechi L, Anyaegbunam Tito C, Oniwon Wisdom O, Ogechukwu Henrietta C, Cosmas S, Ofoefule Sabinus I. Antibacterial Activity of Fresh Red and White Onion (Allium cepa) Extract against Some Drug Resistant Bacteria. JAMB.2019;16(4):1-8. Doi: 10.9734/jamb/2019/v16i430127.
[127]Ahmed M K, Hani S F, Ahmad M A, Safaa A T. Antibacterial Effect of Onion. Sch. J. App. Med. Sci. 2016; 4(11D): 4128-4133. Doi: 10.21276/sjams.2016.4.11.53.
[128]Sharma N., Efficacy of Garlic and Onion against virus. IJRPS. 2019; 10(4): 3578-3586. Doi: 10.26452/ijrps.v10i4.1738.
[129]Pandey P, Khan F, Kumar A, Srinivastava A, Jha NK. Screening of potent Inhibitors Against 2019 Novel Coronavirus (Covid-19) from Alliumsatium and Allium cepa: An inSilico Approach. Biointerface Research in Applied Chemistry.2021; 11(1):7981-7993. Doi: 10.33263/BRIAC111.79817993.
[130]Kumar K E, Harsha K N, Sudheer V, Nelli G B. In vitro antioxidant activity and in vivo hepatoprotective activity of aqueous extract of Allium cepa bulb in ethanol induced liver damage in Wistar rats. Food Sci Hum Wellness. 2013; 2:132-138. Doi: 10. 1016/j.fshw.2013.10.001.

[131]Benmalek Y, Yahia O A, Belkebir A, Fardeau M L. Anti-microbial and anti-oxidant activities of Illicium verum, Crataegus oxyacantha ssp monogyna and Allium cepa red and white varieties. Bioengineered.2013; 4(4):244-48. Doi: 10.4161/bioe.24435.

[132]Yang J, Meyers K J, van der Heide J, Liu R H. Varietal differences in phenolic content and antioxidant and antiproliferative activities of onions. J Agric Food Chem. 2004;52(22):6787-93. Doi: 10.1021/jf0307144.

[133]Di Renzo L, Di Pierro D, Bigioni M, Sodi V, Galvano F, Cianci R, La Fauci L, De Lorenzo A. Is antioxidant plasma status in humans a consequence of the antioxidant food content influence. Eur Rev Med Pharmacol Sci. 2007; 11(3):185-92. PMID: 17970235.

[134]Kumari K, Augusti K T. Antidiabetic and antioxidant effects of Smethyl cysteine sulfoxide isolated from onions (Allium cepa Linn) as compared to standard drugs in alloxan diabetic rats. Indian J Exp Biol. 2002; 40(9):1005-9. PMID: 12587728.

[135]Lean M E, Noroozi M, Kelly I, Burns J, Talwar D, Sattar N, Crozier A. Dietary flavonols protect diabetic human lymphocytes against oxidative damage to DNA. Diabetes.1999; 48(1):176-181. Doi: 10.2337/diabetes.48.1.176.

[136]Troll W. Protease inhibitors interfere with the necessary factors of carcinogenesis. Environ Health Perspect. 1989; 81:59-62. Doi: 10.1289/eph.898159.

[137]Wargovich M J. New dietary anticarcinogens and prevention of gastrointestinal cancer. Dis colon Rectum. 1988; 31(1):72-5. Doi: 10.1007/BF02552576.

[138]Gonzalez Carlos A, Guillem Pera, Antonio Agudo, H Bas Bueno-deMesquota, Marco Ceroti, Heiner Boeing, Mandy Schulz, Guiseppe Del Giudice, Mario plebani, Fatima Carlotta Sacerdote, Rosario Tumino, Salvartore Panico, Goran Berglund, Henrik Siman, Goran Hallmans, Roger Stenling, Carmen Martinez, Miren Dorronsoro, Aurelio Barricarte, Carmen Navarro, Jose R Quiros, Naomi Allen, Timothy J Key, Sheila Bingham, Nicholas E Day, Jakob Linseisen, Gabriele Nagel, Kim Overvad, Majken K Jensen, Anja Olsen, Anne Tjonneland, Frederike L Buchner, Petra H M Peeters, Mattijs E Numans, Francoise Clavel-Chapelon, Marie-Christine BoutronRault, Dimitrios Roukos, Antonia Trichopoulou, Theodora Psaltopoulou, Eiliv Lund, Corinne Casagrande, Nadia Slimani, Mazda Jenab, Elio Riboli. Fruit and vegetable intake and the risk of stomach and oesophagus adenocarcinoma in the European Prospective Investigation into Cancer and Nutrition (EPIC-EURGAST). Int J Cancer. 2006; 118(10):2559-66. Doi :10.1002/ijc.21678.

