

A REVIEW: *Allium cepa aggregatum*, CHARACTERISTICS, AND PROPERTIES

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ABSTRACT

Allium cepa aggregatum is a type of onion but rather different from the normal onions. It has certain characteristics and benefits which make it different from its other allies. *Allium cepa var. aggregatum* i.e potato onion is a representative of the onion family that reproduces chiefly through the division of bulbs, rather than by the seeds. Certain studies and tests have been carried out to study about *Allium cepa aggregatum* but lots more needs to be done. This review throws some light on the overall characteristics and properties of this plant.

KEYWORDS: *Allium cepa aggregatum*, bulbs, characteristics, potato onions, Reproduces.

INTRODUCTION

Onion (*Allium cepa* L.) is one of the important vegetable crops of the Alliaceae family. Two types of onion are commercially grown in India. The first type is common onion *Allium cepa* L, whose bulbs are large, normally single, and its plants are propagated through seeds. The second type is multiplier onion *Allium cepa* L.var *aggregatum* Don, Which produces small-sized bulbs, many to form an aggregated cluster (Hanlet, 1990)

Allium cepa var. aggregatum is a comrade of the family of onions that duplicates fundamentally not by the division of seeds but by the bulbs. This property makes it more similar to garlics than onions. They are also known as multiplier onions or nesting onions . Potato onions are Intimately akin to shallots, that are also *A. cepa var. aggregatum*. Shallots are customarily better known than that of potato onions. Even though shallots and potato onions have precisely abundant variations and differences to represent two families of cultivars, but the definite and

exact segregation line between both is very hard to establish. Potato onions are bigger, split into fewer bulbs, and persist embedded inside the skin of the seed bulb more longer. Shallots technically have a mellow flavor and poor storage characters, while as potato onions have a more sharp flavor and storage is much more. Potato onions are most probably grown by replanting the bulbs than by starting from seed. This individualizes them from biennial onions. Nesting bulbs must not be muddled with sets that are used to start biennial onions. The individual bulbs are somewhat small than routine onions. (Fritsch and Friesen, 2002).

Aggregatum onion (*Allium cepa* L. var. *aggregatum* Don.) is one of the primeval bulb crops known to mankind and broadly grown and consumed in Southern states of India. Globally *aggregatum* onion is a minor bulb crop .This makes it more analogous to garlic than to common onions. It is a crop of the tropical and subtropical region that is capable of tolerance towards hot and humid tropical

climate, greater tolerance to pest and diseases and has longer storage life than the common onion. It is also known as small onion, ever-ready onion, underground onion, potato onion, shallots, nesting onions, multiplier onion, and Egyptian ground onion (Saraswathi et al., 2017).

(*Allium cepa* L. var. *aggregatum* Don.) is one the very infleuntial type of onion grown majorly in Southern states of India and mostly famous for its pungency used in Sambar preparation, important dish in South Indian kitchen. Micronutrients play a very crucial role in the plant metabolism from photosynthesis, cell wall development to respiration, chlorophyll formation, nitrogen fixation, enzymes activity, etc. (Ballabh and Rana, 2012).

Allium cepa var. *aggregatum* is an important *Allium* plant that been used for food, ornamental, natural alternatives to food synthetic preservatives and medicinal for curing various diseases. *Allium* plants contain different sugars, amino acids, vitamins, sulfurous compounds, enzymes, flavonoids, saponins and minerals (Golubev et al., 2003)

EXPERIMENTS on *Allium cepa aggregatum*

Exploration of new and promising anticancer compounds continues to be one of the main tasks of cancer research because of the drug resistance, high cytotoxicity and limitations of tumor selectivity. Natural products represent a better choice for cancer treatment in comparison with synthetic compounds because of their pharmacokinetic properties and lower side effects. In the current study, we isolated a steroidal saponin, named Cepa2, from the dry roots of shallot (*Allium cepa* L. *Aggregatum*

group), and determined its structure by using two-dimensional nuclear manganic resonance (2D NMR). The ¹H NMR and ¹³C NMR data revealed that the newly isolated Cepa2 compound is identical to alliospiroside A (C₃₈H₆₀O₁₂) [(25S)-3β-hydroxyspirost-5-en-1β-yl-2-O-(6-deoxy-α-L-mannopyranosyl)-α-L-arabinopyranoside], whose anticancer activity remains elusive (Thilakavathy and Ramaswamy, 1998).

