

BOTTLE GOURD (*Lagenaria siceraria*)

A vegetable for good health

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Abstract

The gourd is used as curative plant for mental health disorders. Among cucurbits, the bottle gourd, *Lagenaria siceraria* (Mol.) Standl. is the only plant which contains highest choline level along with required metabolites/metabolic precursors for brain function. The purpose of this paper is to explore scientific creditability of narration of gourd in the scriptures of the world and traditional usage. The biological activities of important members of family *Cucurbitaceae* on human body have also been presented. It is emphasized that these plants are having high therapeutic values and must be consumed as daily nutrition. From the point of pharmacological function the seeds are advised for consumption, as they have more nutrition and omega fatty acids.

Linn.), chayote (*Sechium edule* Sw.), loofah (*Luffa* spp.), bottle gourd [*Lagenaria siceraria* (Mol.) Standl.], snake gourd (*Trichosanthes* spp.), and wax gourd [*Benincasa hispida* (Thunb.) Cogn.]. Many of these are earliest cultivated plants and are used for medicinal and nutritional values (Davies & Stewart, 1990; Duke, 1992; Facciola, 1998; Newall *et al*, 1996; Pizzorno & Murray, 1985; Werbach, 1991). Those with hard-shelled fruits, particularly *Lagenaria* spp., have been made into various containers and musical instruments since ancient times, and are now more popular than ever for crafting into artistic objects. Succulent enthusiasts cultivate species of *Coccinia* Wight & Arn., *Corallocarpus* Welw. ex Hook.f., *Cyclantheropsis* Harms., *Gerrardanthus* Harvey ex Hook. f., *Ibervillea* E. Greene, *Kedrostis* Medik., *Melothria* Linn., *Momordica* Linn., *Seyrigia* Kerau., *Xerosicyos* Humb., and *Zehneria* Endl., many of which are endangered in the wild. Some bear attractive ornamental fruits and vines, and all are interesting and worthy of study.

In the scriptures narration about gourd goes: "... Jonah the Prophet, instead of obeying the Divine command,

Introduction

"Thy food be thy medicine" is one of the laws of nature. We get proper nutrition from plants to live healthy life. The vegetable gourd, mostly insignificant in modern food, is a primary food to all living beings especially to human. Significant importance is given to it in Hinduism, the oldest religion of the world, in all auspicious functions and is one of the prime vegetables ever included in the food. In Christianity and Islam, though the fruit is indicted in their scriptures, it is rarely used and less important in the food.

The vegetable gourd, belonging to the family *Cucurbitaceae* (Nadkarni, 1954; Warriar *et al*, 1995) is an eye opener for scientists and theologians since there is narration about gourd in all the

major scriptures (The Presidency of Islamic Researchers, IFTA; Gospel Communications International, 2002). Immense information is disclosed to the humanity by a word in the scriptures. The *Cucurbitaceae* or cucurbit family (also commonly referred to as the gourd, melon, or pumpkin family) is a medium-sized plant family, comprising some 118 genera and 825 species of wide distribution in the warmer regions of the world. It is a major family for economically important domesticated species. Particularly those with edible fruits including: cucumber (*Cucumis sativus* Linn.), melon (*Cucumis melo* Linn.), watermelon [*Citrullus lanatus* (Thunb.) Matsumura & Nakai], squash and pumpkin (*Cucurbita* spp.), bitter melon (*Momordica charantia*

"rose up to flee into Tharsis from the face of the Lord" that he might escape the task assigned to him. He boards a ship bound for that port, but a violent storm overtakes him, and on his admission that he is the cause of it, he is cast overboard. A great fish providentially prepared for the purpose swallows him and after a three-day's sojourn in the belly of the monster, during which time he composes a hymn of thanks giving, he is cast upon dry land. God made a vine, a plant of gourd and made it to come up over Jonah, that it might be a shade over his head, to deliver him from his discomfort (The Presidency of Islamic Researchers, IFTA; Gospel Communications International, 2002). So Jonah was exceedingly glad because of the vine. But God prepared a worm at dawn the next day and it chewed on the vine, so that it withered" (Gospel Communications International, 2002).