[139]Schulz Mandy, Lahmann Petra H, Boeing Heiner, Hoffmann Kurt, Allen Naomi, Timothy J A Key, Bingham Sheila, Wirfalt Elisabet, Berglund Goran, Lundin Eva, Hallmans Goran, Annekatrin Lukanova, Martinez Garcia Carmen, Gonzalez Carlos A, Tormo Maria J, Jose R Quiros, Eva Ardanaz, Nerea Larranaga, Eiliv Lund, Inger T Gram, Guri Skeie, Petra H M Peeters, Carla H van Gills, H Bas Bueno-deMesquita, Frederike L Buchner, Patrizia Pasanisi, Rocco Galasso, Domenico Palli, Rosario Tumino, Paolo Vineis, Antonia Trichopoulou, Victoria Kalapothaki, Dimitrios Trichopoulos, Jenny Chang-Claude, Jakob Linseisen, Marie Christine Boutron-Ruault, Marina Touillaud, Francoise Clavel-Chapelon, Anja Olsen, Anne Tjonneland, Kim Overvad, Mette Tetsche, Mazda Jenad, Teresa Norat, Rudolph Kaaks, Elio Riboli. Fruit and vegetable consumption and risk of epithelial ovarian cancer: the European Prospective Investigation into Cancer and Nutrition. Cancer Epidemiol Biomarkers Prev.2005; 14(11Pt 1): 2531-5. Doi: 10.1158/1055- 9965.EPI-05-0159.

[140]Srinivasan K. Plant foods in the management of diabetes mellitus: spices as beneficial antidiabetic food adjuncts. Int J Food Sci Nut. 2005;56(6):399-414. Doi: 10.1080/09637480500512872.

[141]Dorsch W, Schneider E, Bayer T, Breu W, Wagner H. Antiinflammatory effects of onions: inhibition of chemotaxis of human polymorphonuclear leukocytes by thiosulphates and cepaenes. Int Arch Allergy Appl Immunol.1990; 92(1):39-42. Doi: 10.1159/000235221.

[142]Dirsch V M, Vollmar A M. Ajoene, a natural product with nonsteroidal anti-inflammatory drug (NSAID)-like properties. Biochemical Pharmacology. 2001;61(5): 587-593. Doi: 10.1016/s0006-2952(00)00580-3.

[143]Benhong He, Jianjun Hao, Weiwei Sheng, Yuancai Xiang, Jiemeia Zhang, Hao Zhu, Jingcheng Tian, Xu Zhu, Yunxia Feng, Hao Xia. Fistular onion stalk extract exhibits anti-atherosclerotic effects in rats. Exp Ther Med. 2014; 8(3): 785-792. Doi: 10.3892/etm.2014.1790.

[144]Kumari K, Augusti K T. Lipid lowering effect of S-methyl cysteine sulfoxide from Allium cepa Linn in high cholesterol diet fed rats. J Ethnopharmacol.2006; 109(3):367-71. Doi: 10.1016/j.jep.2006.07.045.

[145]Augusti K T, Arathy S L, Asha R, Ramakrishanan J, Zaira J, Lekha V, Smitha S, Vijayasree V M. A comparative study on the beneficial effects of garlic (Allium sativa Linn), amla (Emblica Officinalis Gaertn) and onion (Allium cepa Linn) on the hyperlipidemia induced by butter fat and beef fat in rats. Indian J Exp Biol.2001; 39(8):760- 66. PMID: 12018576.

[146]Sanchez Manuel, Lodi Federica, Vera Rocio, Villar Inmaculada C, Cogolludo Angel, Jimenez Rosario, Moreno Laura, Romero Miguel, Tamargo Juan, Perez-Vizcaino Francisco, Duarte Juan. Quercetin and Isorhamnetin prevent endothelial dysfunction, Superoxide production, and overexpression of p47phox induced by Angiotensin II in Rat Aorta. The Journal of Nutrition. 2007; 137(4): 910-915. Doi: 10.1093/jn/137.4.910.

