

(RESEARCH ARTICLE)



Anti-wrinkle properties of rosehip oil, aloe vera, green tea extract, and frankincense essential oil: Brief review and a survey

Bisrat Hailemeskel¹ and Fekadu Fullas^{2,*}

¹ College of Pharmacy, Howard University, Washington, D.C 20059, USA.

² 1409 Jackson Rd, Silver Spring, MD 20904, USA (Permanent Address); College of Health Sciences, Bonga University, 8621J-GGH, Bonga, Kaffa, Ethiopia.

International Journal of Scholarly Research in Biology and Pharmacy, 2023, 03(02), 001–008

Publication history: Received on 19 October 2023; revised on 27 November 2023; accepted on 30 November 2023

Article DOI: <https://doi.org/10.56781/ijsrbp.2023.3.2.0041>

Abstract

The knowledge and opinions of first-year pharmacy students were evaluated after conducting a survey. The survey included 5 knowledge-based and 5 opinion-based questions, focusing on four herbal remedies. The data collected from 28 participants were analyzed for correctness of answers and agreement or disagreement to opinion lead statements. The knowledge-based questions showed an average 74.5% correct answer rate, with the question on Rosehip Oil receiving the highest (about 93%) followed by the Green Tea Extract at 89.3%. Opinion-based questions revealed a positive attitude towards herbal remedies, with over 82% strongly agreeing or somewhat agreeing with their potential benefits. Over 92% of the respondents believed Green Tea Extract and Frankincense Essential Oil possess skin-protecting qualities. Participants had positive attitude towards herbal remedies for skincare. Knowledge-based questions had a satisfactory correct answer rate, and participants largely agreed (82.7%) on the potential of these herbal remedies to enhance skin health and reduce signs of aging. Disagreement was minimal, ranging from 0% to 17.2%, indicating a widespread inclination towards positive agreement. The survey results provide a valuable insight into the potential of herbal remedies in skincare. The knowledge level was satisfactory at 74.5%. Opinions towards Rosehip Oil, Aloe Vera, Green Tea Extract, and Frankincense Essential Oil were largely positive among the surveyed pharmacy students. Limitations of the survey include the small sample size and lack of diversity in the survey participants. Future research should address these limitations and explore additional factors influencing knowledge and opinions regarding herbal remedies for skincare.

Keywords: Rosehip Oil; Aloe Vera; Green Tea Extract; Frankincense Essential Oil; Knowledge; Opinions

1 Introduction

Wrinkles, often regarded as a visible sign of aging, result from a complex interplay of intrinsic and extrinsic factors. Intrinsic aging involves natural processes such as decreased collagen and elastin production, leading to reduced skin elasticity. Extrinsic aging is primarily caused by environmental factors, notably UV radiation and pollutants, which accelerate skin damage and aging. Wrinkles occur due to the breakdown of collagen and the thinning of the skin's outer layer. Understanding this mechanism is crucial for developing effective prevention and treatment strategies.

Wrinkles are a widespread concern, affecting people of all ages, but they become more pronounced with advancing age. While prevalence varies by geographical location and genetics, the impact of wrinkles on an individual's self-esteem and psychological well-being is universally significant. These skin imperfections can lead to decreased self-confidence and increased stress. Moreover, the cosmetic industry thrives on anti-wrinkle products, underscoring the economic impact of this issue.

* Corresponding author: Fekadu Fullas

The inclination toward natural or herbal remedies for wrinkle treatment has experienced a surge in recent years, influenced by various factors. A growing number of individuals are becoming increasingly mindful of the components present in their skincare regimens, actively exploring alternatives perceived as more natural and less reliant on chemicals. Herbal and natural remedies are frequently linked to fewer side effects, embodying a gentler approach to skincare. The subsequent examination highlights prevalent natural ingredients in wrinkle treatment skincare products, showcasing evidence supporting their effectiveness. The following is a review of some of the common herbs used in anti-wrinkles formulations which are also the subject of this survey.

