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Research Article

PHYSICOCHEMICAL, FORMULATION, AND EVALUATION OF ANTIFUNGAL HERBAL SOAP USING *CURCUMA AMADA* ROXBURGH AND *PRUNUS DULCIS*

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ABSTRACT

Objective: Mango ginger (*Curcuma amada* Roxburgh) belongs to the *Zingiberaceae* family, a type of annual plant. It is commonly used for culinary and therapeutic purposes, which also has the maximum amount of health benefits. The main objective of the study is formulation of antifungal herbal soap which is alternate to chemical products.

Methods: In the present study, aqueous, ethanol, and chloroform extract of mango ginger were subjected to qualitative and quantitative phytochemical analysis and determined the antioxidant activity using DPPH assay and FRAP assay. Furthermore, the ash and moisture content of the rhizome was analyzed. The aqueous extract of mango ginger is used in the GC-MS study to identify the compounds present in the mango ginger. The oil was extracted from mango ginger and subjected to antifungal activity by the well-diffusion method against three fungi, namely, *Candida tropicalis*, *Candida auris*, and *Candida albicans.* Using the extracted mango ginger oil and almond oil, antifungal Herbal Soap is formulated.

Result: This study shows that aqueous extract of mango ginger has a greater number of carbohydrates, phenol, flavonoids, and antioxidant activity than other extracts. Antifungal activity is observed at various concentrations of extract, which shows that the highest zone of inhibition is 1.4 cm for *C. auris*. The formulated soap has a good aroma, and color – mustard yellow. This soap is base in nature and its pH is 8.9.

Conclusion: According to the above studies, the formulated antifungal herbal soap may rectify the problems of fungal skin infections.

Keywords: Mango ginger, Antifungal activity, GC-MS analysis, Antioxidant activity, Antifungal herbal soap, Phytochemical, *Curcuma amada*.

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INTRODUCTION

The skin is the largest organ in our body, which constitutes about 16% of human body weight (5 kg) and covers an area of about 2 square meters. It is mainly made up of fat, proteins, minerals, and water. The skin is combined into three layers, namely, epidermis, dermis, and hypodermis. It has main functions such as protection, regulation, and sensation [1]. The main primary function of the skin is to act as a barrier. One inch of our skin has approximately 19 million skin cells and 60 thousand melanocytes (i.e., cells that make melanin or skin pigments). It also contains 1000 nerve endings and 2o blood vessels. There are four types of skin infection, namely, bacterial, viral, fungal, and parasitic skin infection [2].

Skin infection is a major public health problem due to various circumstances. The probability of skin infection is increased due to the use of chemical cosmetics products. The only alternative way to this problem is the use of herbal products in our day-to-day life. Herbal products have a very small number of side effects when compared to chemical products [3]. Skin infection caused by fungus is the most common in society and needs proper attention for treatment and also to maintain healthy and smooth skin after treatment. In general, fungi lie in the dead and topmost layer of the skin and irritate [4].

Mango ginger (*Curcuma amada* Roxburgh) belongs to the *Zingiberaceae* family, a type of annual plant. It is commonly used for culinary and therapeutic purposes, which also has the maximum number of health benefits. It is an aromatic plant; the rhizome has a rich content in phytochemicals. Mango ginger plant is a tillering, erect, and herbaceous perennial plant whose height is approximately 50–120 cm [5]. Mango ginger plants prefers humid condition and hot tropical climates with high rainfall for growth. It grows well in red soil and sandy loam soil. The rhizome has the aromatic flavor of mango and the morphology of the rhizome resembles ginger. The rhizome can cure skin diseases and has therapeutic uses [6]. The mango ginger is capable of antifungal activity in nature. Hence, the oil obtained from the mango ginger is used in the formulation of antifungal herbal soap.

The present study was undertaken to investigate qualitative and quantitative phytochemical analysis, the proximate composition, and antioxidant properties of aqueous, ethanol, and chloroform extract of mango ginger, which are commonly used in our daily life. The GC-MS analysis was done on an aqueous extract of mango ginger. And also, extract the oil from mango ginger, then analyze the anti-fungal activity. Using the extracted mango ginger oil and almond oil (for fragrance and nourishment to the skin), the antifungal herbal soap was formulated with a soap base that includes glycerin, coconut oil, NaOH, and rose water. The formulated soap is subjected to testing various parameters such as color, odor, pH, foam height, foam retention, viscosity, specific gravity, and stability [7,8].

