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QUANTITATIVE ESTIMATION OF MINERAL CONTENT FROM EDIBLE FLOWERS OF *ALLIUM CEPA*, *CUCURBITA MAXIMA* AND *CARICA PAPAYA*: A COMPARATIVE STUDY

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Keywords:

Edible flowers, Minerals, Microelements, *Allium cepa, Carica papaya, Cucurbita maxima*

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ABSTRACT: Edible flowers have been an integral part of human nutrition for centuries, being used as garnishes of individual dishes and also consumed fresh. This study determines and compares the essential and trace mineral composition of the three edible flowers of *Allium cepa* (onion), *Carica papaya* (papaya) and *Cucurbita maxima* (pumpkin) with four other commonly consumed edible flowers. Also, a comparative study of the three above-mentioned edible flowers with its respective fruit and leafy parts has been carried out. Macro-mineral and trace mineral contents were estimated by means of Inductively Coupled Plasma-Optical Emission Spectroscopy following the Association of Official Analytical Chemists (AOAC, 1990) method. Amongst the three chosen edible flowers, onion flowers contain the highest amount of potassium, calcium, sodium, zinc, and sulphur content, while the pumpkin flowers have the highest quantity of copper. Onion flowers have the highest quantity of calcium and manganese when compared to their stalk and bulb. Papaya flowers are a rich source of phosphorous and copper compared to their fruit and leaf counterparts. The test flower's average sodium and potassium content are nutritionally sufficient and can be consumed for their high calcium and potassium content. Notably, *Allium cepa* flower is the only edible flower in this study with a detectable level of sulphur content. The results conclude *that Allium cepa, Cucurbita maxima*, and *Carica papaya* flowers are a potential source of microelements, and their consumption may open a new dimension to our nutrition security.

INTRODUCTION: The culinary use of flowers has varied from culture to culture. While many flowers are safe and edible, including the flowers of most culinary herbs, proper identification of their nutrient content is essential to validate their use. *Allium cepa* L. cv. group common onion umbel is a biennial herb belonging to the family *Amaryllidaceae*.

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Onion cultivars are about 89% water, 9% carbohydrates, 1% protein, and have an energy value of 166 KJ [1]. All parts of the herb produce a strong onion odour when crushed. The inflorescence is a spherical umbel, 2-8 cm in diameter with 50-2000 flowers; flowers are sub campanulate to urceolate, tepals six in two whorls, ovate to oblong, 3-5 mm long and greenish-white to purple [2].

Although the green fleshy stalk of onion is considered edible and its budding flower is also consumed in some countries as a side dish or an appetizer, there is no significant literature on the nutritional composition of the onion flowers. Papaya plants (*Carica papaya*) are dioecious or hermaphroditic, producing only male, female or bisexual (hermaphroditic) flowers. Although papaya fruit is extensively consumed worldwide for its reasonable price and high nutritive value, the flowers are not so popular. Even the black papaya seeds are edible and have a sharp, spicy taste. In some parts of Asia, the young leaves of papaya are steamed and eaten like spinach [3]. Studies show that these flowers are considered edible in Northeast India and some Asian countries like Thailand [4]. Papaya flowers are found abundantly in nature; the male flowers are mostly left unused while the female flowers develop into fruits.

The papaya flower tastes bitter, is a good source of dietary fiber and is rich in vitamins A, C and E. Raw papaya pulp (100 gm) contains 0.5 gm of minerals, 0.8 gm of fibre, 7.2 gm of carbohydrate, and provides about 32 kcal of energy, is a significant source of vitamin C and folate [5]. *Cucurbita maxima* (pumpkin), one of at least four species of cultivated squash is a member of the *Cucurbitaceae* family. Most parts of the pumpkin are edible, including the fleshy shell, the seeds, the leaves and even the flowers. Pumpkin flower though widely consumed as dishes like Flores De Calabaza in Mexico, Classic stuffed peppers in West America, and Pakoda or Vajji in India [6], there is not much literature to ascertain its nutritional value. The flowers can be raw in salads, otherwise cooked with other vegetables and steamed in soups. Canned blossoms are also available in the local Mexican markets. Studies have found out the flower's ash, fat, protein, and fibre content as 3.1%, 0.15%, 2.23%, and 4.35%, respectively [7].

