

Formulation of Plant Based Moisturizing Lip Balm

Afza Fathima M¹, Priya R Iyer²

PG and Research Department of Biotechnology, Women's Christian College
(An Autonomous Institution Affiliated to the University of Madras) Chennai -600006, Tamil Nadu, India

Abstract: *This Study aimed to Formulate a Natural Moisturizing Lip Balm using extracts of Tomato (Solanum lycopersicum) and Cucumber (Cucumis sativus). Phytochemical analysis detected various bioactive compounds in both extracts. The lip balm was formulated using cold extraction and oil-infused extraction methods, incorporating beeswax, shea butter, essence, alkanet root extract and honey. The product's pH, physical properties (smell, appearance, spreadability, stability, melting point, and hardness) were evaluate, Antimicrobial activity against E. coli and Candida albicans were evaluated. The formulated lip balm exhibited antioxidant properties due to the presence of secondary metabolites. GC-MS analysis identified the chemical compounds present in the extracts. Comparison with commercial products showed similar properties, indicating the potential of Tomato and Cucumber extracts as natural ingredients for lip care products.*

Keywords: Natural Ingredients, Moisturizing Properties, Lip Care, Organic, Eco Friendly, Evaluation, Analysis.

1. Introduction

The cosmetic industry's rapid growth has led to widespread use of products containing toxic chemicals like parabens, phthalates, and lead, which are linked to health issues like breast cancer and skin problems. Microbeads also harm the environment. To promote healthier beauty standards, customers should demand transparency and choose natural products, driving positive change in the industry (Jonathas Xavier Pereira et al., 2018). Chemical lip balms and lipsticks contain harsh ingredients like parabens, synthetic fragrances, artificial colors, petroleum-based ingredients, and synthetic wax. (Kadu et al., 2020). These chemicals are linked to health issues like cancer, reproductive problems, skin irritation, allergic reactions, and environmental pollution. Opting for natural lip balms can be a healthier alternative, reducing exposure to these toxic chemicals and promoting overall well-being. Natural lip balms offer benefits like moisturizing, protection, and being non-toxic. They're suitable for all skin types, promote healthy lips, and are eco-friendly, prioritizing lip health and sustainability. (Singh, A.2020) The research study formulates a natural lip balm using cherry Tomatoes (Solanum lycopersicum) and Cucumber (Cucumis sativus). Cherry tomatoes are rich in water content, vitamins, antioxidants, and hydrating properties, making them beneficial for lip care. The lycopene content in tomatoes provides a natural red pigment and antioxidant properties, enhancing the lip balm's nourishing and attractive appearance.) (Siti Nuurul Huda Mohammad Azmin et al., 2022) Cucumber (Cucumis sativus) is a hydrating fruit rich in water content, antioxidants, and nutrients like vitamin C, vitamin K, and potassium. Its bioactive compounds provide benefits for skin care, including hydration, cooling, and repairing properties. The high water content and nutrient profile make cucumber an excellent ingredient for natural lip balm formulation, promoting healthy and nourished lips. (T G Uthpala, RAU Marapana et al., 2020). The formulation of natural lip balm uses various ingredients like virgin coconut oil (VCO), shea butter, beeswax, and alkanet root extract. VCO moisturizes and provides antioxidants, while shea butter offers moisturizing and anti-inflammatory benefits. Beeswax acts as a natural emollient and protective barrier, and alkanet root extract provides a natural colorant and antioxidant properties. These ingredients work together to create a nourishing and

protective lip balm. (Siti Nuurul Huda Mohammad Azmin et al., 2022)

2. Materials and Methodology

Materials:

- 1) SOLANUM LYCOPERSICUM
- 2) CUCUMIS SATIVUS

Methodology:

Tomato (cherry tomato) and Cucumber was collected from the local market located at Chennai, Tamilnadu, was cleaned under running tap water to remove all residues and impurities. Samples were then cut into small pieces. The Tomato and Cucumber was dried in the direct sunlight for 5-6 hours and then using the microwave oven 40°C for 1 hour. The dried tomatoes and cucumber were ground using a blender into smaller pieces for further process and it was kept in air tight box for the process

Phytochemicals:

Qualitative analysis:

- Test for Alkaloids by (Wagner's test)
- Test for Carbohydrates (Benedict's test)
- Test for Saponins
- Test for Amino acid: (Ninhydrin test)
- Test for Phenolic compounds (Ferric chloride test)
- Test for Flavonoids
- Test for Protein
- Test for Terpenoids
- Test for Glycosides
- Test for Tanins