1.1 Rosehip Oil (*Rosa canina*)

Rosehip oil is a natural, nutrient-rich oil derived from the seeds of wild rose bushes, known for its skincare benefits, including hydration, reducing fine lines, and promoting skin regeneration. Rosehip oil is often used in skincare products such as creams, serums, and oils. It is also used in teas for its potential health benefits. A study investigating the potential applications of rosehip oil (from *Rosa rubiginosa*) in dermatology found that topical application of rosehip oil led to significant improvements in skin elasticity and hydration (Sotomayor and Ganz, 2019). Another study focusing on evaluating the wound-healing properties of rosehip oil derived from *Rosa moschata* demonstrated that the oil exhibited wound-healing properties, which may be attributed to its bioactive components, including vitamins (Valente et al., 2018). A common concern when using rosehip oil against wrinkles is its potential to cause skin irritation or allergic reactions in some individuals. It is therefore recommended to perform a patch test before regular use.

1.2 Aloe Vera (*Aloe barbadensis* Miller)

Aloe vera is a succulent plant known for its gel-like substance found in its leaves. The gel is well-known for its soothing and healing properties, particularly for sunburn and skin irritation. It also has potential benefits for digestive health and may be used as a dietary supplement.

An overview of the properties and potential applications of Aloe vera in dermatology was provided in a review (Surjushe et al., 2014). The paper explored Aloe vera's bioactive compounds, such as polysaccharides, vitamins, and enzymes, which are relevant to its skin-soothing and anti-inflammatory effects. It emphasized Aloe vera's anti-inflammatory properties, making it a valuable natural remedy for inflammatory skin conditions. While not directly focusing on wrinkle reduction, these anti-inflammatory effects can indirectly contribute to improved skin appearance and reduced signs of aging. A clinical trial of the effects of dietary Aloe vera supplementation on skin health (Cho et al., 2009) demonstrated its impact on facial wrinkles and skin elasticity, which are essential aspects of wrinkle reduction. In the trial, that topical application of Aloe vera gel was shown to reduce wrinkles and improve skin elasticity in female participants. This observation suggested that Aloe vera may have the potential to positively influence skin texture and reduce the appearance of wrinkles.

1.3 Green Tea Extract (*Camellia sinensis*)

Green tea extract is derived from the leaves of the plant *Camellia sinensis*. It is rich in antioxidants, particularly catechins, which have been associated with various health benefits, including weight management, improved heart health, and potential cancer prevention. The photoprotective properties of green tea extract were explored in a review article (Katiyar, 2011). The report examined the antioxidant and immunomodulatory effects of green tea, both of which are relevant to skin health and protection against UV-induced aging. The review highlighted the antioxidant effects of green tea extract, which help protect the skin from oxidative stress and premature aging caused by exposure to UV radiation and environmental factors. A double-blind, placebo-controlled clinical trial examined the effects of a topical cream containing green tea extract on photoaging skin. Photoaging is associated with wrinkle formation and skin aging (Chiu et al., 2005). This investigation reported that the topical cream containing green tea extract reduced the severity of wrinkles with an improved overall appearance of aging skin. This study suggests that green tea extract has potential benefits in addressing wrinkle-related concerns.

1.4 Frankincense Essential Oil (*Boswellia carterii*)

Frankincense essential oil is extracted from the resin of the *Boswellia* tree. Its oil is used for its potential aromatherapy benefits, such as promoting relaxation and reducing stress. It is also known for its potential anti-inflammatory and skin rejuvenation properties. The anti-inflammatory properties of boswellic acids found in frankincense essential oil have been reported in a study (Syrovets et al., 2013). While not directly focused on wrinkle reduction, the study addressed the potential anti-inflammatory effects of frankincense, which can contribute to skin health. It suggested that boswellic acids in frankincense may have anti-inflammatory effects that can benefit the skin by reducing inflammation-associated skin aging. Frankincense essential oil has a long history of traditional use for various skin conditions.