The activities of the glyoxylate cycle, isocitrate lyase and malate synthase, were also detectable in petals of pumpkin [8]. Minerals such as sodium, potassium, calcium, phosphorous, iron, and some trace elements like manganese, cobalt, copper, zinc, lead, and selenium are essential nutrients required for various biochemical and physiological functions human body. Inadequate supply of these essential elements results in a variety of deficiency diseases (WHO). Therefore the present study was designed to analyze the mineral content of these lesser-known edible flowers of *Allium cepa*, *Carica papaya*, and *Cucurbita maxima* as a nutritional supplement to maintain better health. The present study also aims to carry out the following:

- Compare the mineral content of the studied edible flowers with their respective fruit and leafy parts.
- Compare the mineral content of the studied edible flowers with four other commonly consumed edible flowers.

MATERIALS AND METHODS:

Collection of the Sample: The flower samples were collected from the local market and scientifically identified by the Central National Herbarium, Botanical Survey of India, Kolkata.

Preparation of Working Solution of the Samples: The whole flowers were selected as the test portion for the quantitative estimation of the minerals. The minerals were analyzed from the solution obtained when 5 g of the fresh crushed flowers were digested with 10 ml of 5N concentrated hydrochloride. The mixtures were placed on a water bath and evaporated almost to dryness. The solution was cooled, filtered into a 100 ml standard flask, and diluted to volume with distilled water. Atomic absorption Spectrometer (ICP-OES; Model No: VDV-5110; Manufactured by: Agilent Technologies) was used for carrying out the mineral estimations by applying the official methods of the Association of Official Analytical Chemists (AOAC, 1990 Method) [9].

Determination of Manganese (Mn): A sample solution of 5 ml was pipetted into a test tube in duplicate, and 0.25 ml of concentrated sulphuric acid was added and boiled for 1 h in a boiling water bath. A spatula tip full sodium periodate was added and heated for another 10 min, cooled, and the absorbance was taken at 520 nm against the blanks.

Determination of Potassium (K): A sample solution of 5 ml was pipetted into a test tube in duplicate. Then 2 ml of cobalt nitrate was added, shaken vigorously, allowed to stand for 45 minutes, and centrifuged for 15 min. The supernatant was drained off, and 2 ml of ethanol was added to the residue. The solution was shaken vigorously and centrifuged for another 15 min. The supernatant was drained off, and 2 ml of distilled water was added to the residue. The solution was boiled for 10 min with frequent shaking to dissolve the precipitate. About 1ml of 1% choline hydrochloride and 1 ml of 2% sodium ferric cyanide were added.

Then 2 ml of distilled water was also added, and the solution was shaken to mix well. The absorbance was taken at 620 nm against the blank.

Determination of Iron (Fe): 2.5 ml of sample solution was pipetted into a test tube in duplicate, and 0.4 ml of 5N sodium hydroxide was added to bring the pH between 4.0-4.5. Soon 0.75 ml of acetate buffer of pH 4.5 was added, and 0.5 ml of 25% hydroquinone was added, and 0.5 ml of 0.1% dipyridyl was also added, and 0.35 ml of distilled water was added to make it up to 5 ml. The absorbance was taken at 520 nm against the blank.

Determination of Calcium (Ca): About 1ml of sample solution was pipetted into a test tube in duplicate. Then 3 ml of calcium working reagent was added, and absorbance at 512 nm was read against the blank.

Determination of Selenium (Se): About 1ml of sample solution was pipetted into a test tube in duplicate, then 1ml of concentrated HCl and 0.4 ml of 2,4-dinitrophenyl hydrazine/N-1, Napthylethlene diamine hydrochloride (2,4-DrPH-NEDA) were added. 2.6 ml of distilled water was added and mixed. The absorbance was measured at 520nm against the blank.