[147]Kivirantat Jair, Huovinen Keijo, Seppanen-Laakso Tuulikki, Hiltunen Raimo, Karppanen, Kilpelainen Heikki Mikko. Effects of onion and garlic extracts on spontaneously hypertensive rats. Phytotheraphy Research. 1989; 3(4): 132-135. Wiley online library. https://doi.org/10.1002/ptr.2650030404.

[148]Holly L Nicastro, Sharon A Ross, John A Milner. Garlic and onions: Their cancer prevention properties. Cancer Prev Res (Phila).2015; 8(3):181-189.Doi: 10.1158/1940-6207.CAPR-14-0172.

[149]Weidmann Anita Elaine. Dihydroquercetin: More than just an impurity. Eur J Pharmacol.2012; 684(1-3):19-26. Doi: 10.1016/j.ejphar.2012.03.035.

[150]Arung Enos Tangke, Furuta Shoko, Ishikawa Hiroya, Shimizu Kuniyoshi, Kondo Ryuichiro. Melanin biosynthesis inhibitory and antioxidant activities of quercetin-3'-O-beta-D-glucoside isolated from Allium cepa. Z Naturforsch C J Biosci.2011; 66(5-6): 209-14. Doi: 10.1515/znc-2011-5-603.

[151]Oloyede A, Okpuzor J, Omidiji O. Cytological and toxicological properties of a decoction used for managing tumors in Southwestern Nigeria. Pak J Biol Sci.2009;12 (4):383-7. Doi: 10.3923/pjbs.2009.383.387.

[152]Yong Zhou, Wen Zhuang, Wen Hu, Guan- Jian Liu, Tai-Xiang Wu, Xiao-Ting Wu. Consumption of large amounts of Allium vegetables reduces risk for gastric cancer in a meta-analysis. Gastroenterology. 2011;141(1): 80-9. Doi: 10.1053/j.gastro.2011.03. 057.

[153]Pham A, Bortolazzo A, Brando W J. Rapid dimerization of quercetin through an oxidative mechanism in the presence of serum albumin decreases its ability to induce cytotoxicity in MDAMB-231 cells. Biochem Biophys Res Commun.2012; 427(2): 415-20, Doi: 10.1016/j.bbrc.2012.09.080.

[154]Aiman U, Khatimah H, Muhammad AS, Muhammad CM, Dandari SD, UpikAM. Anti-Arthritic effect of onion skin extract on rat complete Freund's adjuvant-induced. European Journal of Molecular and Clinical Medicine. 2020;7(7): 1183-92, 2020.ISSN 2515-8260.

[155]Mandukhali Saf-ur-Rehman, Ahmed Atallah F, Al-Yousef Hanan M, Al-Qahtani Jawaher Hamad, Gilani Anwarul-Hassan. The mechanism underlying the spasmolytic and bronchodilatory activities of the flavonoid -rich red onion "Allium cepa L." peel Extract. International Journal of Pharmacology.2014;10(2):82-89. Doi:10.3923/ijp.2014.82-89.

[156]Mohammad KGN, Hoda Y, Maedeh A. Antispasmodic Activity of Onion (Allium cepa L.) peel Extract on Rat Ileum. Iranian Journal of Pharmaceutical Research.2008;7(2):155- 159. Doi:10.22037/IJPR.2010.759.