METHODS

Preparation of extract

The collected rhizome was blended into small pieces. Then, the samples are homogenized and mixed with the solvents (Water, ethanol, and chloroform) at a ratio of 1:10. The mixture was placed in a 250 mL conical flask covered with aluminium foil or cotton plug. The flask was placed in a rotator shaker for 24 h. After incubation, the mixture was filtered through Whatmann No.1 Filter paper. The crude filtrates obtained were stored in the refrigerator until further analysis. These three extracts were used for the identification of active constituents present in the plant samples.

Qualitative phytochemical screening

Aqueous, ethanol, and chloroform extract of mango ginger were subjected to qualitative analysis of various active constituents, such

as carbohydrate, amino acid, protein, alkaloids, saponins, cardiac glycosides, phenol, tannin, flavonoids, terpenoids, glycosides, and anthraquinones [9,10].

Quantitative test

1. The total carbohydrate level was estimated by phenol sulfuric method
2. The total phenol was estimated by Folin's Ciocaalteau method
3. The amount of flavonoids level was estimated by the aluminium chloride method.

Determination of ash content

A crucible, which was dried for at least 2 h at 100°C from muffle furnace to desiccator, cooled, and its weight was recorded (W_1). 5 g of sample was weighed into the crucible (W_2). The samples were ashed at a high temperature (400–500°C) for 2 h in a muffle furnace. Crucible was allowed to cool in a desiccator and weighed (W_3) [11].

Calculation:

$$\% \text{ of ash} = \frac{W3 - W1}{W2 - W1} \times 100$$

Where, W1: Weight of empty crucible, W2: Weight of crucible+Sample before ash, W3: Weight of crucible+Ash.

Determination of moisture content

A clear and dried crucible was weighed (W_1). 5 g of grounded sample was weighed into the crucible (W_2). The crucible was shaking gently to ensure the uniform distribution of the sample. The crucible containing the sample was placed in the oven at 100°02DAC for 2 h, then the crucible was moved to the desiccator and allowed to cool. The crucible containing a dried sample was weighed (W_3) [11].

Calculation:

$$\% \text{ of moisture} = \frac{W2 - W3}{W2 - W1} \times 100$$

Where, W1: Initial weight of empty crucible, W2: Weight of crucible+Sample before drying, W3: Weight of crucible + Sample after drying.

Determination of antioxidant activity

DDPH assay

The 0.2 mL of extracts were added to the 0.4 mL of DPPH solution and then 0.4 mL of 50mM Tris HCL was added. All the solutions were mixed well and incubated in dark conditions at room temperature for 30 min. After 30 min, the absorbance of the mixture was read at 517 nm in a UV-Visible spectrophotometer. 3 mL of DPPH was taken as control. The experiment was done in triplicate [12].

Calculation:

$$\text{DPPH (\%)} = \frac{Control\,OD - Test\,OD}{Control\,OD} \times 100$$

FRAP assay

The 1.0 mL of extract was added to a test tube. 1.0 mL potassium phosphate buffer (0.2M, pH 6.6) and freshly prepared potassium ferric cyanide (1 mL, 1%) were added to the extracts. The mixture was incubated in a water bath (50°C for 20 min). Moreover, 1.0 mL of Trichloroacetic acid (10% TCA) was added to the mixture followed by centrifugation at 5000 rpm for 5 min. From the upper layer of the sample extract, 1.0 mL was taken and mixed with 1.0 mL of purified distilled water followed by 100 µL of freshly prepared $Fecl_3$ (0.1%). The absorbance of the sample was measured at 765 nm against blank in a UV-Visible Spectrophotometer. The experiment was done in triplicate [12,13].