Determination of Lead (Pb): 5 ml of sample solution was pipetted into a test tube in duplicate, and 5ml of 10% sodium citrate and 1 ml of 25% ammonia were added. Metals were extracted by adding portions of dithizone solution consecutively until dithizone became green.

After the extraction, the supernatant was separated from the residue, 12.5 ml of 1% nitric acid was added, shaken, and allowed to settle. The supernatant was transferred again to a dry test tube; 2.5 ml of hydroxylamine hydrochloride, 2 ml of ammonia, and 2.5 ml of dithizone were added to the supernatant. The mixture was shaken for 1 min. The supernatant was discarded while the residue was allowed to settle and centrifuged for 15 min. The absorbance was taken at 520 nm against the blank.

Determination of Sulphur (S) [10]: 1 ml of a sample solution containing 5% of H_2O_2 was mixed with 6 ml of the colouring reagent (Five milliliters of 0.01 mol/l dimethyl sulphone azo- III of 0.01 mol/l, 5 ml of 1 mol /1 KNO_3, 1.25 ml of 0.01 mol K_2SO_4 and 10 ml of conc. acetic acid were mixed in 200 ml double-distilled water and then topped up with ethanol to make up 11 of fluid). The time allowed for the reaction was about 30 min, absorbance was taken at 655 nm against a blank sample.

Determination of Phosphorous (P): An aliquot of 5 ml of sample solution was taken in a 10 ml volumetric flask, and 1 ml of Ammonium molybdate solution was added to it, mixed well, and allowed to stand for few seconds. 1 ml of hydroquinone solution was added, mixed well, and Na2SO3 solution was added to it. The solution was diluted with water and shaken thoroughly. It was allowed to stand for 30 min, and absorbance was taken at 650 nm.

Determination of Iodine (I): 1 ml of the sample solution is taken in a 10 ml test tube with a stopper. To it 1 ml of distilled water and 1 ml of AS (III) solution were added. The test tubes were closed and warmed at 40 degrees for 40 min. In intervals of 1 min, 1 ml of the Ce (IV) solution, warmed at 40 degrees, was added. After a reaction time of 15 min at 40 degrees, the solution was treated with 0.5 ml Brucine solution under shaking and heated to 100 degrees for 15 min. The colour turns a deep orange-red indicating the presence of iodine. After cooling to room temperature, absorbance is taken at 430 nm in a spectrophotometer.

Determination of Zinc (Zn): 50 ml of sample solution and 10ml dithizone solution is pipette into 50 ml 0.02 NHCl solution containing zinc. Shaken for 1 min, and the phases are separated. The lower portion is collected in a test tube. 5 ml of the extract is taken in a 25 ml volumetric flask, diluted to volume with CCl_4 and measured at 525 nm.

Determination of Copper (Cu): An aliquot of 5 ml of the sample is taken in a 125 ml separating funnel. Next, 2 ml of ammonium citrate solution and ammonium hydroxide (1+1) is added until the solution turns pink. 10 ml of CCl_4 is added and shaken for 5 min. Next, CCl_4 is drained, contents are centrifuged for 5 min and absorbance taken at 430 nm

Determination of Sodium (Na): The flower samples for Na estimation were digested by diacid through wet ashing. The digest is diluted to the suitable concentration range so that the final concentration lies between 0 to 5 ppm. The samples are then read in a flame photometer at 598 nm wavelength.

RESULTS: The mineral content of the test flowers have been summarised in **Table 1.** A graphical representation of the same is given in **Fig. 1.** Selenium, iodine, and lead content of the flowers is found Below the Detectable Limit (BDL).

Lead was found at a concentration of below 0.1 mg/ 100 g and the rest of the trace elements studied namely manganese, zinc and copper were found in average quantities. The flowers have a good quantity of calcium and potassium.