Quantitative analysis:

- Determination of Alkaloids
- Determination of Phenolic compounds
- Determination of Carbohydrates
- Determination of Tannin
- Estimation of Proteins
- Estimation of Amino acids

Extraction of Sample:

This Research Formulates the product by 2 methods, The Extraction of Tomatoes and Cucumber was carried out using

Volume 14 Issue 11, November 2025

Fully Refereed | Open Access | Double Blind Peer Reviewed Journal

www.ijsr.net

- Ethanol extraction
- Oil infusion method

Ethanol extraction

- 70% ethanol, Distilled water, Filter paper, Water bath, Beaker, Measuring cylinder
- Dried sample of
 - Tomato
 - Cucumber

The extraction process involved soaking 20g of dried tomato and cucumber samples in 200ml of 70% ethanol (1: 10 ratio). The mixture was incubated in the dark for 1 day to extract the desired compounds, then filtered and evaporated in a water bath at 70°C for 3 hours to remove the ethanol, resulting in a ready-to-use extract for lip balm formulation.

Oil infusion extraction:**Materials:**

- Virgin coconut oil (VCO), Beaker, Aluminium foil
- Dried sample of
 - Tomato
 - Cucumber

The oil infusion method was used to extract tomato and cucumber samples. 5g of each sample was mixed with 20ml of virgin coconut oil (VCO) and heated at 60°C for 5 minutes. The mixture was left overnight to infuse, then strained using muslin cloth to separate the oil from the solids, resulting in infused VCO ready for lip balm formulation.

Formulation of lip balm

Evaporated ethanol extract (Tomato and cucumber), Glycerin, Beeswax, Shea butter, essence, Honey, Alkanet root infuse oil in (2: 10)

The lip balm formulation involved mixing ethanol extract with glycerin, then combining it with melted beeswax and shea butter (3: 2 ratio). The mixture was stirred, and 2% of the ethanol extract mixture, 1% essence, 1% honey, and 1% alkanet root-infused oil (for color) were added. The mixture was cooled, hardened at room temperature, and stored for further analysis.

Oil extraction method:

Same as followed instead of using (ethanol extraction) Oil extraction is used for formulation Oil infused method

Evaluation of formulated lip balm:**pH:**

To test the pH, melt a small lip balm sample, dip pH paper into it, and compare the resulting color change with a pH chart to determine the pH value.

Smell testing:

The formulated lip balm was checked for the smell at regular interval 4 week. It was checked by the evaluator for 2 weeks and self-evaluation for 2 weeks. This is how the test was performed.

Appearance testing:

This check was performed to notice any deformation on or above the formulated lip balm at regular interval for 4 weeks. This was done by the Self evaluation

Spreadability test:

In order to Evaluate the Spreadability of prepared lip balm, formulated lip balm were repeatedly applied on to a glass slide (at room temperature) Visually observed its behavior of their uniformed layers are formed. Any Deformalities or Drying after the spread of lip balm was evaluated for 4 hours in regular intervals

Stability test:

The formulated lip balms was placed in two different conditions

- Room temperature
- Refrigerator
 - The evaluation was done for the 4 weeks at regular intervals
 - This Check was done for any Abnormalities condition takes place, melting of the lip balms under different temperature

Melting point:

A small amount of lip balm was taken in a beaker. Shown In a water bath the degrees of heat was measure using the thermometer to know the melting point at which degree the lip balm melts. This is how the melting point of formulated lip balm sample was measured

Hardness test:

This test was performed under (Room temperature and Refrigerator) using the formulated sample. To check which incubated sample is soft and which becomes hard

Comparison between formulated and commercial lip balm:

The above test like

- Smell
- Appearance
- Spread test, pH test
- Hardness test was performed with commercial product
 - This step was done to ensure both the lip balm does not have much difference between the products
 - To check the similarities this step was done.

Antimicrobial assay:

The antibacterial assay involved preparing Mueller Hinton Agar (MHA) media, inoculating it with E. coli culture, and punching wells to add lip balm samples. The petri plates were incubated at 37°C overnight under sterile conditions to assess the antibacterial activity.

Antifungal assay:

The antifungal assay involved preparing Potato Dextrose Agar (PDA) media, inoculating it with Candida albicans culture, and adding lip balm samples to punched wells. The petri plates were incubated at 37°C overnight under sterile conditions to assess the antifungal activity.