Calculation:

$$\text{FRAP (\%)} = \frac{Frap\,Blank\,OD - FRAP\,Test\,OD}{FRAP\,Blank\,OD} \times 100$$

GC-MS analysis

GC-MS analysis of aqueous extract of mango ginger was performed using a THERMO GC-TRACE ULTRA VER; 5.0 interfaced with a mass spectrometer (THERMO MS DSQ II) equipped with a DB 35-MS capillary standard non-polar column having dimension (length 30 m, diameter 0.25 mm, and film thickness 0.25 µL). For the temperature for GC-MS detection, an electron ionization energy system with an ionization energy of 70 eV was used. The carrier gas used was helium (99.99%) at a constant flow rate of 1 mL/min and the injection volume of 1 µL was employed. The injector temperature and the ion source temperature were maintained at 25°C. The oven temperature was programmed as 50°C with an increase of 12°C/min to 300°C. Mass spectra were taken at 70 eV with a scan-interval of 0.5 s with a scan range of 50–550 m/z. The total GC running time was 23.833 min. The relative percentage amount of each compound was calculated by comparing the compound average peak area to the total areas.

Identification of components

Interpretation of the mass spectrum of GC-MS was done using the database of in-built libraries like National Institute of science and technology and Wiley 9 having more than 62,000 patterns. The mass spectrum of the unknown compound was identified compared with the spectrum of the known components stored in the WILEY 9 library.

Preparation of mango ginger oil

The mango ginger is taken and washed through the tap water. The cleaned mango ginger is grated into fine pieces using a grater, and then, it is soaked into the coconut oil and stirred well. The mixture is closed tightly with aluminium foil or lid and left for 1 week. Then, the mixture is filtered using the filter. The oil is collected and stored in a bottle.

Determination of antifungal activity

The antifungal activity was determined using the well-diffusion method [14].

Test organisms

1. *Candida tropicalis*
2. *Candida auris*
3. *Candida albicans*

Procedure

The antifungal activity of crude extract extracts was determined by the well-diffusion method. In an aseptic room, MHA plates are prepared by pouring 20 mL of molten media into sterile Petri plates. After the solidification of media, the 20–25 µL suspension of fungal inoculums was swabbed uniformly on Petri plates. The sterile paper disks were dipped into the required solvents and then placed on agar plates. The wells were bored with an 8 mm borer in seeded agar. Then, 25–100 µL of the sample was poured into the wells. After that, the plates were incubated at room temperature (37°C) for 24 h. The assay was done in triplicates and control plates were also maintained. The zone of inhibition was measured from the edge of the well to the zone in mm and recorded [15,16].

Formulation of antifungal herbal soap

The soap base contains glycerine and coconut oil which are used for the preparation of soap. The soap base of about 70 g rams is weighed and taken, then cut into small pieces and melt at the low heat in the heating mandle. Then, 20 mL of mango ginger oil and 10 mL of almond oil are added little by little. Stir the mixture slowly and continuously for 30–40 min. This mixture is poured into a rectangle or any shape mold, and then, it is allowed to solidify at room temperature until set and cooled down and kept under physical observation for any characteristic changes.

Determination of clarity, color, and odor of soap

Clarity and color were checked by naked eyes against the white background, and the odor was checked by smelling [17,18].

Determination of pH

The pH of the soap is determined using the digital pH meter.

Foam test

The 5 mL of soap solution is taken in the test tube and shaken well. Then, the result is observed with naked eyes.

Foam height

The 1 g of soap is taken and diluted with distilled water in the measuring cylinder. The cylinder is closed by hand and shaken vigorously for 10 times, and then, foam height is measured using a scale and noted.

Foam retention

The 5 mL of soap solution is measured and taken in the measuring cylinder and shake vigorously. The foam appeared. The volume of foam at 1-min intervals for 10 min was recorded.

Viscosity

The viscosity of herbal soap was determined using Brookfield Viscometer.

Procedure

1. Take an accurate quantity of sample (400–600 mL)
2. The sample is filled into the beaker or sample holder provided by the instrument
3. Set up the instrument with the level of the base and attach with a constant electrical supply
4. Clean the spindle and attach it to the Brookfield viscometer
5. Rotate the spindle in the gel until a constant reading dial reading is obtained
6. And the obtained readings from the display are noted
7. Repeat the test at least 3 times for reproducible results.

Specific gravity

Specific gravity is a relative parameter. It is determined in related to water.