TABLE 1: MINERAL CONTENT OF THE TEST FLOWERS (FRESH WEIGHT)

	Test Parameters		
Mineral Content (mg/100gm)	***Allium cepa* (onion) Flower**	***Carica papaya* (papaya) Flower**	***Cucurbita maxima* (Pumpkin) flower**
Sulphur (S)	8.22	BDL (DL: 0.05)	BDL (DL: 0.05)
Phosphorous (P)	0.27	26.47	21.81
Selenium (Se)	BDL (DL: 0.05)	BDL (DL: 0.02)	BDL (DL: 0.02)
Manganese (Mn)	0.46	0.33	0.34
Iron (Fe)	1.68	1.76	1.65
Iodine (I)	BDL (DL: 0.05)	BDL (DL: 0.05)	BDL (DL: 0.05)
Zinc (Zn)	0.60	0.45	0.43
Lead (Pb)	BDL (DL: 0.02)	BDL (DL: 0.01)	BDL (DL: 0.01)
Copper (Cu)	0.44	2.52	3.32
Calcium (Ca)	53.92	44.50	52.43
Potassium (K)	114.79	36.20	50.98
Sodium (Na)	2.04	5.20	6.32

"BDL: Below Detection Limit DL: Detection Limit"

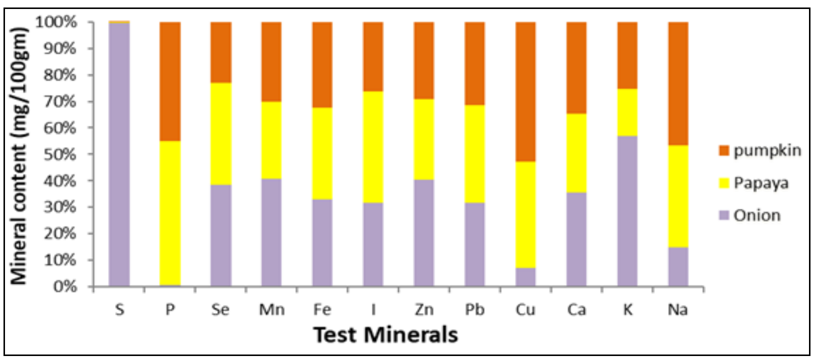

FIG. 1: MINERAL CONTENT DISTRIBUTION OF *ALLIUM CEPA*, *CARICA PAPAYA* AND *CUCURBITA MAXIMA* FLOWERS

Table 2 compares the mineral content of onion, papaya, and pumpkin flowers with their respective fruit/ bulb and leaf/ stalk. The onion flowers have less sulphur content (8.22 mg/ 100 gm) when compared to its bulb (35.02 mg/ 100 gm) and do not have any detectable lead, selenium, *etc.* iodine content.

Onion flowers are a fairly rich source of potassium, calcium, sodium and zinc. Also the flowers have higher amount of calcium (53.92 mg/ 100 gm) and manganese (0.46 mg/ 100 gm) when compared to its stalk (Ca: 31.12 mg/ 100 gm, Mn: 0.22 mg/ 100 gm) and bulb (Ca: 12.92 mg/ 100 gm, Mn: 0.11 mg/ 100 gm). The papaya flowers are a good source of phosphorous (26.5 mg/ 100 gm) and copper (2.52 mg/ 100 gm), with copper found in higher quantities in the flowers when compared to its fruit (0.05 mg/ 100 gm) and leaf (0.06 mg/ 100 gm). Sulphur, lead and iodine remain undetected in the flowers, fruits, and leaves of papaya. *Cucurbita maxima* flowers (3.32 mg/ 100 gm) are a much better source of copper than its fruits (0.06 mg/ 100 gm) and leaves (0.29 mg/ 100 gm); also, calcium, iron, zinc, and copper content is higher in the flowers when compared to its fruit. The flowers are devoid of any detectable selenium content, unlike the fruits (0.37 mg/ 100 gm) and leaves (1.38 mg/ 100 gm).