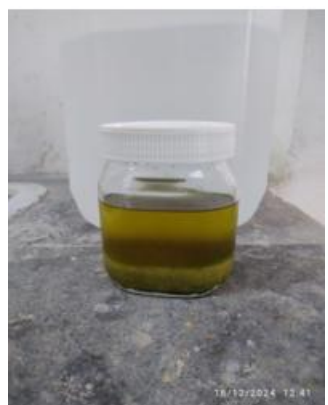
Antioxidant test:

The antioxidant activity was evaluated using the DPPH assay. The lip balm formulation was mixed with DPPH solution and incubated in the dark. Absorbance was measured at 517nm using a spectrophotometer. Ascorbic acid served as the positive control, and percentage inhibition was calculated to determine the antioxidant potential.

Gas Chromatography – Mass Spectrometry-GC-MS analysis was conducted on tomato and cucumber samples by mixing 0.3g of powdered sample with 3ml of ethanol, incubating, and then subjecting it to GC-MS instrumentation to identify and quantify the chemical compounds present.

3. Result and Discussion**Collection of Sample:**

The Tomatoes and Cucumber were collected, dried and grounded into powdered. (Siti Nuurul Huda Mohammad Azin et al., 2022) in their research similar work was done in sample collection.

**Figure 1:** Tomato powder**Figure 2:** Cucumber Powder**Preparation of extract:****Figure 3:** Cucumber extract (ethanol)**Figure 4:** Tomato extract (ethanol)

The cold ethanol extraction was done to get the extraction of (Tomato and cucumber) sample. Extraction of the samples gives the expected colour for the formulation, as expected the Similar work has been done by the (Sharad Visht et al., 2023) they have used different herbal samples like (Opuntia ficus-indica) fruit to extract the colour from the desired sample by cold extraction

Phytochemical analysis:

Phytochemical analysis of sample extracted using ethanol was carried out

Qualitative Analysis:**Table 1:** Qualitative analysis of sample

Test (Ethanol Extract)	Tomato Observation	Cucumber Observation
ALKALOIDS	+	+
CARBOHYDRATES	+	+
SAPONINS	+	+
AMINO ACIDS	+	+
PHENOLIC COMPOUND	+	+
FLAVONOIDS	+	+
PROTEINS	+	+
TERPENOIDS	+	+
GLYCOSIDES	-	-
TANNINS	+	+

In the Qualitative analysis of sample in Ethanol extract, Test for Alkaloids, Carbohydrates, Saponins, Amino acids, Phenolic compound, Flavonoids, Proteins, Terpenoids and Tannins was found to be positive. Glycoside was found to be absent in both samples. The phytochemical compounds which are present in the tomato and cucumber samples are given in Table.1 for the understanding. The similar work was reported by the (Poonam Chaudhary et al., 2018) they have reported that present section focused mainly on Phenolics, Alkaloids. The similar work for the cucumber was done by the (K. Latha 2022) This research have reported that the Amino acid show the negative results for the analysis

Quantitative Analysis:

The TOMATO sample contains high amount of tannins and phenolic compound other content are found to be in moderate amount in both samples similar work done by (Poonam chaudhary et al., 2018) ((K. Latha 2022)

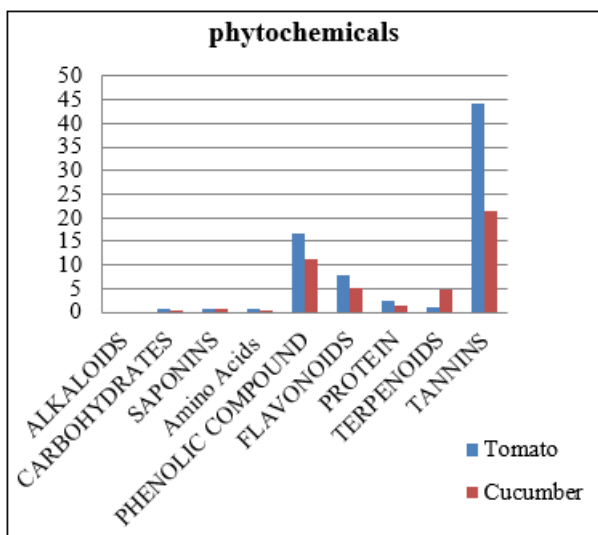


Figure 5: Total amount of Phytochemicals present in the Tomato & Cucumber extract

Extraction of samples:

Ethanol method and Oil infusion method

Ethanol extraction:



Figure 6: Ethanol Extraction of Cucumber and Tomato

The extraction was carried out by the ethanol method for lip balm formulation by the cold extract and used for the formulation, shown in Figure 6, the similar work was been done by (Sharad Visht et al., 2023) they have used with other sample but same procedure was followed to extract the colour.