Procedure

1. Weigh an empty container first and record its weight (W1 g)
2. Next, fill your container with sample liquid and weigh it again (W2 g)
3. The weight of your liquid is equal to the second measurement minus the first
4. Similarly, fill the container with water and note its weight (W3 g)
5. Determine the weight of water by subtracting W3 minus W1.

Calculation:

$$\text{Specific gravity of Sample} = \frac{Weight\ of\ the\ Sample}{Weight\ of\ an\ equal\ volume\ of\ distilled\ water}$$

Stability

The samples were kept under accelerated conditions and the physical characteristics such as appearance, pH, viscosity, and specific gravity were determined to confirm their stability even after stress. The period of the study was 3 months at 45–50% and 75% relative humidity [18].

RESULTS

The present study mainly deals with the assessment of nutritional potentials in the "Mango Ginger" plant source through the identification of phytochemicals, analysis of the proximate composition, estimation of secondary metabolites, and study of antioxidant capacity. The GC-MS analysis was done on an aqueous extract of mango ginger. The oil is extracted from the mango ginger and antifungal activity is carried out in the extracted oil. Using the extracted oil and almond oil formulation of antifungal herbal soap is done. The results obtained from this work are presented and discussed as follows.

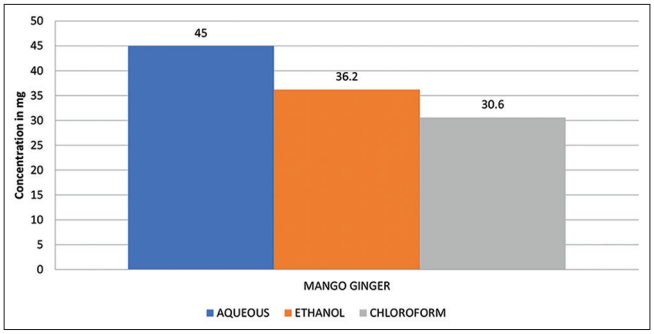

Fig. 1: Result for total carbohydrates

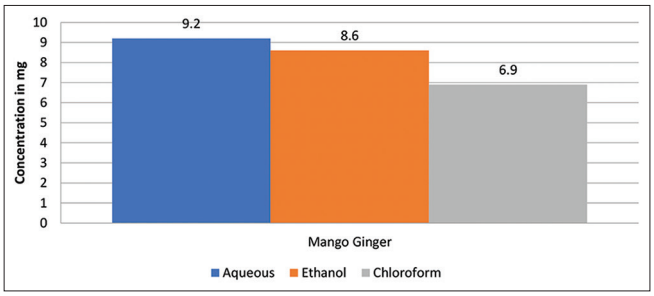

Fig. 2: Result for total phenol

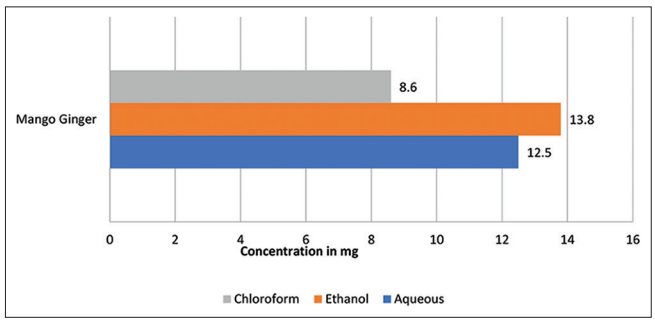

Fig. 3: Result for flavonoids

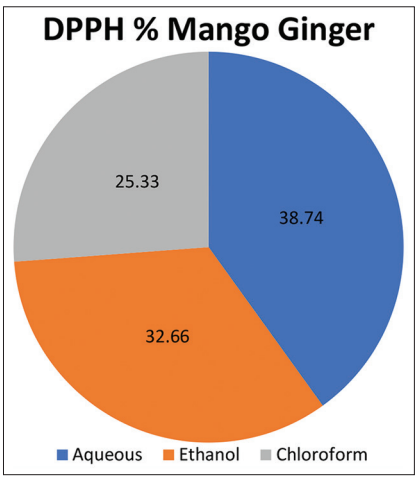

Fig. 4: Result for DPPH assay

Phytochemical screening

The results of the phytochemical screening for mango ginger were obtained as follows (Table 1).