TABLE 2: COMPARISON OF ALLIUM CEPA FLOWERS WITH ITS BULB [11, 12, 13] AND STALK [11], *CARICA PAPAYA* FLOWERS WITH ITS FRUIT [11] AND LEAF [11, 14] AND *CUCURBITA MAXIMA* FLOWERS WITH ITS FRUIT [11] AND LEAF [11]

Test Parameters	Mineral Content (mg/100gm)								
	Allium cepa			*Carica papaya*			*Cucurbita maxima*		
	Flower	Bulb	Stalk	Flower	Fruit	Leaf	Flower	Fruit	Leaf
Sulphur	8.22	35.02	-	BDL (DL: 0.05)	-	-	BDL (DL: 0.05)	-	-
Phosphorous	0.27	39.65	28.53	26.47	24.11	1971.1	21.81	22.18	64.54
Selenium	BDL (DL:0.05)	1.02	5.22	BDL (DL: 0.02)	1.29	-	BDL (DL: 0.02)	0.37	1.38
Manganese	0.46	0.11	0.22	0.33	0.03	1.86	0.34	0.07	1.14
Iron	1.68	0.53	3.09	1.76	0.20	32	1.65	0.36	5.58
Iodine	BDL (DL: 0.05)	-	-	BDL (DL: 0.05)	-	-	BDL (DL: 0.05)	-	-
Zinc	0.60	0.24	0.99	0.45	0.08	2.14	0.43	0.11	0.90
Lead	BDL (DL: 0.02)	0.68	0.016	BDL (DL: 0.01)	-	-	BDL (DL: 0.01)	-	0.011
Copper	0.44	0.07	0.14	2.52	0.05	0.06	3.32	0.06	0.29
Calcium	53.92	19.92	31.12	44.50	22.72	338.60	52.43	23.06	271
Potassium	114.79	160	312	36.20	173	676.25	50.98	253	423
Sodium	2.04	4.06	15.52	5.20	7.55	151.25	6.32	8.81	12.20

BDL: Below Detection Limit DL: Detection Limit

Fig. 2, 3 and **4** are the individual graphical representations of the comparative study of the three flowers with their respective fruit/bulb and leaf/stalk based on their mineral content.