Oil Infusion extraction



Figure 7: Oil Infused Extraction (Cucumber & Tomato)



Figure 7.1: Alkanet Root infused in VCO

The extraction was carried out by Virgin Coconut Oil (VCO) and the samples were heated to get the extraction for the lip balm formulation. Shown in Figure 7, 7.1, Similar work was done with slight modification to get the oil infusion extract. (Siti Nuurul Huda Mohammad Azin et al., 2022)

Formulation of Lip Balm:

Ethanol Method Formulation:

Table 2: Ingredients used for the formulation

Ingredients	Tomato	Cucumber
BEESWAX	3%	3%
Shea Butter	2%	2%
Ethanol Extract + Alkanet Root Extract	2%+1%	2% +1%
Essence	1% Rose essence	1% Pineapple essence
Honey	1%	1%

The ratio given in Table.2 was used to formulate the lip balm shown in Figure.8 Two types of lip balm were prepared successfully using the two different ethanol extract (Tomato and Cucumber) similar work was done by (Sharad Visht et al., 2023)



Figure 8: Formulated lip balm using ethanol extraction

Oil Infusion Method Formulation

Table 3: Ingredients used for the formulation

Ingredients	Tomato	Cucumber
BEESWAX	3%	3%
SHEA BUTTER	2%	2%
Oil Infuse Extract + Alkanet Root Extract	2%+1%	2% +1%
ESSENCE	1% Rose Essence	1% Pineapple Essence
HONEY	1%	1%



Figure 9: Formulated lip balm using Oil Extraction

Oil infusion method of lip balm formulation was done the ratio given in Table.3 was used to formulate the lip balm shown in Figure.9 The two different types of lip balm (Tomato and Cucumber) were prepared successfully using the Infused oil. similar work was done by. (Siti Nuurul Huda Mohammad Azin et al., 2022)

Evaluation of Formulated Lip Balm:

The Evaluation of Formulated Lip Balm was evaluated by using some parameters given below

pH

The evaluation of formulated lip balms was found in that it is in Acidic nature this evaluation were observed for four weeks no change in th pH. Right from the first day of the formulation to the end of fourth week in evaluation. The results was given below in table.4. similar work was done by. (Siti Nuurul Huda Mohammad Azin et al., 2022) they were also reported that the pH of the lip was in acidic the range given by them was (3-5 pH)

Table 4: Evaluation of Formulated Lip Balm

SAMPLES	pH	pH	pH	pH
OIL TOMATO	3	3	3	3
OIL CUCUMBER	5	5	5	5
ETHANOL TOMATO	5	5	5	5
ETHANOL CUCUMBER	5	5	5	5

Smell Test:

Smell of the Formulated 4 Different Lip Balm was Evaluated by Observer for 2 weeks and the rest 2 weeks it was Evaluated by Self Examination and It was found that the oil method formulated Lip balm shows the good smell from ethanol method. similar work was done by (Pande Ayu Naya Kasih et al., 2021) they have reported that there was no difference in smell so far till the incubation time

Appearance Test:

The appearance of the Formulated four Different Lip Balm was Evaluated by Observer for two weeks and the rest two weeks it was Evaluated by Self Examination and it was found to be normal until the end of Incubation. similar work was done by. (Pande Ayu Naya Kasih et al., 2021) they have reported that no changes were observed until the end of Incubation. The appearance of the formulated lip balm were shown in Figure.10



Figure 10: Appearance of the lip balm

Spreadability test:

The stored sample was repeatedly spread in the glass slide the end result was found to be the Oil Method Formulation was having a good spread and sustainable but the ethanol formulation lip balm was not having the good spread as oil formulation does and their was no deformation during the incubation time of 4 hours at regular interval of every week the Figure: 11 shows the result. Similar work was done by the (Shikha Pawar et al., 2024) they have used many formulation at different sample two among three was having the deformation during incubation.



Figure 11: Spread Test on glass slide

Stability Test:

The stability of the formulated 4 different lip was tested at Room temperature and Refrigerator It was found to be stable at Room temperature without melting, But becomes slightly hard at Refrigerator throughout the evaluation. Similar work was done by. (Siti Nuurul Huda Mohammad Azin et al., 2022), they have reported the same issues faced in their research also.