Nutritional importance of gourd

Bottle gourd is found to be the one mentioned in the scriptures as a

healer for mental health disorders for its highest content of choline than any other vegetable known to man till date and the vitamins, minerals and amino acids that are present in it for the synthesis of neurotransmitters (Table 1). Our study results on 35 G u j a r a t earthquake victims, who were suffering from mental disorders like depression, stress and manic disorders, were extremely significant with shade dried gourd powder capsules. The curative efficacy of gourd in such cases is not only confirming the narration in scripture but also revealing to the humanity that it is a therapeutic formula available for mankind on such circumstances. Further the botanical age of origin of gourd was established as 3000 years back



Fig. 1b : Different varieties of Pumpkin

(Armstrong, 1996), coincided such incidence date. This may be the only cucurbit plant known in both the New and Old Worlds in early prehistoric times. Archeological evidences support man's association with bottle gourd in Peru from 11,000 to 13,000 years B.C. (Sirohi & Sivakami, 1991).

Medicinal uses of cucurbits

The medicinal values of *Cucurbitaceae* or cucurbit family are given in Table 2. The spoilage of many ingredients like vitamins and amino acids on heating process is to be considered once we decide to consume these vegetables. The seeds, which are given least importance, have prime role in our body. The seeds of bottle gourd, pumpkin and melons are encapsulated with innumerable phyto-chemicals, vitamins, minerals and amino acids along with essential fatty acids, omega fatty acids which are major components of the communicating membranes of the brain. Some of the vegetables belonging to the

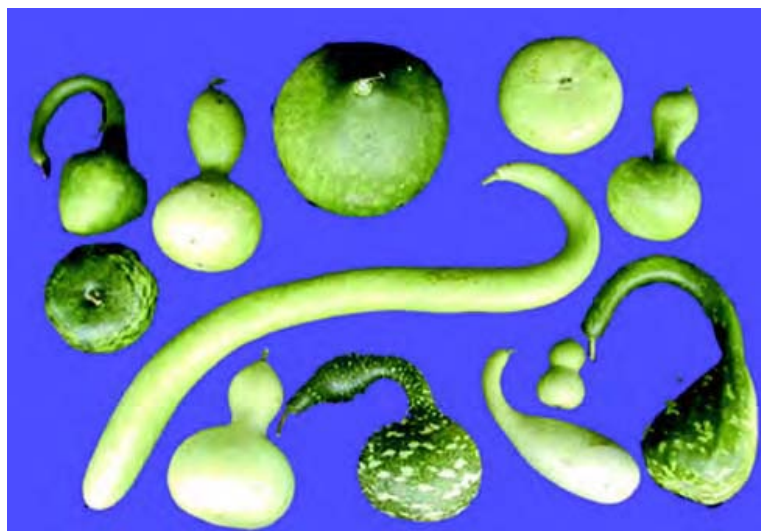


Fig. 1a : Different varieties of Gourd



Fig. 1c : Watermelon

family *Cucurbitaceae* are displayed for identification purposes (Fig. 1a, 1b, 1c, 1d & 1e). All ingredients that are present in the gourd plant help synthesis of choline, which in turn maintain our brain function. Also basic metabolites required for L-carnitine metabolism are present in the gourd, which in turn build up our body and energy is provided to the cells whenever they lack it (Canty & Zeisel, 1994; Mathews & Van Hode, 1995).

Conclusion

The plants of the family *Cucurbitaceae* are rich potential source of drugs as they produce a vast array of novel bioactive molecules many of which probably serve as chemical defenses against infection or predation. Among the available species only 5% have thus far been screened for the presence of any bioactive molecules of potential therapeutic use. Instead of consuming vitamin pills or tonics, a slice of gourd, a slice of melon and a handful of pumpkin seed are enough for maintaining our health. A cup of watermelon juice in the morning, mixed green salad of gourd slices (two pieces of melon, two pieces of gourd, four pieces of snake gourd, one piece of bitter gourd and some cuttings of cucumber) are suffix to prefix for good health.