Quantitative analysis

Total carbohydrate

From the above result, the total carbohydrate content was more or less similar in all selected solvents, but comparatively, carbohydrates were highly present in the aqueous extract (45.0±0.20 mg), whereas the lower concentration in the chloroform extract of mango ginger (30.6 mg) (Fig. 1 and Table 2).

Secondary metabolites

Total phenol

The amount of total phenol present in the sample is as follows.

From the above results, the total phenol content was more or less similarly present in all selected solvents but comparatively the total phenol was highly present in the aqueous extract (9.2 mg), whereas lower concentration in the chloroform extract of mango ginger (6.9 mg) (Fig. 2 and Table 3).

Flavonoids

The number of flavonoids present in the sample is as follows.

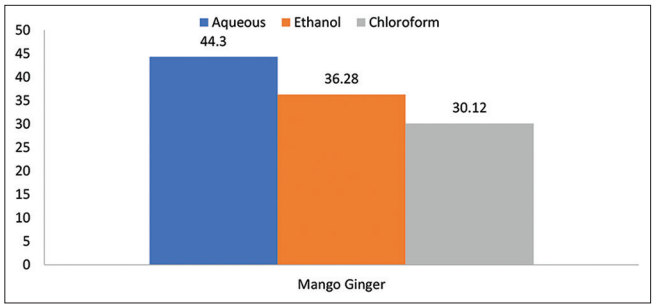

Fig. 5: Result for FRAP assay

From the above results, the flavonoids content was more or less similarly present in all selected solvents but comparatively the flavonoids were highly present in the ethanol extract (13.8 mg), whereas lower concentration in the chloroform extract of mango ginger (8.6 mg) (Fig. 3 and Table 4).

Table 1: The result for phytochemical analysis in mango ginger

S. No.	Test for phytochemicals	Extract		
		Aqueous	Ethanol	Chloroform
1	Carbohydrate			
	(a) Molish's test	++	++	+
	(b) Fehling's test	+	+	+
2	Amino acids			
	Ninhydrin test	–	–	–
3	Protein			
	(a) Biuret test	–	–	–
4	Alkaloids			
	(a) Mayer's test	+	+	+
	(b) Wagner's test	+	+	+
5	Saponins			
	Foam test	+	+	+
6	Cardiac glycosides	–	+	+
7	Phenol	+	+	+
8	Tannin			
	Lead acetate test	–	-	–
9	Flavonoids			
	Acid test	+	+	+
10	Terpenoids			
	Acetic anhydride test	–	–	–
11	Glycosides	–	–	–
12	Anthraquinones	–	–	–

Table 2: The concentration of total carbohydrates

Source	Total carbohydrates (mg) in extracts		
	Aqueous	Ethanol	Chloroform
Mango ginger	45.0±0.20	36.2±0.16	30.6±0.22