Melting Point:

The melting point of the 4 different formulated Lip Balm was measure to be and above was noted and the similar work was done by (Shikha Pawar et al., 2024) they have evaluated their 4 types formulated Lip balm by various weather conditions and they have also reported the melting point of each sample was measure to be 61° C at different weather conditions

Hardness Test:

The hardness of the 4 different formulated lip balm was found to be that **Oil formulation** was **showing good results** in hardness for example: **it was found to be creamy and colour** but the **Ethanol formulation is watery in nature**. this is the result which observed by the research. Similar work was done by the (Shikha Pawar et al., 2024) they have used many

formulation at different sample 2 among 3 was having the watery nature during incubation

Comparison Test

The result was found to be the **Oil Infused Formulated Lip Balm was having nearest similarity with** commercial product here Vilvah (grape fruit) Lip Balm was used and compare from one other. The Ethanol did not showed the similarities with commercial product. **The hardness and the pH was similar when compared to the formulated Lip balm.** similar work was done by. (Siti Nuurul Huda Mohammad Azin et al., 2022) here the similarity was checked between formulated lip balm and commercial nivea fruity mango and same result was reported by their research.

Antimicrobial Test for the Product:

Antibacterial Assay:

The result was observed as the zone Inhibition was 1.5 mm Radius around the sample loaded well the result was shown in Figure: 12. For the test 5 wells were loaded, Four wells with the sample, 1 well was loaded with the positive control used as Ampicillin the sample loaded with the Lip balm was shown the result of inhibition with 1.5mm around the well and for the positive control it has shown 4 mm Radius around the wells loaded with the Antibiotic. This shows the result as each sample which has formulated shows the zone of Inhibition. similar work was done by the (Maria Grasela Kase et al., 2023) here they have reported the lip balm inhibition zones with concentration of 18.75% and 25% had a strong inhibitory power according to their concentration the range was about 21.



Figure 12: Antibacterial Zone Inhibition

Antifungal assay:

The result was observed as the zone appeared one mm radius around the sample loaded well the result was shown in Figure: 13. For the test 5 wells were loaded, Four wells with the sample, 1 well was loaded with the positive control used as Flucanazol the sample loaded with the Lip balm was shown the result of inhibition with 1 mm radius around the well and for the positive control it has shown 4.3 mm Radius around the wells loaded with the Antibiotic. This shows the result as each sample which has formulated shows the zone of Inhibition. The similar work was performed with some other alteration (Elys Safitri et al., 2023) In there Research they have added nanosilver with formulated lip balm. They reported that test results shows the zone of Inhibition in their Antifungal assay



Figure 13: Antifungal Zone Inhibition

Antioxidant Test

After Incubating the test tubes in dark for 30 minutes. The reading was measured using the Spectrophotometry by the absorbance at 517nm

Percentage of the amount of Inhibition was calculated by the Formula:

$$\% \text{ inhibition} = \left\{ \frac{\text{Absorbance of control} - \text{Absorbance of test}}{\text{Absorbance of control}} \right\} \times 100$$

The values are displayed in Table.5

Table 5: Amount of Antioxidant present in the samples

SAMPLE	Value in %
VCO	100
OIL TOMATO	103.3
OIL CUCUMBER	250
ETHANOL TOMATO METHOD	323
ETHANOL CUCUMBER METHOD	340



Figure 14: Anti Oxidant Assay

5.6.11: GC-MS:

The Result for the cucumber sample is shown as propane, 1, 1, 3- Triethoxy has got the highest peak in the MS Chromatogram graph shown in the Figure.15 and the rest 19 compound was listed below Figure.16 Similar work was done by the (Sabbir Hossain et al., 2015) but their intension of study to determine the amount of residual level present in sample by GC-MS they have reported that the vegetables have contaminated with Organophosphorus, Carbamate pesticides and they study Reveals the different Pestiides is increasing day by day