References

1. Armstrong WP, The wild and wonderful world of gourds, *Zoonooz*, 1996, **69**(10), 24-29.
2. Canty DJ and Zeisel SH, Lecithin and Choline in human health and disease, *Nutr Rev*, 1994, **52**, 327-339.
3. Davies S and Stewart A, *Nutritional Medicine*, Avon Books New York, 1990, p.509.
4. Duke James A, *Handbook of Biologically active Phytochemicals and their activities*, Boca Raton, FL. CRC Press, 1992.
5. Facciola S, *Cornucopia - A Source Book of Edible Plants*, Kampong Publications, Vista CA, 1998, p.713.
6. Gospel Communications International, 2002, *The Bible Ch 1*, 17; 4,1.
7. Mathews CK and Van Hode KE, *Biochemistry*, second edition, The Benjamin/Cummings Publishing Company, Inc. 1995, p.634, 737-781.
8. Nadkarni KM, *Indian Materia Medica*, Popular Book Depot, Bombay & Dhootapapeshwar Prakashan Ltd., Panvel, 2vols, 3rd edition (revised and enlarged) by A.K.Nadkarni, 1954, p.721.
9. Newall CA, Anderson LA and Phillipson J D, *Herbal Medicine - A Guide for Health-care Professionals*, The Pharmaceutical Press, London, 1996, p. 296.
10. Pizzorno JE and Murray MT, *A Textbook of Natural Medicine*, John Bastyr College Publications, Seattle, Washington (Looseleaf), 1985.
11. Sirohi PS and Sivakami N, Genetic diversity in cucurbits ...bottlegourd, *Indian Hort*, 1991, **36**(3), cover, II, 44-45.
12. The Presidency of Islamic Researchers, IFTA, *The Holy Quran English Translation of Meanings and Commentary*, King Fahad Holy Qur an Printing Complex, Al-Madinah Al-Munawarah. Ch 37,139-148.
13. Warriar PK, Nambiar VPK and Ramankutty C, 1995, *Indian Medicinal Plants*, Orient Longman, Hyderabad, 1996 reprint, Volume 3, 1995, p.292.
14. *Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products—Raw Materials Series*, vol VI, 16-19,1962, reprinted 1998 National Institute of Science Communication (erstwhile Publication and Information Directorate), Council of Scientific & Industrial Research, New Delhi.
15. Werbach M, *Nutritional influences on mental illness — A source book of clinical research*. Third Line Press, Inc, Tarzana CA, 1991, p. 360.
16. Zeisel S, Dietary choline: biochemistry, physiology and pharmacology, *Ann Rev Nutrition*, 1981, **1**, 95-121.



Fig. 1d : Bitter melon



Fig. 1e : Cucumber

**Table 1 : Nutritional composition of *Lagenaria siceraria*,
(Amount in 100 grams of edible portion)**

Nutrients	Units	Fruit ^a	Seed ^a	RDA ^{b,c}
Proximates				
Protein	g	0.62	24.54	40 - 80
Total lipid (Fat)	g	0.02	45.85	20 - 22
Carbohydrate, by difference	g	3.39	17.81	-
Fiber, total dietary	g		3.90	-
Minerals				
Calcium, Ca	mg	26	43	800 - 1000
Iron, Fe	mg	0.20	14.97	10 - 15
Magnesium, Mg	mg	11	535	300 - 400
Phosphorus, P	mg	13	1174	800 -1200
Potassium, K	mg	150	807	99.0
Sodium, Na	mg	2	18	500.0
Zinc, Zn	mg	0.70	7.46	15.0
Copper, Cu	mg	0.026	1.387	2 - 3
Manganese, Mn	mg	0.066	3.02	2.5 - 5.0
Selenium, Se	mcg	0.2	5.60	50 - 200
Vitamins				
Vitamin C, total ascorbic acid	mg	10.1	1.9	45 - 60
Thiamin	mg	0.029	0.21	1.5
Riboflavin	mg	0.022	0.320	1.8
Niacin	mg	0.320	1.745	20.0
Pantothenic acid	mg	0.152	0.339	10.0
Vitamin B-6	mg	0.04	0.224	2.0
Folate, total	mcg	6	58	200.0
Folate, food	mcg	6	58	n.a.
Folate,DFE	mcg_DFE	6	58	n.a.
Vitamin B-12	mcg			3 - 6
Vitamin A, IU	IU	16	380	2700-5000
Vitamin A,Rae	mcg_RAE	1	19	n.a.
Vitamin E	mg_ATE		1.000	30 IU/10 mg
Choline	mg	16.02/g [dry basis] ^d		n.a.