[157]Corea G, Fattorusso E, Lanzotti V, Capasso R, Izzo AA. Antispasmodic saponins from Bulbs of Red onion, Allium cepa L. var. Tropea. Journal of Agricultural and Food Chemistry., 2005; 53(4): 935-940. Doi: 10.1021 /jf048404o.
[158]Sampath Kumar K P, Bhowmik D, Chiranjib, Biswajit, Tiwari P, "Allium cepa: A Traditional medicine herb and its health benefits. Journal of Chemical and Pharmaceutical Research.2010; 2(1):283-291. Available from www.jocpr.com. ISSN no:0975-7384.
[159]Medicinal uses of onion. Available from Sypdersden - WordPress.com. https://images .app.goo.gl/mH72ULWMCwZXCEaRA (accessed Mar. 22,2021)
[160]Virshette S J, Patil M K, Shaikh Junaid R. A review on pharmacological properties and phytoconstituents of indigenous carminative agents. Journal of Pharmacognosy and Phytochemistry.2020;9(3):142-145. www.phytojournal.com.
[161]Marsunn Ortiz. Antimicrobial activity of onion ang ginger against two food borne pathogens Escherichia coli and staphylococcus Aureus. MOJ Food Process Technol. 2015;1(4):104-112. Doi: 10.15406/mojfpt.2015.01.00021.
[162]Mansoor Al-Saadi Narjis Hadi. In vitro study of the anticoagulant activity of some plant extracts. Indian Journal of Applied Research.2013;3(7):120-122. Doi: 10.36106/ijar.
[163]Taj Eldin I M, Abdalmutalab Majed M, Izzalddeen Hajir M, Abdalkareem Madina A, Abdalraheem Marwa A, Alhassan Marwa B. Evidence for an in vitro Anticoagulant Activity of Red onion (Allium cepa L.). Sudan JMS.2011; 6(2): 85-88. Doi: 10.4314/sjms. v6i2.72459.
[164]Ebbo A. A, Bello A, Ismail S M, Liman Y M, Idris S B, Ogah J I, Sani A. A, Yusuf S A. In Vitro Anticoagulant Effects of Aqueous Extract of Allium cepa (onion) on Albino Rat Blood. Chronicles of Pharmaceutical Science.2019; 4(1): 4-9. Scientiaricerca.com.
[165]Sudhakaran Menon I, Kendal R Y, Dewar H A, Newell D J. Effect of Onions on Blood Fibrinolytic Activity. Brit. med. J.1968; 3(5614): 351-352. Doi:10.1136/bmj.3.5614.351.
[166]Agarwal R K, Dewar H A, Newell D J, Das B. Controlled trail of the effect of cycloalliin on the fibrinolytic activity of venous blood. Atherosclerosis.1977; 27(3):347-51. Doi: 10.1016/0021- 9150(77)90044-2.
[167]Nagda K. K, Ganeriwal S K, Nagda K C, Diwan A M. Effect of onion and garlic on blood coagulation and fibrinolysis In vitro. Ind. J. Physiol. Pharmac.1983; 27(2):141-45. PMID: 6885127.
[168]Orengo K O, Maitho T, Mbaria J M, Maingi N, Kitaa J M. In vitro anthelmintic activity of Allium sativum, Allium cepa, and Jatropha curcas against Toxocara canis and Ancylostoma caninum. African Journal of Pharmacy and Pharmacology. 2016;10(21): 465-71. Doi: 10.5897/AJPP2016.4551.
[169]Aniela Saplontai-Pop, Augustin Mot, Marioara Moldovan, Radu Oprean, Radu Silgahi Dumitrescu, Olga Orasan, Marcel Parvu, Emese Gal, Corina Ionescu. Testing antiplatelet and antioxidant activity of the extract of seven varieties of Allium cepa L. Open Life Sci.2015; 10(1): 89-98. Doi: 10.1515/biol-2015-0011.
[170]Ebrahimi-Mamaghani Mehranghiz, Saghafi-Asl Maryam, Pirouzpanah Saeed, Asghari-Jafarabadi Mohammad. Effects of raw onion consumption on metabolic features in overweight or obese women with polycystic ovary syndrome: a randomized controlled clinical trial. J Obstet Gynaecol Res.2014; 40(4):1067-76. Doi: 10.1111/jog.12311.Epub 2014 Mar 10.
[171]Abhishek Bhanot, Richa Shri. A comparative profile of methanol extracts of Allium cepa and Allium sativum in diabetic neuropathy in mice. Pharmacognosy Res.2010; 2(6): 374-84. Doi:10.4103/0974- 8490.75460.
[172]Bang Mi-Ae, Kim Hyeon-A, Cho Young-Ja. Alterations in the blood glucose, serum lipids and renal oxidative stress in diabetic rats by supplementation of onion (Allium cepa. Linn). Nutr Res Pract.2009; 3(3): 242-6, Doi: 10.4162/nrp.2009.3.3.242.