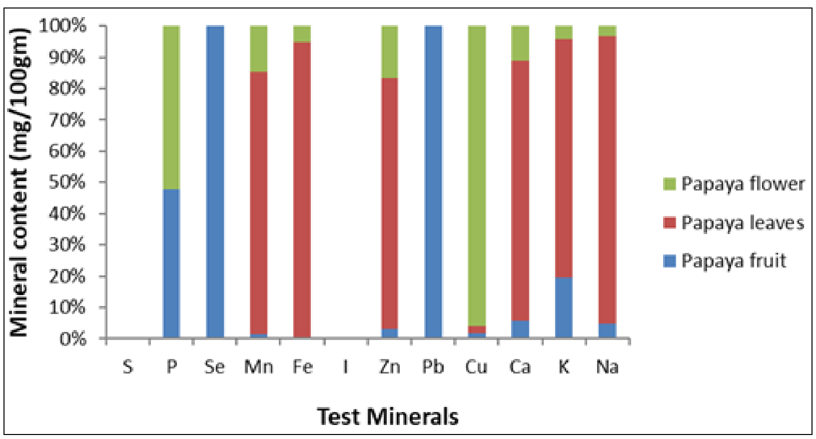

FIG. 2: COMPARATIVE DISTRIBUTION OF THE MINERAL CONTENT OF ONION FLOWER WITH FRESH ONION BULB AND STALK

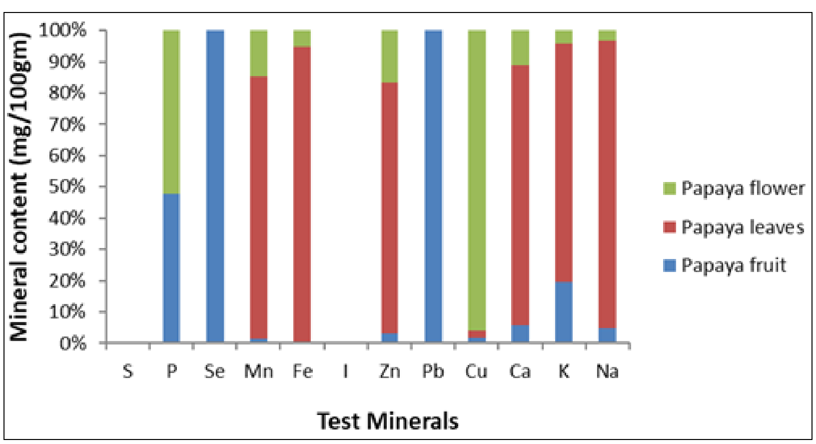

FIG. 3: COMPARATIVE DISTRIBUTION OF THE MINERAL CONTENT OF PAPAYA FLOWER WITH FRESH PAPAYA FRUIT AND LEAVES

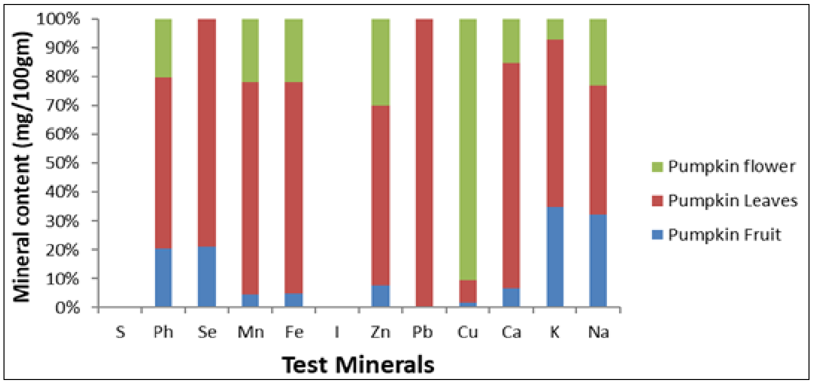

FIG. 4: COMPARATIVE DISTRIBUTION OF MINERAL CONTENT OF PUMPKIN FLOWER WITH FRESH PUMPKIN FRUIT AND LEAVES (FRESH TENDER)

Table 3 compares the mineral content (mg/100 gm) of *Allium cepa*, *Carica papaya* and *Cucurbita maxima* flowers with four other commonly consumed edible flowers, namely *Moringa oleifera* [15], *Madhuca indica* [4, 16], *Sesbania grandiflora* [17] and *Nymphaea stellata* [18].

TABLE 3: MINERAL CONTENT OF THE STUDIED FLOWERS COMPARED WITH MORINGA OLEIFERA, MADHUCA INDICA, SESBANIA GRANDIFLORA AND NYMPHAEA STELLATA

Mineral content (mg/100gm)	*Allium cepa* (onion) flowers	*Cucurbita maxima* (pumpkin) flowers	*Carica papaya* (papaya) flowers	*Moringa oleifera* (Moring) flowers	*Madhuca indica* (Mahua) flowers	*Sesbania grandiflora* (Agathi) flowers	*Nymphaea stellata* (Shapla) flowers
Sulphur	8.22	BDL(DL:0.05)	BDL(DL:0.05)	-	-	-	-
Phosphorous	0.27	21.81	26.47	19.66	140	290	0.32
Selenium	BDL(DL:0.05)	BDL(DL:0.02)	BDL(DL:0.02)	0.28	-	0.2	-
Manganese	0.46	0.34	0.33	4.067	-	-	-
Iron	1.68	1.65	1.76	48.11	15	5.4	4.23
Iodine	BDL(DL:0.05)	BDL(DL:0.05)	BDL(DL:0.05)	-	-	-	-
Zinc	0.60	0.43	0.45	3.27	-	-	8.96
Lead	BDL(DL:0.02)	BDL(DL:0.01)	BDL(DL:0.01)	-	-	-	0.012
Copper	0.44	3.32	2.52	0.64	-	-	1.15
Calcium	53.92	52.43	44.50	32.34	140	145.00	507.00
Potassium	114.79	50.98	36.20	671.00	1.20	1400.00	442.68
Sodium	2.04	6.32	5.20	41.24	0.02	291.00	152.10

BDL: Below Detection Limit DL: Detection Limit

Fig. 5 is the graphical representation of the same. Among the compared edible flowers in this study, pumpkin flowers have the highest copper content (3.32 mg/ 100 gm). The iron content of the studied flowers (onion 1.68 mg/ 100gm, pumpkin 1.65 mg/ 100 gm, papaya 1.76 mg/ 100 gm) is found to be higher than Mahua (0.23 mg/ 100 gm) and Agathi (0.84 mg/ 100 gm) flowers.