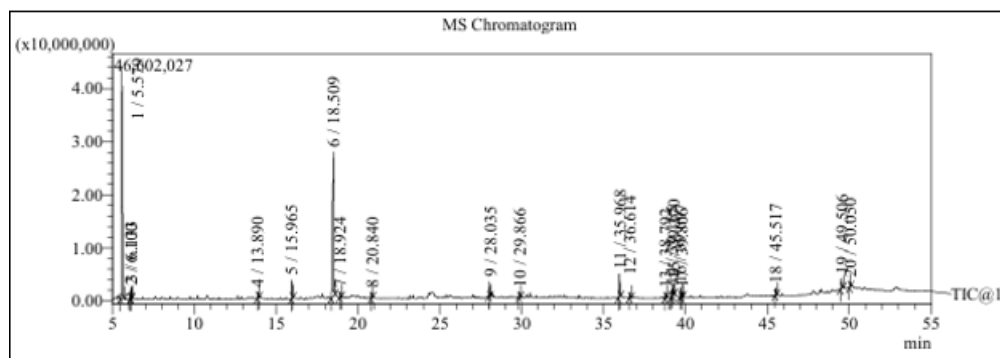


Figure 15: MS-Chromatogram of cucumber

MASS Peak Table TIC

Peak#	Ret. Time	m/z	Area	Compound Name	Area%
1	5.579	TIC	180762543	Propane, 1,1,3-triethoxy-	43.032
2	6.100	TIC	2871171	2-Pentenal, 2-methyl-	0.684
3	6.133	TIC	5176334	3-Furaldehyde	1.232
4	13.890	TIC	3526395	Maltol	0.839
5	15.965	TIC	9420926	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	2.243
6	18.509	TIC	148789568	5-Hydroxymethylfurfural	35.420
7	18.924	TIC	2917500	1,2,3-Propanetriol, 1-acetate	0.695
8	20.840	TIC	2920554	N-Nitroso-2-ethyl-1,3-tetrahydrooxazine	0.695
9	28.035	TIC	7709283	Cyclohexanecarboxamide, N-ethyl-5-methyl-2-(1-meth	1.835
10	29.866	TIC	3196321	Pyrimidine-2,4(1H,3H)-dione, 6-hydroxy-5-methylimi	0.761
11	35.968	TIC	14307374	n-Hexadecanoic acid	3.406
12	36.614	TIC	2981558	Hexadecanoic acid, ethyl ester	0.710
13	38.792	TIC	2623454	Phytol	0.625
14	39.165	TIC	4200642	9,12-Octadecadienoic acid (Z,Z)-	1.000
15	39.270	TIC	6935466	9,12,15-Octadecatrienoic acid, (Z,Z,Z)-	1.651
16	39.697	TIC	4758979	9,12-Octadecadienoic acid, ethyl ester	1.133
17	39.806	TIC	2910788	9,12,15-Octadecatrienoic acid, ethyl ester, (Z,Z,Z)-	0.693
18	45.517	TIC	3952391	Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl)ethyl	0.941
19	49.506	TIC	7515998	13-Docosenamamide, (Z)-	1.789
20	50.050	TIC	2590552	Squalene	0.617
Total			420067798		100.000

Figure 16: Mass Peak of the compounds present in the cucumber

The results for the tomato sample is shown as Ethyl picecolinate has got the highest peak in MS chromatogram graph in Figure.17 And the other compounds was listed below in Figure.18. similar work was done by the (Sabbir Hossain et al., 2015) but their intension of study to determine the

amount of residual level present in sample by GC-MS they have reported that the vegetables have contaminated with organophosphorus, carbamate pesticides and they study reveals the different pesticides is increasing day by day

