



Dr. BRR. GOVERNMENT COLLEGE,
JADCHERLA, MAHABUBNAGAR (Dist.)

Student Study Project
2021 -22

DEPARTMENT OF CHEMISTRY

Topic

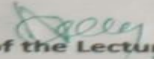
Oxalate ion Content in Tomato (Red & Green) and Brinjal
Conducted by students

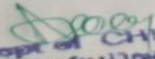
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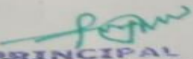
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A project on Oxalate ion Content in Tomato(Red & Green) and Brinjal

ABSTRACT

This paper describes method for estimation of oxalate ion content in tomato and brinjal. Crushed pulp of a fruit or a vegetable is its most

useful source to estimate any content in it. The oxalate ion content in a fruit or a vegetable can also be determined by performing a specific procedure on this pulp. The strength of oxalate ion content is determined through the experiment and it is the clear indicator of the amount of oxalate ion content present in that fruit or vegetable. Oxalic acid has various harmful as well as useful effects on our body. The estimation of oxalate ion content hence can be further used for studying direct effects of that specific fruit or vegetable on our human body.

This paper describes method for estimation of oxalate ion content in tomato and brinjal. Crushed pulp of a fruit or a vegetable is its most useful source to estimate any content in it. The oxalate ion content in a fruit or a vegetable can also be determined by performing a specific procedure on this pulp. The strength of oxalate ion content is determined through the experiment and it is the clear indicator of the amount of oxalate ion content present in that fruit or vegetable. Oxalic acid has various harmful as well as useful effects on our body. The estimation of oxalate ion content hence can be further used for studying direct effects of that specific fruit or vegetable on our human body.

AIM OF THE PROJECT

TO STUDY THE PRESENCE OF
OXALATEION CONTENT
INTOMATO (RED & GREEN)
AND BRINJAL

INTRODUCTION

The tomato is the edible, often red, fruit of the plant *Solanum lycopersicum*, commonly known as a tomato plant. The plant belongs to the nightshade family, which is called Solanaceae. The in Central and South America. The Nahuatl (Aztec language) word *tomatl* gave rise to "tomate", from which



10 Health Benefits of...

Tomatoes

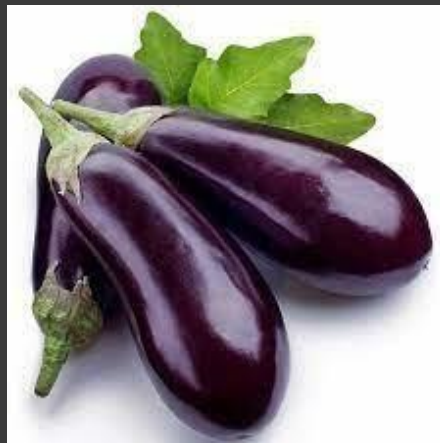
1. Reduce Heart Disease
2. Lowers Risk of Stone Formation
3. Promotes Healthy Skin
4. Lowers Cholesterol
5. Reduces Migraines
6. Anti-Inflammatory
7. Improves Bones
8. Boosts Immunity
9. Prevents Cancer
10. Purifies Blood



EatHealthyLiveFit.com

BRINJAL

Eggplant (*Solanum melongena*), or auberge, is a species of nightshade, grown for its edible fruit. Eggplant is the common name in North America, Australia and New Zealand, but British English uses the French word auberge. It is known in South Asia and South Africa as brinjal.



Oxalate (IUPAC: atheneite) is the dianion with the formula $C_2O_4^{2-}$. Either name is often used for derivatives, such as salts of oxalic acid, for example sodium oxalate $Na_2C_2O_4$, or dimethyl oxalate $((CH_3)_2C_2O_4)$. Oxalate also forms coordination compounds where it is sometimes abbreviated as ox. The oxalate ion content in tomato (ripened and fresh) and brinjal will be calculated, determined and compared in the experiment performed by us.