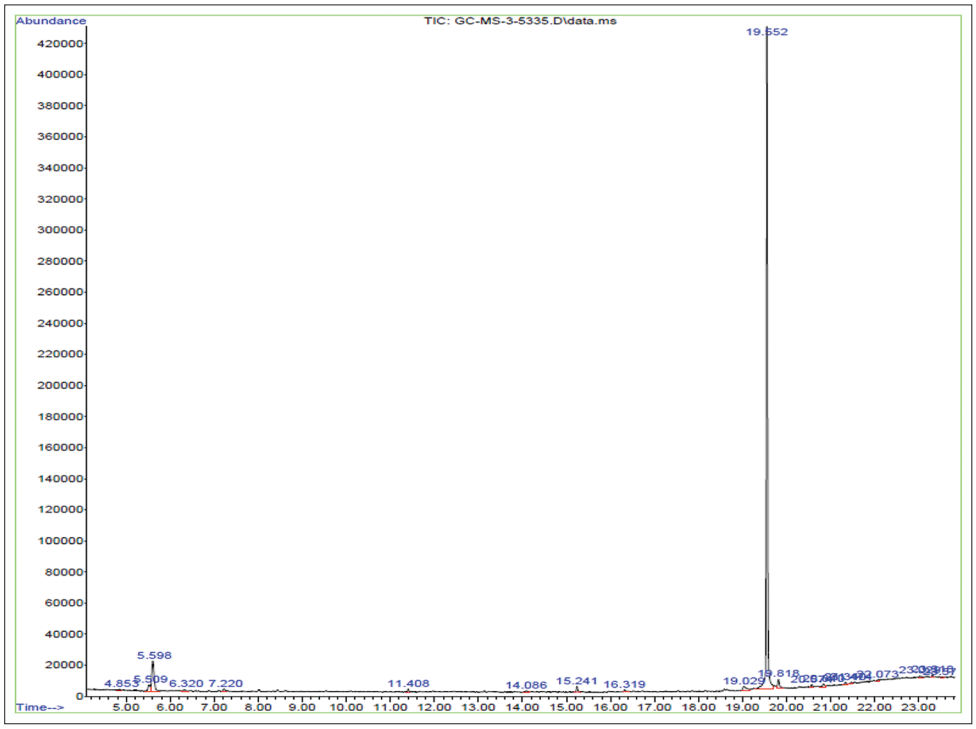

Fig. 6: Graph for GC-MS analysis

Determination of ash content
The result reported that the ash content of 3.0% was present in the sample (mango ginger).

Determination of moisture content
The result reported that the moisture content of 90% was present in the sample (Mango ginger).

Antioxidant activity
The antioxidant activity of mango ginger was analyzed using DPPH and FRAP assay in the aqueous, ethanol, and chloroform extract.

DPPH assay
From the above result, the sample of all the solvents has a potent DPPH activity. Comparatively, the aqueous extract (38.74%) of mango ginger exhibits an enormous DPPH activity than others (Fig. 4 and Table 5).

FRAP assay
From the above result, the sample of all the solvents has a better FRAP activity. Comparatively, the aqueous extract of mango ginger exhibits an enormous amount of FRAP activity (44.30%) than others (Fig. 5 and Table 6).

Table 3: The concentration of total phenol

Source	Total phenol (mg) in extracts		
	Aqueous	Ethanol	Chloroform
Mango ginger	9.2±0.3	8.6±0.2	6.9±0.2

Table 4: The concentration of flavonoids

Source	Flavonoids (mg) in extracts		
	Aqueous	Ethanol	Chloroform
Mango ginger	12.5±0.4	13.8±0.7	8.6±0.1

Table 5: The percentage of DPPH assay

Source	DPPH (%) in extracts		
	Aqueous	Ethanol	Chloroform
Mango ginger	38.74±2.1	32.66±1.3	25.33±0.9

Table 6: The percentage of ferric reducing antioxidant power assay

Source	FRAP assay (%) in extracts		
	Aqueous	Ethanol	Chloroform
Mango ginger	44.30±2.5	36.28±1.8	30.12±1.0

FRAP: Ferric reducing antioxidant power

GC-MS analysis
From the above table and graph, the compounds cis, cis-3-Ethylbicyclo [4.4.0] decane, Naphthalene,2-ethyldecahydro-, trans, and cis-3-ethylbicyclo [4.4.0] decane have the highest peak value at the retention time of 19.552 min than other compounds. The second compound which attains the higher peak value is bicyclo [3.1.0] hex-2-ene, 4-methyl-1-(1-methylethyl) – at the retention time of 5.598 min. The sample is run for 23.833 min in GC-MS at the temperature of 50–300°C (Fig. 6 and Table 7).

Determination of Antifungal Activity
The antifungal activity was determined by the well-diffusion method. In the present study, the extracted mango ginger oil showed the maximum zone of inhibition against *C. auris* (1.4 cm) (Fig. 7 and Table 8).

Determination of clarity, color, and odor of soap
The formulated antifungal herbal soap was rectangle in shape.

1. Clarity transparent
2. Color mustard yellow
3. Odor good aromatic

Determination of pH of the soap
The pH of the soap is determined by a digital pH meter. The pH is found to be 8.9 and the soap is base in nature.

Foam test
The diluted soap solution is taken into the measuring cylinder and shaken well. After, shaking the foam appeared in the measuring cylinder.