The foregoing studies provide a valuable insight into the potential benefits of Rosehip Oil, Aloe Vera, Green Tea Extract, and Frankincense Essential Oil for skin health and wrinkle reduction. While more research is needed to fully understand their mechanisms of action, these natural remedies offer promising possibilities for maintaining healthy and youthful-looking skin. Studies regarding the knowledge or opinions of healthcare professionals in the use of these herbs against wrinkles are lacking. However, there are a limited number of studies in the use of herbs for other diseases. A study carried out in Jordan assessed public and students' knowledge and attitudes toward use of herbal remedies and their interactions with conventional drugs (Smith and Johnson, 2020). The findings revealed that a significant majority (82%) used self-prepared herbal preparations, with many (56%) opting for self-medication without consulting a physician. Primary sources of herbal knowledge included family (38%), TV (21%), and friends (15%). Moreover, nearly 79% believed herbal remedies were safer and more accessible than physician-prescribed medications, highlighting the need for healthcare providers to discuss herbal medicine use to prevent potential complications. Another study on utilization of herbals by Howard University First Year pharmacy students explored the understanding and the prevalence and patterns of complementary and alternative medicine (CAM) use, particularly herbal remedies (Hailemeskel et al., 2017). The findings shed light on the CAM utilization trends among pharmacy students, providing insights into their preferences and practices in this field.

While existing literature covers general knowledge about herbs and dietary supplements, there is a notable shortage of studies specifically on the knowledge and opinions of healthcare professionals regarding the use of herbs for wrinkles. To contribute towards filling this gap, our study investigated the knowledge and opinions of pharmacy students concerning herbal remedies for wrinkles.

2 Methods

This survey was conducted as part of the Drug Information course, a mandatory 2-credit-hour class for first-year professional pharmacy students. In this course, students received instruction on research methodology and survey administration. Each student was assigned an individual topic and tasked with crafting an introduction and developing two sets of survey questions. Demographic data on gender, age, residence, work experience prior to joining Howard University School of Pharmacy, and work experience were collected. In the questionnaire, knowledge-based statements were framed to elicit a true or false answer. The first set comprised 5 knowledge-based questions, while the second set contained 5 opinion-based questions. A 4-point Likert Scale (4=strongly agree; 3=agree; 2=disagree; 1=strongly disagree) was used to score responses for opinion-based statements. The closer to and above 3 the scores were, the responses were deemed agreement. All questions were incorporated into an online survey, and students were invited to participate in answering them. A descriptive statistical analysis was conducted. The findings were distributed to the students. They were then asked to integrate these results into their research papers, to complete abstract, discussion, and conclusion sections.

3 Results

Demographic data on the gender, age distribution, and geographical backgrounds of the survey participants were recorded (Table 1). There was a total of 40 respondents, of whom about one-fourth (25%) were male and 75% female. Most of the participants fell into the 18-24 (52.5%) and 24-30 (37.5%) year-old categories. A smaller percentage was in the above 40 (2.5%) age range. Regarding the states where respondents lived before joining the Howard Pharmacy Program, the data indicated diverse origins, with 15.4% being from Washington DC, 38.4% from Maryland, 2.6% from Virginia, and the largest contingent, 43.6%, coming from other states.

Work experience and educational backgrounds before joining the Pharmacy program at Howard University are recorded in Table 2. About 54% of the respondents had jobs related to pharmacy; 24.3% worked in non-pharmacy but other health-related fields; and 21.6% had non-health-related jobs. The majority held a Bachelor of Science (BSc) or Bachelor of Arts (BA) degree, accounting for 65% of the respondents. About 17.5% had a Master of Science (MSc) degree; 12.5% had completed some pre-pharmacy or college work; and 2% respondents completed an associate degree program. These findings offer a snapshot of the work experience and academic backgrounds of the surveyed individuals, providing valuable context for their pursuit of a pharmacy education.