[173]Kook S, Gun-Hee K, Choi K. The antidiabetic effect of onion and garlic in experimental diabetic rats: meta-analysis. J Med Food.2009; 12(3): 552-60. Doi: 10.1089/jmf.2008.1071.
[174]Gabriela Tataringa, Anca Miron, Ioana Paduraru, Monica Hancianu, Eliza Gafitanu, Ursula Stanescu. Characterization of some extractive fractions isolated from raw Allium cepa L. bulbs. Rev Med Chir Soc Med Nat lasi. 2008;112(2): 522-4. PMID:192950
[175]Campos K E, Diniz Y S, Cataneo A C, Faine L A, Alves M J Q F, Novelli E L B, Hypoglycaemic and antioxidant effects of onion, Allium cepa: dietary onion addition, antioxidant activity and hypoglycaemic effects on diabetic rats. Int J Food Sci Nutr.2003; 54(3):241-6. Doi: 10.1080/09637480120092062.
[176]Jevas Chibuike Ozougwu. Anti-Diabetic effects of Allium cepa (ONIONS) aqueous extracts on alloxan-Induced diabetic Rattus Novergicus April 2011, Pharmacologyonline 1(7):270-281
[177]Chul-Won Lee,[1] Hyung-Seok Lee,[2] Yong-Jun Cha,[3] Woo-Hong Joo,[4] Dae-Ook Kang,[5] and Ja-Young Moon[5] . In vivo Investigation of Anti-diabetic Properties of Ripe Onion Juice in Normal and Streptozotocin-induced Diabetic Rats, Prev Nutr Food Sci. 2013 Sep; 18(3): 169–174.
[178]Augustine I Airaodion1*, Ime U Akaninyene2, Kenneth O Ngwogu3, John A Ekenjoku4 and Ada C Ngwogu5 1 . Hypolipidaemic and Antidiabetic Potency of Allium cepa (Onions) Bulb in Alloxan-Induced Diabetic Rats , ACTA SCIENTIFIC NUTRITIONAL HEALTH (ISSN:2582-1423) Volume 4 Issue 3 March 2002
[179]Kook S, Kim GH and Choi K. The Antidiabetic Effect of Onion and Garlic in Experimental Diabetic Rats: Meta Analysis , Published Online:23 Jul 2009
[180]Daniega DR , The anti-diabetic use of Allium cepa (Garden Onions), Journal of Community Medicine & Health Education 4th World Congress on Public Health, Epidemiology & Nutrition, DOI: 10.4172/2161-0711-C2-036
[181]Ban Jung Ok, Hwang In Guk, Kim Tae Myoung, Hwang Bang Yeon, Lee Ung Soo, Jeong Heon-Sang, Yoon Young Won, Kimz Dae Joong, Hong Jin Tae. Anti-proliferate and pro-apoptotic effects of 2,3- dihydro-3,5-dihydroxy-6-methyl-4H-pyranone through inactivation of NF-kappaB in human colon cancer cells. Arch Pharm Res.2007; 30(11): 1455-63. Doi:10.1007/BF02977371.
[182]Katrin Sak. Site-specific anticancer effects of dietary flavonoid quercetin. Nutr Cancer.2014; 66(2): 177-93. Doi: 10.1080/01635581.2014.864418.
[183]Porchezhian E, Ansari S H. Effect of liquid extract from fresh Abutilon indicum leaves and Allium cepa bulbs on paracetamol and carbontetrachloride induced hepatotoxicity. Pharmazie.2000; 55(9): 702-3. PMID: 11031781
[184]Tulay Askin Celik, Ozlem Sultan Aslanturk. Evaluation of cytotoxicity and genotoxicity of Inula viscosa leaf extracts with Allium test. J Biomed Biotechnol.2010;2010,18252. Doi:10.115/2010/189252.
[185]Aganovic-Musinovic Izeta, Todic Maida, Becic Fahir, Kusturica Jasna. Genotoxicity evaluation of paracetamol applying Allium test. Med Arh. 2004;58(4):206-9. PMID: 15526585.
[186]Arkhipchuk V. V, Goncharuk V. V, Chernykh V. P, Maloshtan L. N, Gritsenko I. S. Use of a complex approach for assessment of metamizole sodium and acetylsalicylic acid toxicity, genotoxicity and cytotoxicity. J Appl Toxicol.2004; 24(5): 401-7. Doi: 10.1002/jat.1027.
[187]Hiroyuki Sakakibara H, Saki Yoshino, Yoshichika Kawai, Junji Terao. Antidepressant-Like Effect of Onion (Allium cepa L.) Powder in a Rat Behavioral Model of Depression. Bioscience Biotechnology and Biochemistry.2008;72(1):94-100. Doi: 10.1271/bbb. 70454.