Lipids				
Fatty acids, total saturated	g	0.002	8.674	-
Fatty acids, total monounsaturated	g	0.004	14.258	-
16:1 undifferentiated	g		0.099	-
18:1 undifferentiated	g	0.004	14.146	-
Fatty acids, total polyunsaturated	g	0.009	20.904	-
18:2 undifferentiated	g	0.009	20.702	-
18:3 undifferentiated	g		0.181	-
Amino acids				
Tryptophan	g	0.003	0.431	0.2
Threonine	g	0.018	0.903	0.7
Isoleucine	g	0.033	1.264	1.0
Leucine	g	0.036	2.079	1.5
Lysine	g	0.021	1.833	1.1
Methionine	g	0.004	0.551	0.7
Cystine	g		0.301	n.a.
Phenylalanine	g	0.015	1.222	n.a.
Tyrosine	g		1.019	n.a.
Valine	g	0.027	1.972	1.1
Arginine	g	0.014	4.033	n.a.
Histidine	g	0.004	0.681	n.a.
Alanine	g		1.158	n.a.
Aspartic acid	g		2.477	n.a.
Glutamic acid	g		4.315	n.a.
Glycine	g		1.796	n.a.
Proline	g		1.000	n.a.
Serine	g		1.148	n.a.
References				
^a USDA Nutrient Database Sr-15,NBD No:11218; 1206 .				
^b Gopalan C, Rama Sastri BV and Balasubramanian SC, Nutritive value of Indian foods, National Institute of Nutrition, ICMR, Hyderabad, India,1996.				
^c Other substances in food in Recommended Dietary Allowances, National Research Council, 10th ed. Washington, DC: National Academy Press, 1989, 262-271.				
^d <i>The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products</i> — Raw Materials Series, vol VI,18,1962, reprinted 1998, National Institute of Science Communication (erstwhile Publication and Information Directorate), Council of Scientific & Industrial Research, New Delhi.				