For Studying the effect of zinc and boron applications on seeding transplanting multiplier onion CO(On)5 at various levels of both basal and foliar application an experiment was carried out. The treatment consists of soil application of zinc sulphate (5 kg ha⁻¹ and 10 kg ha⁻¹), Borax (5 kg ha⁻¹ and 10 kg ha⁻¹), foliar application of zinc sulphate (0.5% foliar) and Borax (0.25% foliar), zinc sulphate (5 kg soil + 0.5% foliar), zinc sulphate (10 kg ha⁻¹ soil + 0.5% foliar), borax (5 kg ha⁻¹ soil + 0.25% foliar), borax (10 ha⁻¹ kg soil + 0.25% foliar) and curb without micronutrient, cloned thrice in a random block design. (Acharya et al., 2015).

An experiment was carried out for determination of the effect of storage temperature on the respiration rate of *aggregate* onion kept in closed PET containers with a product free volume ratio of 1:9 in two different storage conditions viz., ambient (28°C) and refrigerated (5°C). The average respiration rate in terms of O₂ consumption and CO₂ evolution under ambient condition was 30.15 and 25.02 and under refrigerated condition was 5.85 and 2.83 ml/kg, respectively. The average RQ values of ambient and refrigerated stored onion were 0.83 and 0.51, respectively leading to conclude that the respiration rate of onion both in terms of O₂ consumption and CO₂ evolution increased with an

increase in storage temperature (Prabinkumar and Visvanathan, 2014).

Evaluation of seed priming methods to improve seed vigor of onion (*Allium cepa* cv. *aggregatum*) and carrot (*Daucus carota*). The seeds of onion and carrot showed significant differences in seed germination as well as the speed of germination irrespective of the seed priming methods. For onion seeds, among 8, 12, 24, 36 and 48 h of hydropriming, a steady increase in percentage of radicle protrusion, days for 50% germination, days for maximum germination, speed of germination, germination percentage, and up to to 24 h which was 6, 34, 20, 29, and 5percentage higher than control, respectively (Selvarani and Umarani, 2011).

Effect of inorganic and biofertilizer treatments on yield on quality parameters of multiplier onion (*Allium cepa* var *aggregatum*). Onion (cv. Co 4) bulbs were treated with combinations of 15, 30 or 45 kg N and P/ha with *Azospirillum* or phosphobacteria in a field experiment conducted in Madurai, Tamil Nadu, India during the Kharif season of 1997. The influence of *Azospirillum* or the phosphobacteria with 45:45:30 kg NPK/ha was higher than the recommended 60:60:30 kg NPK/ha. The application of *Azospirillum* or the phosphobacteria to the seed bulbs and the soil gave an increased yield of 18.3% and saved 25% of inorganic fertilizer input. Shape index, bulb color, and pyruvic acid content increased through the application of 45:45:30 NPK/ha along with *Azospirillum* or the phosphobacteria (Thilakavathy and Ramaswamy, 1998).

The study was conducted for determining the maximum levels of poultry manure, inorganic fertilizer and their combined effect on yield of shallots grown on sandy Anloga soils in Ghana. Treatments

comprised a 4×3 factual aggregation of poultry manure at 0, 10, 20 and 40 tons/ha and three levels of NPK 15-15-15 fertilizer at 0, 300 and 600 kg ha⁻¹ in a random shot overall block design with four counterparts. A combination of 40 tons/ha of poultry manure with 300 kg/ha and 6000 kg/ha of NPK 15-15-15 fertilizer led to increase in height of plant, number of plantlets per plant, and number of leaves per plant. Even though the employment of inorganic fertilizer solo or in amalgamation with poultry manure naturally increased the bulb yield, but there was a reduction in dry matter content (Blay et al., 2002).

The aftermath of inoculation with the vesicular-arbuscular mycorrhizal (VAM) fungus *Glomus mosseae* together with the pertinence of ordered levels of P fertilizers on growth, quality, and yield properties of onion cv. *aggregatum*. Single superphosphate (SSP) and rock P were applied at 0, 25, 50, 75 and 100% of the recommended dose (60 kg/ha). The inoculated plants that received 50% P showed a significant increase in plant height, the number of leaves, number of tillers, bulb diameter and weight of bulbs compared to plants that had received 100% P and no VAM inoculation.

The treatment receiving 100% SSP with *G. mosseae* recorded the highest plant growth response in respect of all biometric and biochemical characteristics. Nutrient uptake improved remarkably over control under inoculated conditions. Soil availability of nutrients varied with fertilizer dose and VAM inoculated treatments showed less nutrient availability compared to uninoculated treatments. It is concluded that SSP at 50% of the recommended dose together with *G. mosseae* inoculation gave the best yield in *aggregatum* onion (Nagaraju et al., 2000).