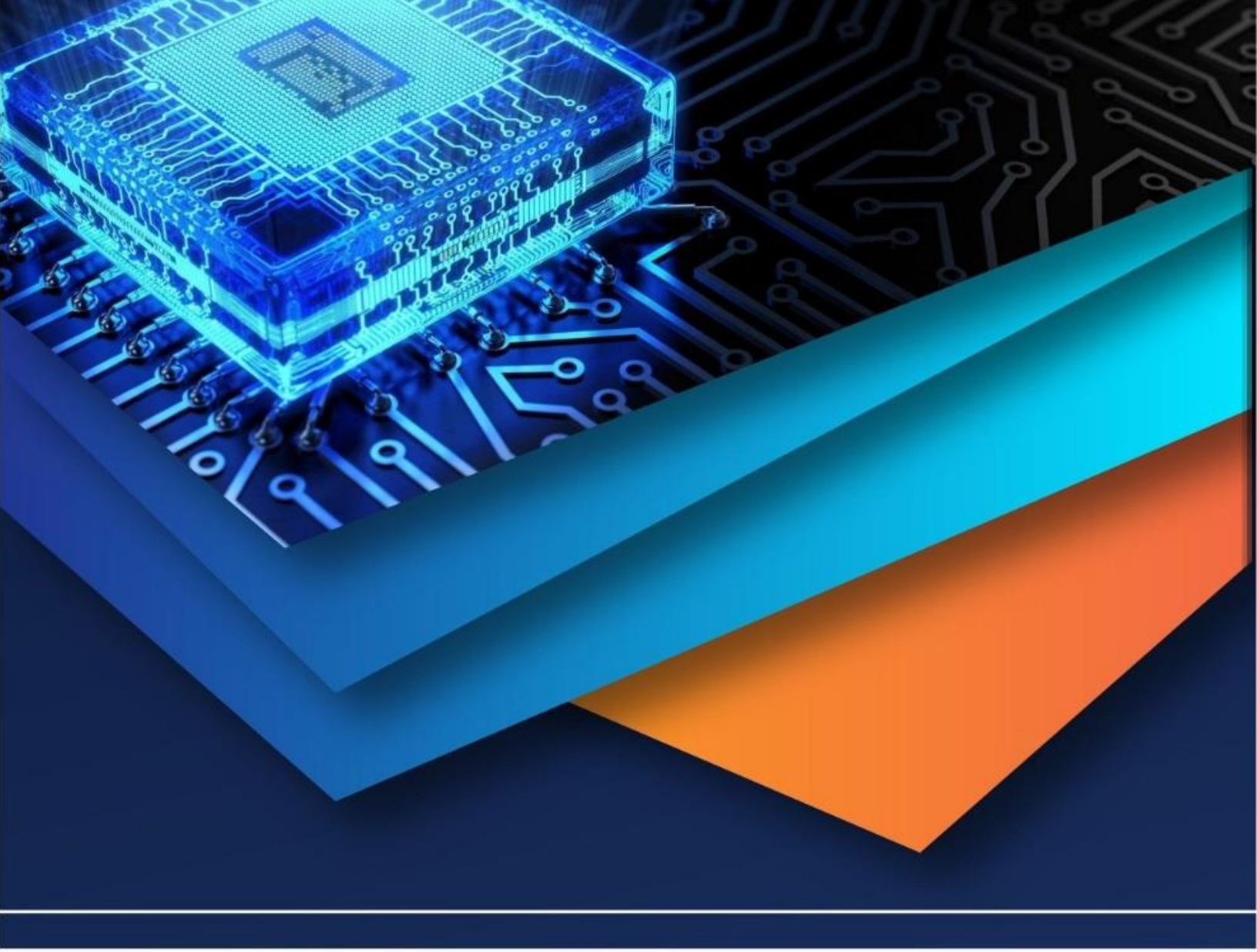
[188] Simra Nasri, Mahdieh Anoush, Narges Khatami. Evaluation of analgesic and anti-inflammatory effects of fresh onion juice in experimental animals. African Journal of Pharmacy and Pharmacology.2012; 6(23): 1679-1684. Doi: 10.5897/AJPP12.179.

[189] Obioha U E, Suru Stephen M, Ola-Mudathir Kikelomo F, Faremi Toyin Y. Hepatoprotective potentials of onion and garlic extracts on cadmium-induced oxidative damage in rats. Bio Trace Elem Res.2009; 129(1-3): 143-56. Doi: 10.1007/s12011-008-8276-7.

[190] Ozougwa J C, Eyo J E. Hepatoprotective effects of Allium cepa (onion) extracts against paracetamol-induced liver damage in rats. African Journal of Biotechnology .2014; 13(26): 2679-2688. Doi: 10.5897/AJB2014.13815.

[191] Shri R, Bora KS. Neuroprotective effect of methanolic extracts of Allium cepa on ischemia and reperfusion-induced cerebral injury. Fitoterapia. 2008;79(2): 86-96. Doi: 10.1016/j.fitote.2007.06.013.



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