Foam height
The diluted soap solution is taken into the measuring cylinder and shaken well by closing the measuring cylinder by hand. The foam height of the soap solution is 6.5 cm.

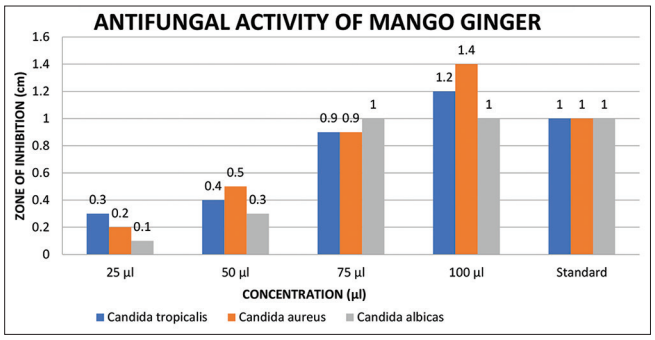

Fig. 7: Result for antifungal activity

Table 7: GC-MS analysis of aqueous extract of mango ginger

S. No.	Peak number	RT (min)	Name of the compound	Peak area (%)	Molecular formula	Molecular weight
1	3	5.598	Bicyclo [3.1.0] hex-2-ene, 4-methyl-1-(1-methylethyl)-	8.05	$C_{10}H_{16}$	136.23
2	7	14.086	2,2-Dibromocholestanone	0.40	$C_6H_6Br_2O_2$	269.92
3	7	14.086	Octatriacontane, 3,5,23-trimethyl-	0.40	$C_{41}H_{84}$	577.1
4	8	15.241	3,5-Octadiene, 2,2,4,5,7,7-hexamethyl-, (E, Z)-	0.88	$C_{14}H_{26}$	194.36
5	8	15.241	Naphthalene, 1,1'-(1,2-ethanediyl) bis [decahydro-	0.88	$C_{22}H_{38}$	302.5
6	11	19.552	cis, cis-3-Ethylbicyclo [4.4.0]decane	78.59	$C_{12}H_{22}$	166.30
7	11	19552	Naphthalene, 2-ethyldecahydro-	78.59	$C_{12}H_{22}$	166.30
8	11	19.552	trans, cis-3-Ethylbicyclo [4.4.0]decane	78.59	$C_{12}H_{22}$	166.30
9	12	19.818	1,2-Bis (trimethylsilyl) benzene	1.56	$C_{12}H_{22}Si_2$	222.47
10	12	19.818	1-benzylindole	1.56	$C_{15}H_{13}N$	207.27
11	12	19.818	Silane, 1,4-phenylenebis [trimethyl-	1.56	$C_{12}H_{22}Si_2$	222.48
12	15	21.340	Trimethyl [4-(2-methyl-4-oxo-2 pentyl) phenoxy] silane	0.62	$C_{15}H_{24}O_2Si$	264.43

Foam retention

The 5 mL of soap solution is taken into the measuring cylinder and shaken well. The foam will have appeared. At the initial time, 0 min the height of the foam is 6.5 cm. After 10 min, the height of the foam is 3.4 cm. The foam is stable for up to 6.0 min, after those 6.0 min starts to reduce.

Viscosity

The viscosity of the soap is determined by Brookfield Viscometer. The viscosity has been done for at least three trials to get the proper result. The value of the viscosity of soap is displaced in the below table (Table 9).

Specific gravity

Specific gravity is the relative parameter. It is determined by related to water. It is done 3 times to get a proper and accurate result. The table shows the value of specific gravity (Table 10).

Stability

The stability is checked in soap, whether it is stable for long period or not without any changes in the characterization. Here, we check the stability of the soap for 3 months. The table shows the result of stability in the soap.

According to the above table, the value from the initial month to after 3 months, there will be no enormous changes. It has only a very slight variation in it. From the results, we conclude that the formulated soap is stable after the testing period (Table 11).