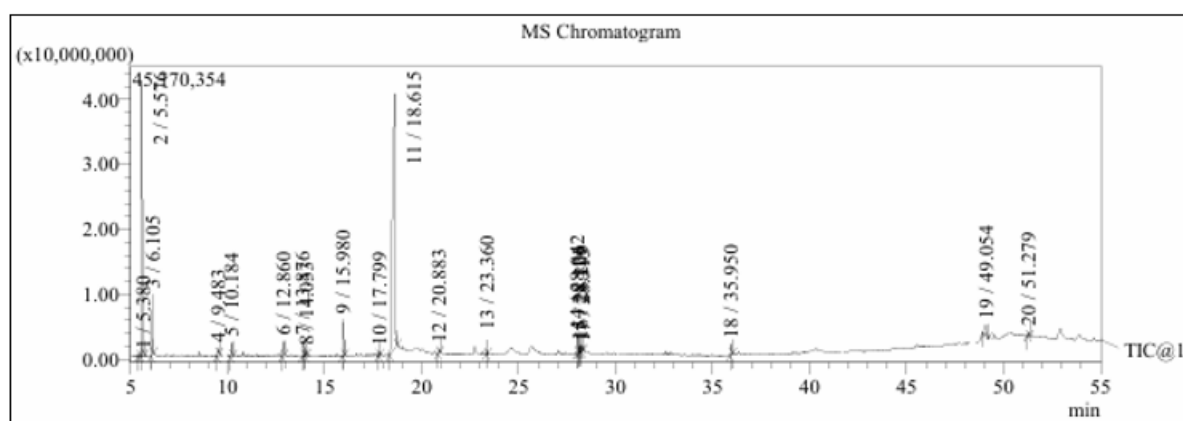


Figure 17: MS –Chromatogram of tomato

MASS Peak Table TIC				
Peak#	Ret. Time	m/z	Area	Compound Name
1	5.380	TIC	1967217	Ethyl pipercolinate
2	5.576	TIC	164953893	Propane, 1,1,3-triethoxy-
3	6.105	TIC	25525935	Furfural
4	9.483	TIC	4243693	2,5-Furandione, 3-methyl-
5	10.184	TIC	5967219	2-Furancarboxaldehyde, 5-methyl-
6	12.860	TIC	6690398	Benzeneacetaldehyde
7	13.876	TIC	8988712	2,5-Furandicarboxaldehyde
8	14.033	TIC	2232406	Furyl hydroxymethyl ketone
9	15.980	TIC	15749695	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-
10	17.799	TIC	1368025	Dodecane
11	18.615	TIC	377352867	5-Hydroxymethylfurfural
12	20.883	TIC	2026379	4-Methoxy-6-oxo-3,6-dihydro-2H-pyran-3-yl acetate
13	23.360	TIC	1199940	Tetradecane
14	28.042	TIC	7627747	Cyclohexanecarboxamide, N-ethyl-5-methyl-2-(1-methyl-2-oxoethyl)-
15	28.121	TIC	2516692	1-Heptadecene
16	28.200	TIC	3604094	1,3-Dioxolane, 4,4,5-trimethyl-2-pentadecyl-
17	28.315	TIC	2063712	Heptadecane
18	35.950	TIC	6022989	L-(+)-Ascorbic acid 2,6-dihexadecanoate
19	49.054	TIC	11522502	Tetrapentacontane
20	51.279	TIC	1589831	Hexatriacontane
Total			653213947	

Figure 18: Mass Peak Table of the compounds present

4. Conclusion

The Natural Moisturizing Lip Balm was Formulated from the Plant sample Tomato and Cucumber. Extract from the sample was Collected using Two different methods Cold Extraction and Oil Infusion Extraction was carried out. The Phytochemical Analysis of the Plant sample Indicated high amount of Phenolic Compound and Tannin, Alkaloids, flavonoids, Saponins, Carbohydrates, Terpenoids. The Lip Balm was Formulated into Four different types by using the Two different Methods, For example: In Oil Infusion tomato and cucumber both were Formulated under the same ratio, The same was followed by Ethanol Method. The formulated lip balm was Evaluated for the pH, Smell, Appearance, Speardability, Stability, Melting point, Hardness. By the end of Evaluation the Oil Infused method show the best results comparing to Ethanol Formulation. The Comparison test was done between the Formulated lip balm and the Commercial Lip Balm to check the Nearest Similarities. The formulated lip balm inhibits *E. coli* and *Candid albicans*. The formulated lip balm were had the Antioxidant Activity because of the Secondary Metaboilites. GC-MS was done to know the compounds present in the (TOMATO AND CUCUMBER). The natural moisturizing lip balm can be used as a replacement for the other products, which are more toxic and having profound chemicals which is harmful and damages the lips. An Eco Friendly, cost effective, Natural products can be better choice in near future.

Acknowledgements

We extend our heartfelt thanks to Dr. Anitha R. J. Singh, Dr. Anchana Devi, Dr. Preethi Jeyakumar for their whole hearted support. We also thank Dr. Lilian I Jasper, the Principal of Women's Chrisian College for providing this opportunity. We would finally like to thank our families and friends for their support.