HEALTH BENEFITS OF BRINJAL

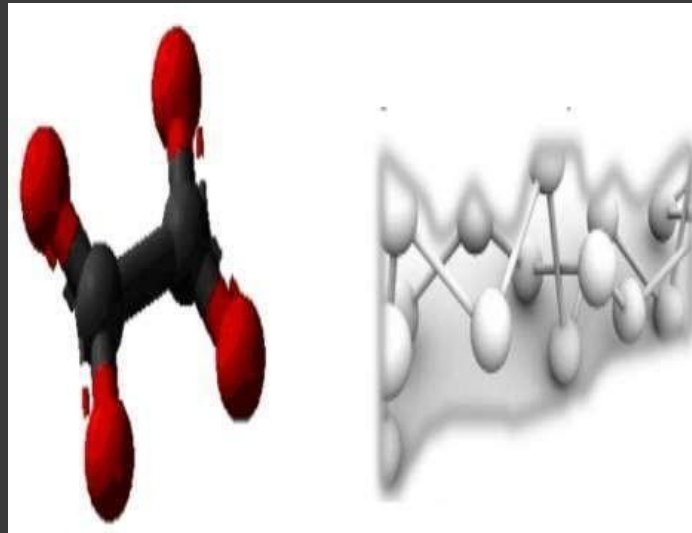
- NORMALIZES IRON LEVELS IN THE BODY
- HELPS TO CURE STOMACH ULCERS AND VARIOUS NERVOUS CONDITIONS
- PREVENTS CELLULAR DAMAGE IN BRAIN
- BRINJAL CURES INSOMNIA IF IT IS TAKEN (BAKED) WITH HONEY AT NIGHT
- CONTROLS IRON LEVELS IN THE BODY
- GOOD FOR PEOPLE WITH ASTHMA AND TOOTH PROBLEMS
- PREVENTS ATHEROSCLEROSIS



myhealthonly.net

WHAT IS OXALATE?

- It is a carboxylic acid, primarily found in plants and animals. It is not an essential molecule and is excreted from our body, unchanged. Our body either produces oxalate on its own or converts other molecules like vitamin C to oxalate.
- External sources like food also contribute to the accumulation of oxalate in our body. The oxalate present in the body is excreted in the form of urine as waste.
- Too much of oxalate in our urine results in a medical condition called hyperoxaluria, commonly referred to as kidney stones. Diet is looked upon as a preventive measure in addition to medication to treat kidney stones.



THEORY

- Oxalate ions are extracted from the fruit by boiling pulp with dilute H_2SO_4 .

The oxalate ions are estimated volumetrically, by titrating the solution with KMnO_4 solution.

- A reagent, called the titrant, of a known concentration (a standard solution and volume is used to react with a solution of the analyte or titrant, whose concentration is not known.

- Using a calibrated burette or chemistry pipetting syringe to add the titrant, it is possible to determine the exact amount that has been consumed when the endpoint is reached.

- The endpoint is the point at which the titration is complete, as determined by an indicator. This is ideally the same volume as the equivalence point.

REQUIREMENTS

(A) Apparatus

100 ml measuring flask
Burette



Pestle & Mortar



Beaker



Funnel



Weighing machine



Filter



(B) CHEMICALS



= dil H_2SO_4

= (N/10) $KMnO_4$ solution

PROCEDURE

- Weigh 50 g of fresh (green) tomato pulp and crush it to a fine pulp using pestle and mortar.
- Transfer the crushed pulp to a beaker and add about 50 ml dil. H_2SO_4 to it. Boil the content for 2 minutes.
- Cool and filter the contents in a 100 ml measuring flask.
- Make the volume up to 100 ml by adding distilled water



- Take 20 ml of solution from the measuring flask into a titration flask add 20 ml of dil. H_2SO_4 to it.
- Heat the mixture to about 60°C and titrate it against $\text{N}/10\text{ KMnO}_4$ solution taken in a burette. The end point is appearance of permanent light pink colour.
- Repeat the above procedure for ripened (red) tomato as well as brinjal.