DISCUSSION

In the world population, nearly 65–75% of people prefer herbal products to use in their day-to-day life. Many investigations show that chemical products will lead to side effects in the future of our lives. Hence, they use alternatives to chemical products (i.e., herbal products). In the present study, I analyzed the phytochemical constituents, proximate composition, secondary metabolites, and antioxidant activity of the mango ginger. To identify components GC-MS analysis where undergone in aqueous extract of mango ginger. The essential oil was extracted from mango ginger and the oil was subjected to the evaluation of antifungal activity against the *Candida* species. Using the extracted mango ginger oil and almond oil, the antifungal herbal soap is formulated. Some of the parameters were checked in the formulated soap.

The present study investigated that mango ginger has certain active phytochemical constituents such as carbohydrates, saponins, phenol, alkaloids, and cardiac glycosides. The nutritional analysis shows that mango ginger is a good source of macronutrients like carbohydrates. Mango ginger also contain secondary metabolites like flavonoids and total phenol. The ash and moisture content in the mango ginger is in a normal ratio.

The antioxidant compounds have a very important role in human health benefits. The compound of antioxidants can counteract and migrate the negative impact of oxidants in our bodies. The antioxidant was determined by DPPH and FRAP assay, which shows that the aqueous extract has a higher amount than the other extracts. The GC-MS analysis of the aqueous extract of mango ginger shows the various compounds present in the rhizome. Those compounds have several various biological activities which help with therapeutic purposes. The obtained extracted mango ginger oil is used for the determination of antifungal activity against *Candida* species. Antifungal activity is observed at various concentrations of extract, which shows the highest zone of inhibition is 1.4 cm for *C. auris*. This study shows that the mango ginger has antifungal activity and may be capable of controlling fungal infections.

The antifungal herbal soap is formulated using mango ginger and almond oil (for fragrance and nourishment to the skin) and has good result in skin infection which avoids itching and give smooth skin, skin glow, and nourishment to the skin. The formulated soap has a good aroma, and color – mustard yellow. This soap is base in nature and its pH is 8.9. This soap gives moderate foam and the height of the foam is 6.5 cm and it has a viscosity of 0.85 poise. This soap also has a specific gravity of 1.2232 g/cc. According to the study, this soap is stable for 3 months without any drastic changes in pH, viscosity, and specific gravity.

CONCLUSION

Most people suffer from fungal skin infections due to the use of chemical products instead of herbal products. The present study concluded that mango ginger has active phytochemical constituents and nutrient composition, such as carbohydrate, alkaloids, flavonoids, phenol, saponin, and cardiac glycosides. The antioxidant activity of DPPH and FRAP assay was higher in the aqueous extract of mango ginger. The GC-MS analysis shows that mango ginger has various compounds present in it. According to the results, mango ginger oil has an antifungal activity that can cure fungal skin infections. Hence, the antifungal herbal soap which is formulated using mango ginger oil and almond oil will cure fungal skin infections and help to nourish the skin. The parameters of soap show that soap is base in nature and stable for a certain period. The herbal products also give good results for curing skin infections without any side effects.

Table 8: The antifungal activity of mango ginger oil

Concentration of solution	Organisms zone of inhibition (cm)		
	Candida tropicalis	*Candida auris*	*Candida albicans*
Concentration (µL)			
25	0.3±0.01	0.2±0.01	0.1±0.01
50	0.4±0.02	0.5±0.01	0.3±0.02
75	0.9±0.01	0.9±0.02	1.0±0.02
100	1.2±0.03	1.4±0.01	1.0±0.02
Standard	1.0	1.0	1.0

Table 9: The result of viscosity

S. No.	Trials	pH	Viscosity in poise
1	First	8.94	0.85
2	Second	8.87	0.83
3	Third	8.92	0.86

Table 10: The result of specific gravity

S. No.	Trials	pH	Specific gravity g/cc
1	First	8.94	1.2246
2	Second	8.87	1.2198
3	Third	8.92	1.2232

Table 11: The result of stability

S. No.	Accelerated condition	Appearance		pH		Viscosity in poise		Specific gravity (g/cc)	
		0 month	3 months	0 month	3 months	0 month	3 months	0 month	3 months
1	40±2°C at 75±5% RH	Mustard yellow	Mustard yellow	8.94	9.06	0.85	0.80	1.2246	1.2280
2				8.87	8.82	0.83	0.81	1.2198	1.2286
3				8.92	9.0	0.86	0.84	1.2232	1.2224

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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