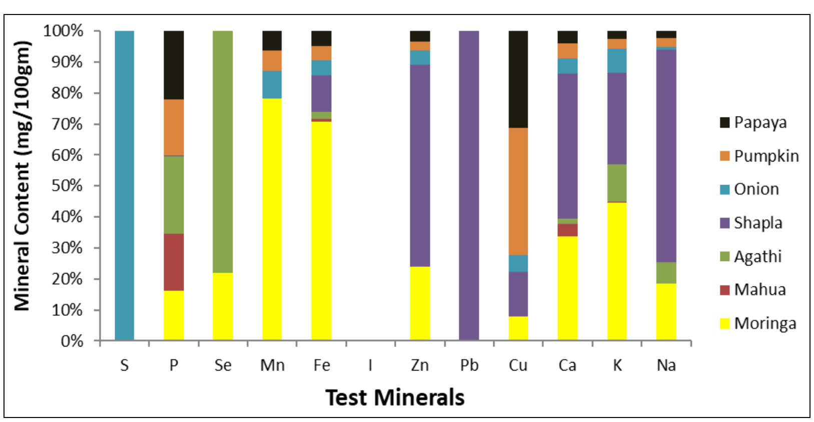

FIG. 5: COMPARATIVE DISTRIBUTION OF THE MINERAL CONTENT OF *ALLIUM CEPA, CARICA PAPAYA* AND *CUCURBITA MAXIMA* FLOWERS WITH FOUR COMMON EDIBLE FLOWERS (FRESH)

Allium cepa flowers have a higher potassium content (114.79 mg/ 100 gm) amongst the three test samples and third in line when compared to Moringa (671 mg/ 100 gm) and Shapla (442.68 mg/ 100 gm) flowers, with Agathi flowers being the richest source (1400 mg/ 100 gm). *Allium cepa* flower is the only edible flower in this study with a detectable level of sulphur content (8.22 mg/ 100 gm), sulphur being responsible for the strong, pungent 'onion' odour and causes one to become teary-eyed when crushing the flowers with hand. *Curcubita maxima* (21.81 mg/ 100 gm) and *Carica papaya* (26.47 mg/ 100 gm) flowers have a significant content of phosphorous when compared to *Allium cepa* (0.27 mg/ 100 gm) flowers but the test flowers are low in phosphorous when compared to Mahua (140 mg/ 100 gm) and Agathi flowers (290 mg/ 100 gm).

DISCUSSION: Dietary trace elements including copper and iron participate in oxidation-reduction reactions in energy metabolism in our body. Indian diets have a high variation in copper intakes ranging from 1.6-5.2 mg/day [19]. The flowers of *Allium cepa* (0.44 mg/ 100 gm), *Carica papaya* (2.52 mg/ 100 gm), and *Cucurbita maxima* (3.32mg/100gm) can contribute to the daily copper intake. Iron as a constituent of haemoglobin and myoglobin plays a vital role in the transport of oxygen copper in turn plays a key role in iron absorption and mobilization [20]. The iron content of the three studied flower samples, ranging from 1.68 mg - 1.76 mg/ 100 gm is relatively low and not sufficient to fulfill the daily iron requirements set at 29 mg/day and 19 mg/day for Women of Reproductive Age (WRA) and adult men respectively [19].