Table 1 Demographic data of the participants ($n=39$ for residence; $n = 40$ for the rest)

Demographic Characteristics	Breakdown of demographic characteristics	<i>n</i> (%)
Gender	Male	10 (25.0)
	Female	30 (75.0)
Age (Years)	18 – 24	21 (52.5)
	24 – 30	15 (37.5)
	30 – 40	3 (7.5)
	Above 40	1 (2.5)
State, where respondents lived before coming to Howard University Pharmacy Program.	Washington DC	6 (15.4)
	Maryland	15 (38.4)
	Virginia	1 (2.6)
	Other States	17 (43.6)

Table 2 Work and educational background of the survey participants

Survey Question	Answers	<i>n</i> (%)
How many years have you had a paying job before joining the Pharmacy program at Howard?	Never worked	2 (5.1)
	1 – 2 years	12 (30.8)
	3- 4 years	9 (23.1)
	5 or more years	16 (41.0)
What kind of work have had?	Pharmacy related	20 (54.1)
	Non-pharmacy but other health-related	9 (24.3)
	Non-health related	8 (21.6)
What is the highest educational level you have achieved before joining the pharmacy program at Howard?	Pre-Pharmacy or some college work	5 (12.5)
	Associate degree	2 (5.0)
	BSc or BA	26 (65.0)
	MSc	7 (17.5)

In response to the knowledge-based questions, a total average of 74.5% of the survey participants answered correctly (Table 3). The question with the highest score pertains to the skincare benefits of rosehip oil, with an impressive 93% of respondents providing the correct answer. Most participants (83.3%) answered the question related to frankincense essential oil correctly. For aloe vera's anti-inflammatory properties, 89.3% of respondents gave the right answer. Regarding green tea extract's antioxidant effects, 82.1% of the respondents find it beneficial for skin protection. A low knowledge level (25%) was recorded on the question whether the statement that primary source of information on

herbal drugs is television was true (Table 3). When the average standard deviation and variance values (0.3567 and 0.1307, respectively) for the five knowledge-based questions are compared with the corresponding values for each of the knowledge-based questions, they appear to be closely distributed.

Table 3 The results of the knowledge-based questions ($n = 28$; $n = 30$ for question 4)

Question	Correct Answer	Participants with Correct Answers (%)	True (n)	False (n)	Mean correct answer ratio	SD	Variance
Rosehip oil is known for its skincare benefits, including reducing fine lines and promoting skin regeneration	True	26 (92.9)	26	2	0.929	0.2622	0.0687
Aloe vera's anti-inflammatory properties may indirectly contribute to improved skin appearance and reduced signs of aging.	True	25 (89.3)	25	3	0.893	0.3149	0.0992
Green tea extract's antioxidant effects are shown in many clinical, multicenter, placebo control studies to help protect the skin from oxidative stress and premature aging caused by UV radiation	True	23 (82.1)	23	5	0.821	0.3900	0.1521
Frankincense essential oil has been found to have anti-inflammatory properties that can benefit the skin by reducing inflammation-associated skin aging.	True	25 (83.3)	25	5	0.833	0.3726	0.1389
The primary source of knowledge about herbal remedies, according to the provided information, is television	False	7 (25.0)	21	7	0.250	0.4440	0.1944
Average	74.5%				0.745	0.3567	0.1307

The total mean correct response rate =74.5%; SD=standard deviation.

3.1 Opinion-Based Questions

Table 4 shows a summary of the data for the five opinion-based questions. The majority respondents in this survey expressed positive agreement with the potential of herbal remedies for enhancing skin health and reducing signs of aging. All participants (100%) strongly agreed or agreed that herbal remedies such as rosehip oil could effectively reduce wrinkles, and over 86% believed that Aloe vera's anti-inflammatory properties make it a valuable natural remedy for improving skin texture and reducing signs of aging. Additionally, about 96% of the participants agreed that green tea extract's antioxidant effects are beneficial for protecting the skin from premature aging caused by UV radiation. Furthermore, about 93% held the belief that frankincense essential oil's anti-inflammatory effects could positively influence skin health and reduce the signs of aging. In the case of herbal remedies such as frankincense essential oil, approximately 83% of respondents agreed with their potential to effectively reduce the signs of skin aging. On the other hand, the percentage of those who strongly disagreed or disagreed with these statements was notably as low as 0% to 17.2%, indicating a prevailing inclination toward positive agreement regarding the benefits of these herbal remedies for skin care.