Table 2 : Ethnobotanical uses of some cucurbits

System	<i>Lagenaria siceraria</i> (Mol.) Standl. (Bottle gourd/Calabash)	<i>Cucurbita pepo</i> Linn. (Squash and Pumpkin)	<i>Trichosanthes cucumerina</i> Linn. (Snake gourd)	<i>Cucumis sativus</i> Linn. (Cucumber)	<i>Cucumis melo</i> Linn. (Melon)	<i>Citrullus lanatus</i> (Thunb.) Mats. & Nakai (Watermelon)	<i>Momordica charantia</i> Linn. (Bitter melon)	<i>Sechium edule</i> Sw. Chayote	<i>Luffa</i> spp (Loofah)		<i>Benincasa hispida</i> (Thunb.) Cogn. Ash/Wax gourd
									<i>Luffa acutangula</i> Roxb. Ridged/ribbed gourd	<i>Luffa cylindrica</i> (Linn.) M. J. Roem. syn. <i>L. aegyptiaca</i> Mill. Spongegourd Vegetable Sponge	
1. Gastro.	Adenopathy; Diuretic; Dropsy; Laxative; Litholytic; Lithontriptic; Purgative	Anthelminthic; Diuretic; Vermifuge	Cathartic; Hydragogue; Laxative; Stomachic; Vermifuge	Diuretic; Dyspepsia; Vermifuge	Anasarca; Digestive; Diuretic; Dyspepsia; Jaundice; Stomatitis; Vermifuge	Calculus; Digestive; Diuretic; Laxative; Peptic; Stomatitis	Abdomen; Apertive Bladder; Carminative; Digestive; Laxative; Dysentery; Gout; Hepatitis; Jaundice; Laxative Liver; Purgative; Spleen; Roundworms; Splenitis; Stomachic; Vermifuge	Diuretic	Diuretic; Jaundice; Laxative; Purgative; Splenitis; Splenomegaly	Bladder; Carminative; Cathartic; Dysentery; Enterorrhagia; Hernia; Intestine; Jaundice; Purgative; Stomach Vermifuge	Abdomen; Diuretic; Gravel; Laxative; Vermifuge
2. CVS	Dropsy; Diuretic; Hydropsy	Diuretic	#	Diuretic	Anasarca; Diuretic	Diuretic; Hypertension	Fatality; Hypertension	Arteriosclerosis; Diuretic; Hypertension	Diuretic; Piles	Circulation; Hermostat; Hematochezia; Hemorrhage	Diuretic; Phthisis
3. CNS	Ache (Head); Emetic; Ache (Tooth); Biliou; Convulsion; Insanity; Refrigerant	Demulcent; Nervine; Refrigerant	Ache (Head); Biliou; Emetic; Refrigerant	Ache (Head); Emetic; Refrigerant	Bruise; Emetic; Refrigerant	Demulcent; Repellant	Ache (Head); Ache (Ear); Colic; Emetic; Fatality; Melancholy; Swelling; Aphrodisiac; Biliou; Refrigerant; Rheumatism	#	Anodyne; Convulsion; Demulcent; Emetic; Madness; Spasm	Ache (Tooth); Analgesic; Emetic; Orchitis; Refrigerant; Swelling	Anodyne; Demulcent
4. Horm.	#	#	#	#	Diabetes	Diabetes	Diabetes; Diabetes Mellitis; Hyperglycemia; Aphrodisiac	#	Adenopathy; Amenorrhoea	Emmenagogue; Menorrhagia; Metrorrhagia	Dysuria; Pimple; Thirst



5. Genito.	Dropsy; Diuretic; Litholytic; Lithontriptic	Diuretic	#	Diuretic	Diuretic; Dysuria; Anasarca; Emmenagogue; Gonorrhoea; Micturition; Menorrhagia; Oliguria	Calculus; Diuretic; Kidney; Nephritis; Urogenital	Abortifacient; Carminative; Dysmenorrhoea; Dysentery; Dyspepsia; Emmenagogue; Gonorrhoea; Kidney; Laxative; Piles; Renitis; Stone; Urethritis	Diuretic	Amenorrhoea; Diuretic; Piles; Syphillis; Uremia	Bladder; Carminative; Cathartic; Dysentery; Emmenagogue; Menorrhagia; Metrorrhagia; Piles; Purgative; Urogenital	Diuretic Dysuria Gonorrhoea; Gravel
6. Infections	Alexiteric; Alopecia; Sore Boil; Burn; Cancer; Fever; Depurative; Refrigerant; Rheumatism; Scrofula; Tetanus; Tumor; Wound	Boil; Carbuncle; Fever; Demulcent; Measles; Refrigerant, Smallpox; Sprain; Taenicide; Taenifuge; Vermifuge	Alopecia; Boil; Fever; Malaria; Refrigerant; Vermifuge	Burn; Cancer; Refrigerant; Scald; Taenifuge; Vermifuge; Pneumonia; Wound	Bruise; Cold; Cancer; Cancer (Stomach); Coryza; Eczema; Anasarca; Extravasation Eczema; Refrigerant; Taenifuge; Vermifuge	Antiseptic; Aphthae; Cancer; Demulcent; Malaria	Antibiotic, Boil; Burn; Cancer; Cancer (Breast); Colitis; Depurative; Eczema; Eruption; Fever; Leprosy; Malaria; Refrigerant; Roundworms; Scabies; Sore; Soap; Styptic Swelling; Thrush; Wound	Pertussis	Conjunctivitis; Dropsy; Leprosy; Meibomian Secretion; Scabies; Scrofula; Sore; Sore (Veterinary); Tetanus	Antiseptic; Boil; Cancer; Dropsy Orchitis; Refrigerant; Smallpox; Swelling; Scarlet-Fever; Variola	Abscess; Demulcent; Eruption; Fever; Internulcer; Suppurative; Wound; Abscess
7. Nutr.	#	Tonic; Wart	#	Tonic	#	Hemostat	Tonic	#	Tonic	Tonic	Longevity; Tonic
8. Resp.	Asthma; Cough	#	Bronchitis	#	Coryza; Cough	#	Asthma; Cold; Cough	Pertussis; Bronchitis	Asthma; Expectorant	#	Cough; Expectorant; Hemoptysis; Lung; Phthisis
9. Eye	#	#	#	#	#	#	Catarrh; Eye (Veterinary); Lactagogue; Halitosis; Night-Blindness	#	#	#	#
10. ENT	Gum; Hoarseness	#	#	#	Coryza	#	#	Catarrh	Conjunctivitis; Meibomian Secretion; Snuff	Caries; Lactagogue	#
11. Allergy	#	#	#	#	#	#	Itch	#	#	#	#