Both Calcium and Phosphorous Required Dietary Allowance (ICMR) is 1000 mg/day for both men and Non-Pregnant Non-Lactating (NPNL) women over 18 years [19]. An elemental Ca: P ratio of 1:1 may be maintained in most age groups. A small amount of the minerals can be accessed from pumpkin (Ca: 52.43 mg/ 100 gm, P: 21.81 mg/ 100 gm), papaya (Ca: 44.50 mg/ 100 gm, P: 26.47 mg/ 100 gm) and onion (Ca: 53.92 mg/ 100 gm, P: 0.27 mg/ 100 gm) flowers. ICMR daily sodium recommendations for both men and women (18-60 years) are 2000 mg [19] and the onion, pumpkin, and papaya flowers are small contributors to the sodium requirement providing 2.04 mg/ 100 gm, 6.32 mg/ 100 gm, and 5.20 mg/ 100 gm respectively. The adequate intake [AI] for potassium is established at 3400 mg/day and 2600 mg/day for adult (19y-70y) males and females, respectively [19]. The edible flowers of onion (114.79 mg/ 100 gm), pumpkin (50.98 mg/ 100 gm), and papaya (36.20 mg/ 100 gm) are nutritionally good sources of potassium but not rich in sodium, hence the desirable sodium: potassium ratio of 1:1 (WHO guidelines), an important factor in the prevention of hypertension arteriosclerosis cannot be fulfilled by consuming these flowers alone.

The concentration of lead in the three flowers was less than 0.1 mg/ 100 g fresh weight which is below the baseline concentration. The lead Provisional Tolerable Weekly Intake (PTWI) is 0.214 mg/day for a 60 kg person [21], indicating that the flowers can be consumed without any negative health effects. A person of 70 kg requires around 1.1 g of methionine/cysteine per day [22] and sulphur is the key mineral required to form these essential amino acids. Studies show that sulphur compounds may protect against cancer, lower blood sugar levels and reduce the production of unhealthy cholesterol [23]. Onion flowers being a fairly good source (8.22 mg/ 100 gm) may act as a vegetable source of sulphur when consumed raw. Zinc, an essential metal for the normal functioning of various enzyme systems, has a Tolerable Upper Limit (TUL) of 40 mg/day (ICMR) [19] for adult men and women (NPNL). The studied edible flowers have zinc ranging from 0.45 to 0.6 mg/ 100 gm, which is well within the prescribed TUL.

Growth failure, skeletal abnormalities, and impaired reproductive function have been reported to be caused by manganese deficiency, and the studied edible flowers contribute to the daily manganese requirement of 2-5 mg [19] with onion, pumpkin, and papaya flowers providing 0.46 mg, 0.34 mg and 0.33 mg per 100 gm respectively. Selenium, an essential trace mineral for health, is below the detectable level (0.02 mg/ 100 gm) in the studied edibles flowers and hence can be safely consumed. Selenium required at 0.04 mg/day can result in toxicity in humans upon an acute consumption of 0.7 mg/day [19]. The concentration of lead in the three edible flowers studied does not exceed the maximum permissible limits of 0.03

mg/ 100 gm (FAO/WHO, 2001) [24] and hence can safely be consumed. Lead affects the nervous system, bones, liver, pancreases, teeth and also causes certain blood diseases.

CONCLUSION: The flowers of *Allium cepa, Cucurbita maxima,* and *Carica papaya* contain a sufficient quantity of macro minerals such as calcium, sodium, potassium, iron, and trace minerals like Iodine, Sulphur, Manganese, Copper, Zinc, and Lead. Although needed in minute quantities by our body, the trace elements function primarily as catalysts in enzyme systems and have a wide range of health benefits. *Allium cepa* flower is the only edible flower in this study with a detectable level of Sulphur content. These edible flowers can also be concluded to provide the right dietary ratio of Copper and Iron. The flowers can supplement the microelement requirements and can alleviate some of the common mineral deficiencies faced by our population when consumed in the right proportion and frequency. The flowers are also low-cost, easily available, and can be incorporated in our diet, as a garnish or as a main course. This study leaves room for further experiments to identify the other nutritional components like antioxidants and anti-nutritional factors.

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CONFLICTS OF INTEREST: The authors of this study declare no conflict of interest.

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