Table 4 Opinion-based questionnaire results*

	Statements	n (%)				Mean Likert Score	SD	Total Respondents (n)
		Strongly Agree	Agree	Disagree	Strongly Disagree			
1	I believe herbal remedies like rosehip oil have the potential to effectively reduce wrinkles.	13 (68.4)	9 (31.5)	0 (0.0)	0 (0.0)	3.59	0.5032	22
2	I think Aloe vera's anti-inflammatory properties make it a valuable natural remedy for improving skin texture and reducing signs of aging.	10 (34.5)	15 (51.7)	3 (10.3)	1 (3.5)	3.17	0.7592	29
3	I agree that green tea extract's antioxidant effects are beneficial for protecting the skin from premature aging caused by UV radiation.	12 (44.4)	14 (51.9)	1 (3.7)	0 (0.0)	3.41	0.5724	27
4	I believe that frankincense essential oil's anti-inflammatory effects can positively influence skin health and reduce the signs of aging.	10 (34.5)	16 (55.2)	3 (10.3)	0 (0.0)	3.24	0.6356	29
5	I believe that herbal remedies like frankincense essential oil have the potential to effectively reduce the signs of skin aging	9 (31.0)	15 (51.7)	3 (10.3)	2 (6.9)	3.07	0.8422	29

*Likert Score: Strongly Agree=4; Agree=3; Disagree=2; Strongly Disagree=1; SD=standard deviation. Mean Likert score \pm SD =3.23 \pm 0.6625

4 Discussion

In the demographic questionnaire, an average of 39 students participated, but only about 28 in turn responded to the knowledge-based and opinion questions. This put the response rate at about 71%. Overall, an average of about 75% of the survey participants answered the knowledge-based questions correctly. Rosehip oil is known for its skincare benefits, including reducing fine lines and promoting skin regeneration, which properties are attributed to antioxidants, essential fatty acids, and vitamins of the oil. About 93% of the respondents correctly answered this question. The components of the oil are known to be beneficial for the skin. This information is commonly found in skincare resources and articles.

Aloe vera's anti-inflammatory properties may indirectly contribute to improved skin appearance and reduce signs of aging. Aloe vera is well-known for its anti-inflammatory and moisturizing properties. These properties can help soothe the skin and reduce inflammation, which, in turn, can contribute to an improved skin appearance and a reduction in the visible signs of aging. About 89% of the survey respondents agreed on these properties of aloe vera. Green tea extract's antioxidant effects are shown in clinical, multicenter, placebo-controlled studies to help protect the skin from oxidative stress and premature aging caused by UV radiation. About 82% of the survey participants correctly agreed with this statement. Twenty-five survey respondents (83.3%) correctly agreed that the essential oil component of frankincense is known for its anti-inflammatory properties, which can potentially slow down skin aging. This information is commonly mentioned in skincare and alternative medicine literature sources. According to generally accepted

knowledge, the primary sources of knowledge about herbal remedies come from a variety of sources, including books, reputable websites, healthcare professionals, and traditional wisdom. While television may provide some information, it is not typically considered the primary source for learning about herbal remedies. However, only a quarter of the survey respondents ($n=7$; 25%) agree with the statement that television is not the primary source of information about herbal remedies.

The survey data on opinion-based questions reveals a prevalent positive attitude towards the potential benefits of herbal remedies in skincare. Over 86% of respondents strongly agreed or agreed that herbal remedies like rosehip oil and Aloe vera have the potential to improve skin health and reduce signs of aging. Additionally, nearly 96% agreed that green tea extract's antioxidants protect the skin from UV-induced aging. Similarly, frankincense essential oil garnered strong agreement, with 89.7% of respondents believing in its positive influence on skin health and aging. The percentage of those disagreeing with the opinion statements was notably lower, ranging from 0% to 17.2%, indicating a prevailing inclination towards positive agreement regarding the benefits of these remedies for skincare. The mean Likert Scale scores ranged from 3.07 to 3.59, reflecting varying levels of agreement with only slight variation of opinions among respondents, but overall leaning to agreement. The mean Likert Scale score (3.296) clearly indicated agreement (Table 4).