12. Immun.	Cancer; Scrofula; Tetanus; Tumor	Tumor	Hemagglutinant; Tumor (Abdomen)	Cancer	Cancer, Cancer (Stomach); Eczema; Polypus; Tumor	Cancer	Cancer, Cancer (Breast); Eczema; Leprosy; Malignancy Tumor; Yaws	#	Scrofula; Tetanus	Tumor	Tumor
13. Skin	Alopecia; Leucoderma Anasarca; Boil; Burn; Depurative; Pimple; Wound	Smallpox; Taenifuge; Taenicide; Boil; Wart	Alopecia; Boil	Burn; Scald; Skin; Taenifuge; Wound	Eczema; Sunstroke; Taenifuge	#	Astringent; Boil; Burn; Psoriasis Chilblain; Depurative; Eruption Dermatosis; Eczema; Leprosy; Psoriasis; Scabies	Leucoderma; Freckle	Leprosy; Scabies; Scrofula	Boil; Scarlet-Fever; Smallpox Variola	Abscess; Cosmetic Eruption; Pimple Rush; Wound
14. Meta.	Refrigerant	Refrigerant	Refrigerant	Refrigerant	Refrigerant	#	Night-Blindness; Refrigerant; Rheumatism	#	Scrofula; Uremia	Refrigerant	Internulcer; Thirst
15. M.Skl.	Pectoral; Rheumatism	Sprain	#	#	#	Pectoral	#	#	Scrofula	Pectoral	Heat
16. Poison	Alexiteric; Antidote	#	#	#	Antivinous	Alcoholism, Antidote	Bite (Snake); Insecticide; Poison; Canicide	#	#	Parasiticide	#

Systems:

1. Gastrointestinal; 2. Cardio vascular system; 3. Central nervous system; 4. Hormonal; 5. Genito-urinary system; 6. Infections and inflammations; 7. Nutrition; 8. Respiratory; 9. Eye; 10. Ear, nose and throat; 11. Allergy; 12. Immunology; 13. Skin; 14. Metabolism; 15. Musculo-Skeleton; 16. Poison.

References:

- Davies S and Stewart A, Nutritional Medicine. Avon Books, New York. 1990, p.509.
 Duke James A, Handbook of Phytochemical Constituents of GRASS herbs and other economic plants. Boca Raton, FL. CRC Press, 1992.
 Duke J A, Write ups or information summaries on approximately 2,000 economic plants. USDA, ARS, Beltsville, MD 20705.
 Jeffery B Harborne and H Baxter, eds. Phytochemical Dictionary: A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London, 1983, p. 791.
 Martindale , The Extra Pharmacopoeia., Twenty-eighth edition, The Pharmaceutical Press, London, 1982.
 Mills Simon and Bone Kerry. Phytotherapy, Churchill Livinston, Edinburgh, 2000.
 Pizzorno J E and Murray MT, A Textbook of Natural Medicine. John Bastyr College Publications, Seattle, Washington (Looseleaf). 1985.
 Werbach, M, Healing with Food, Harper Collins, New York, 1993, p. 443.