OBSERVATIONS

Weight of fruit or vegetable taken each time = 50g

Vol. of pulp extract taken in each

titration = 20 ml Normality of KMnO_4

solution = 1/10 N

Table given below shows the volume of KMnO_4 solution used for brinjal and the two types of tomatoes.

S.NO	VEGETABLE TYPE	BURETTE READING INITIAL	BURETTE READING FINAL	VOL OF KMnO_4 USED
1	TAMATO(GREEN& FRESH)	0	36.5	36.5
2	TAMATO(RED & RIPENED)	0	40	40
	BRINJAL	0	11	11

CALCULATIONS

Normality of the $KMNO_4$
solution = N_1
Normality of
the GREEN Tomato = N_2
Volume of the $KMNO_4$
solution = V_1
Volume of
the GREEN Tomato = V_2

FOR GREEN TOMATO

$$N_1 = 1/10 \quad N_2 = ? \quad V_1 = 36.5 \quad V_2 = 20 \text{ ml}$$

$$N_1 V_1 = N_2 V_2$$

$$\text{So, } N_2 =$$

$$N_1$$

$$V_1/V_2 N$$

$$2 =$$

$$36.5/200$$

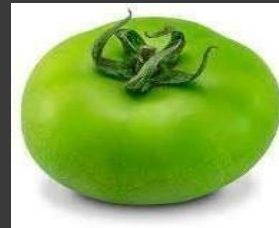
$$N_2 =$$

$$0.1825N$$

Strength of the Green Tomato = Equivalent weight X
Normality

$$= 44 \times 0.1825N$$

$$= 8.03 \text{ grams/liter}$$



CALCULATIONS

Normality of the KMNO_4 solution = N_1

Normality of the RED Tomato = N_2

Volume of the KMNO_4
solution = V_1 Volume of
the RED Tomato = V_2

FOR RED TOMATO

$N_1 = 1/10$ $N_2 = ?$ $V_1 = 40$ $V_2 = 20$ ml

$N_1 V_1$

= N_2

V_2 So,

$N_2 =$

N_1

V_1/V_2

$N_2 = 40/200 = 0.2$ $N_2 = 0.2N$

Strength of the Red Tomato = Equivalent weight
Normality

= 44×0.2 N

= 8.8 grams/liter



CALCULATIONS

Normality of the KMNO₄
solution = N₁ Normality of
the BRINJAL = N₂ Volume
of the KMNO₄ solution =
V₁ Volume of the
BRINJAL = V₂

FOR BRINJAL

N₁ = 1/10 N N₂ = ? V₁ = 11 V₂ = 20 ml

N₁ V₁ = N₂ V₂

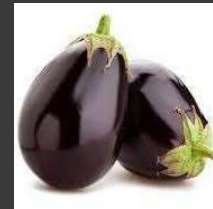
So, N₂ = N₁ V₁/V₂ N₂ =

11/200 = 0.055 N₂ = 0.055 N

Strength of the Brinjal = Equivalent weight X
Normality

= 44 X 0.055 N

= 2.42 grams/liter



RESULT

Strength of oxalate in fresh (green tomato) =
8.03 g/liter Strength of oxalate in ripened (red
tomato) = 8.8 g/liter Strength of oxalate in
brinjal = 2.42 g/liter

CONCLUSION

From our observations, we can conclude that the oxalate ion content is

much more in tomato (ripened or fresh) than in brinjal. We also saw that oxalate ion content in ripened (red) tomato is more than in fresh (green) tomato. Hence we can also conclude that oxalate ion content

in tomato increases
with ripening.
**THE STRENGTH OF OXALATE ION OF
TAMATO & BRINJAL**

GREEN TAMATO < RED RIPENED TAMOTO > BRINJAL

Advantage

This technique of estimation of oxalate ion content can be utilized to determine the oxalate ion content in any desired fruit or vegetable as per an individual's need.

REFERENCES

<https://en.wikipedia.org/wiki/Oxalate>

<https://www.ncbi.nlm.nih.gov/pubmed/6547492>

<https://en.wikipedia.org/wiki/Guava>

<https://books.google.co.in/books?>

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