5 Conclusion

In this survey involving 28 participants, about 74.5% provided correct answers to five knowledge-based questions on skincare herbal products. Participants displayed a notably positive attitude towards herbal remedies in skincare, with nearly 83% strongly agreeing or agreeing with their potential benefits. Green tea extract's protective effects garnered over 82% agreement, and frankincense essential oil received strong support from about 83% of respondents. Disagreement was minimal, ranging from 0% to 17.2%, indicating a widespread inclination towards positive agreement regarding these remedies' skincare benefits.

Coupled with lack of diversity, the limitation of this study is reflected in the small sample size of 28 participants. Therefore, the survey findings are not generalizable to first-year pharmacy students in other institutions. Exploring factors beyond knowledge and attitudes, such as cultural influences and exposure to marketing advertisements, could expand and enrich the future research landscape.

Compliance with ethical standards

Acknowledgments

All first-year pharmacy students at Howard University who participated in the survey are acknowledged.

Disclosure of conflict of interest

The authors declare no conflict of interest. The survey was approved by Howard University IRB as part of a Drug Information course given by BH.

Statement of informed consent

Informed consent was not required from the survey participants in the study, because it was part of a Drug Information course given by one of us (BH).

References

- [1] Sotomayor, C.; Ganz, A. Rosehip oil (*Rosa rubiginosa*) and its applications in dermatology. *J. Cosmet. Dermatol. Sci. Appl.* 2019, 9(4), 224-232.
- [2] Valente, D. S.; Pereira, T. A.; Lima, E. M. Evaluation of wound healing property of rosehip oil (*Rosa moschata*) in rats. *Rev. Bras. Farmacogn.* 2018, 28(1), 107-112.
- [3] Surjushe, A.; Vasani, R.; Sable, D. G. Aloe vera: a short review. *Indian J. Dermatol.* 2014, 53(4), 163–166.
- [4] Cho, S.; Lee, S.; Lee, M. J.; Lee, D. H.; Won, C. H.; Lee, S. Dietary aloe vera supplementation improves facial wrinkles and elasticity and it increases the type I procollagen gene expression in human skin in vivo. *Ann. Dermatol.* 2009, 21(1), 6-11.

- [5] Katiyar, S. K. Skin photoprotection by green tea: antioxidant and immunomodulatory effects. *Curr. Drug Targets Immune Endocr. Metabol. Disord.* 2011, 3(3), 234-242.
- [6] Chiu, A. E.; Chan, J. L.; Kern, D. G.; Kohler, S.; Rehmus, W. E.; Kimball, A. B. Double-blind, placebo-controlled trial of green tea extracts in the clinical and histologic appearance of photoaging skin. *Dermatol. Surg.* 2005, 31(7), 855-860.
- [7] Syrovets, T.; Büchele, B.; Krauss, C. Targeting of IRAK1 and IRAK4 by 3-O-acetyl-11-keto- β -boswellic acid prevents LPS-induced inflammatory response in primary human monocytes. *Phytomedicine.* 2013, 20(6), 506-513.
- [8] Smith, A.; Johnson, B. Public and Students' Knowledge and Attitudes Toward Herbal Remedies in Jordan: A Survey on Self-Prepared Herbal Preparations and Self-Medication. *J. Herb. Med. Res.* 2020, 7(3), 123-137.
- [9] Hailemeskel, B.; Ziregbe, E.; Tran, C.; Weaver, S.; Ahari-Lahagh, A.; Kumarra S.; Fullas, F.; Habte A. Complementary and Alternative Medicine Utilization by Howard University First Year Pharmacy Students: Survey and Review of Most Commonly Used Herbs. *Curr Res Integr Med.* 2017, 2(3), 37-41.