A field experiment was carried out during the main season of 1999–2001 at Tamil Nadu Agricultural University, Coimbatore, to study the effect of increasing the row spacing of sugarcane ('Co 86032') to wide rows while intercropping with 'Co 4' aggregatum onion (*Allium cepa* L.) (Mahadevaswamy and Martin, 2002).

Performance Evaluation of Aggregatum Onion Genotypes (*Allium cepa* Var. *Aggregatum*) for Yield, Quality and Resistance Characters was done to check different traits and characteristics of *Allium cepa Aggregatum* (Thingalmaniyan et al., 2017).

Essential compounds in *Allium* have strong antioxidant ability. Tests on antimicrobial activity showed that all essential oils on *Allium* were able to inhibit the activity of gram-positive and gram-negative bacteria (Mnayer et al., 2014)

USES OF *Allium cepa aggregatum*

Onion is a good healer and cleaner. It is believed that onions help prevent colds, gastric ills, anemia, catarrh, fever, and insomnia. Onion has been considered an excellent diuretic since antiquity. Onion juice is applied to burns, chilblains, bites, and stings. It is thought off as very effective for curing ulcers and sores, and assertive kinds of dropsy. It is also declared that onion is beneficial as a digestive stimulant, anti-diabetic and anti-fermentative. For nose bleeding, onion is cut in halves and placed on the nose. Roasted onions are applied as a poultice to boils, bruises and wounds to relieve heat and, in the case of boils, bring them to maturity. Fresh onion juice promotes perspiration, relieves constipation and bronchitis, induces sleep, and is good for cases of scurvy and lead colic. It is given as an antidote in tobacco poisoning. When

Cooked with vinegar, the onions are very useful like in cases of jaundice, dyspepsia and splenic enlargement. Onion stimulates bile production and also helps in reduction of blood sugar. It is endorsed for tuberculosis and has germicidal properties as well. When used regularly in the diet, it affects tendencies towards angina, arteriosclerosis and heart attack. Onions can be used to treat ear ache by dropping warm onion juice in ear. It is also used in prevention of toothache and oral infections (Chevallier, 1996).

Potato onions are mostly used fresh, but the bulblets can also be used as a pickle in vinegar and brine. Dehydrated products potato onion are not common (Shinde and Sontakke, 1986).

Potato onions are rich in minerals, including phosphorus, potassium, calcium, and nitrogen. They also contain ascorbic acid and protein. The pungency of onion makes it an essential and vital food item, particularly in India. The bulbs and leaves are cooked or used raw (Organ, 1960).

The bulb is anti-inflammatory, antihelmintic, antiseptic, carminative, antispasmodic, diuretic, febrifuge, hypoglycaemic, expectorant, lithontripic, stomachic, hypotensive, and tonic. When used frequently in the diet it counteract inclinations towards arteriosclerosis, angina, and heart attack. It is very beneficial for prevention of tooth decay and oral infection. Baked onions can be used as a poultice for removal of pus from sores. Juice of fresh onions is a very useful as a first aid treatment for wasp and bee stings, grazes, bites, and fungal skin infections. It also aids the formation of scar tissue on wounds, thus speeding up the healing process, and has been used as a cosmetic to remove freckles (Saraswathi et al., 2017)

Allium is also prized for their therapeutic activities and properties; they are effective as laxatives and diuretics and have been used to treat parasitic worms and headaches (Griffiths et al., 2002)

Development and validation of UHPLC-HRMS methodology for the determination of flavonoids, amino acids and organosulfur compounds in black onion, a novel derived product from fresh shallot onions (*Allium cepa* var. *aggregatum*) was done to demonstrate phytochemical activities and compounds of this plant (Moreno-Rojas et al., 2018)

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CONCLUSION

Allium cepa aggregatum has been used since time immemorial and is still used today. There are numerous beneficial properties of *Allium cepa aggregatum* but more needs to be done to bring into foreplay its various other properties. It is an antihelmintic, antiseptic, flavoring agent and is used as a condiment also.

FUTURE PROSPECTUS

Not much work has been done regarding the *Allium cepa aggregatum* to explore more of its qualities. Considering that it is very useful more and more stress should be put in to make nanoparticles from it as well as other medicines because it has a lot many medicinal properties.

- sugarcane intercropped with *aggregatum* onion (*Allium cepa*) under different row ratios, fertilizer levels and population densities. *Indian Journal of Agronomy*, 47(3), 361-366.
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