References

- [1] Siti Nuurul Huda Mohammad Azmin, Zaitie Fatiha Zainal Abidin, Nur Solehin Sulaiman, et al, "Evaluation of moisturizing lip balm compriseof natural pigment from tomato", 2022.
- [2] Alessandra Ribeiro Fernandes, Michelli Ferrera Dario, Claudinéia Aparecida Sales de Oliveira Pinto, Telma Mary Kaneko, André Rolim Baby, Maria Valéria Robles Velasco "Stability evaluation of organic Lip Balm" Brazilian Journal of Pharmaceutical Sciences, 2013
- [3] Mayuri Kadu, Suruchi Vishwasrao, Sonia Singh "Review on natural lip balm" International Journal of Research in Cosmetic Science 5 (1), 2015
- [4] H Anisa, Y Sukmawardani and N Windayani "A simple formulation of lip balm using carrot extract as a natural coloring agent" Department of Chemistry Education, 2019
- [5] Sabbir Hossain, M. Alamgir Zaman Chowdhury, Md. Mashihul Alam, Nazrul Islam, Md. Harunur Rashid and Israt Jahan, "Determination of Pesticide Residues in Brinjal, Cucumber and Tomato using Gas Chromatography and Mass Spectrophotometry (GC-MS)", 2015
- [6] Ibitomi O. O., Adefila E. I, Adeyemi C. O., Olaniyi S. S. and Abubakar A "Comparative Analysis of Nutritional and Phytochemical Properties of Fresh Tomato, Sundried Tomato and Processed Tomato Paste" Ilorin Journal of Science, 2024
- [7] Pande Ayu Naya Kasih Permatananda, Desak Putu Citra Udiyani, I Gede Suranaya Pandit "Lip Balm Formulation Based on Balinese Grape seed Oil" International Journal of Current Science Research and Review, 2021
- [8] Sharad Visht, Sana Sirwan Salih, Darya Aziz Mohammed, Areej Ammar Abduljabbar, Sarmad Jabbar Hama, Ibrahim Ahmed Khudhair "Formulation and Evaluation of Lip Balm Using Different Herbal Pigments", 2023

- [9] Shikha Pawar, Neha Joshi, Priyanka Joshi, Himanshu Joshi, Gauri Joshi, Navin Kumar "Formulation and Evaluation of Lip Balm" 2024
- [10] Irmawati Akma Abdul Hapiz, Jemima Japakumar, Jivinthiran Jayagobi, Mohamad Azfar "Production of Lip Balm from Natural Dyes" 2021
- [11] Rushikesh M Sankpal, Shrutika R Kadam, Nandini S Aswale, Sachin S Navale "Natural Lip Balm" International Journal of Advanced Research In Science, Communication and Technology, 2022
- [12] Jayshri C Pawar, Ujjwala Y Kandekar, Vijaya S Vichare, Pranali N Ghavane "Production and analysis of lip balm using herbal resources", 2021
- [13] Andrade Lima, L. J. de, Cominato, L., Oliveira, H. M., dos Santos, W. de O., Malpass, G. R. P., Okura, M. H., & Granato, A. C. "Lip balm using cinnamon oleoresin and essential oil: microbiological safety assessment with accelerated and extended stability" (2020)
- [14] Kritika Nhuchhe Pradhan, Souvik Das, CSR Lakshmi, PN Kavitha. "Cosmeceutical Lip Balm Harnessing the Power of Herbal Ingredients" World Journal of Pharmaceutical Research, 2023
- [15] Hafni Nur Insan, Yulia Vera "Evaluation and Formulation of Lip Balm Preparation from Aloe Vera (Aloe Vera) and Bit (Beta Vulgaris) Fruit Extract as Natural Dye" Journal of Public Health and Pharmacy, 2021
- [16] Poonam Chaudhary • Ashita Sharma • Balwinder Singh • Avinash Kaur Nagpal "Bioactivities of phytochemicals present in tomato" 2018
- [17] K. Latha "PHYTOCHEMICAL ANALYSIS IN FOAMY EXTRACT OF CUCUMBER (CUCUMIS SATIVUS L.)" 2022
- [18] Maria Grasela Kase, Aniek Prasetyaningsih, Dwi Aditiyarini "Antioxidant and Antibacterial Activity of Pomegranate Extract (Punica granatum L.) in Lip Balm Formulation" 2023
- [19] Hilmia Lukman, Vivi Shofia, Shinta Nova Salsabila, Titis Maysaroh "Antioxidant Activity Evaluation of Carrot (Daucus carota L.) Extract-Enriched Lip Balm: A Natural Approach for Lip Protection" Indonesian Journal of Science and Pharmacy, 2024
- [20] Nikma Fadila, Anugrah Umar "Formulation and Physical Stability Test of Lip Balm Preparation Etanol Extract of Coppeng Fruit (Syzigium Cumini) As Antioxidants", 2024.