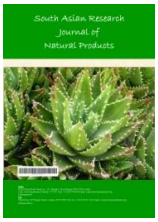

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Creating Leathery Scent for Leathery Product and Perfume from Natural Materials

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim and Objectives: The aim of this research is to create leathery scents from natural compounds to replace chemical synthesis for leathery products and perfume.
Materials and Methods: All the materials for making the leathery fragrance were taken from the project on Vietnam essential oils and related natural products. In our experiments, we used the volatile solvent is a solvent of alcohol 96%, and an odorless solvent diethyl phthalate (DEP).
Fragrance assessment by olfactory, the aroma is diluted with an odorless diethyl phthalate (DEP) solvent, followed by a special scent paper and the smell of the nose to assess the scent. The leathery fragrance was tested on leathery shoes 0.3%, leathery product 0.2%, perfume 5% by weight.
Results: After the experiment, we have selected fragrance FLS for leathery shoes, FLP for leathery products and FP for perfume. The main aroma of leathery odor is made up of Woody notes, Animalic notes, Amber notes, Sweet notes, Fruity notes, Floral notes. The main note of leathery scent was Woody notes with Sassafras oil, Ambergris absolute, Cassie oil, Sytrax resin, Labdanum resin, Poumu oil, Sandalwood oil, Cedarwood oil, Vetiver oil, Orris absolute, Galbanum oil, Guaiacwood oil, Ionone, Methyl ionone.
Conclusions: We have created the leathery fragrances FLS for leathery shoes, FLP for leathery products, and FP for perfume from ingredients derived from natural origin.

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Keywords: Odour; leather product; perfume; shoes; tanin.

1. INTRODUCTION

Scented oils and perfumes have fascinated mankind with their history of the development and use of oils and perfumes in ancient times with a deeper look at the scientific claims and analysis of artifacts recovered from antiquity [1].

Historically, leather has been scented by humans before Christ. At that time, especially in Asia, the leather was rubbed with fragrant bark, such as Kumquats. Gradually people treated with different scents such as Musk, Amber, or Camphor, with sweet aromas of Almond, Iris, or Civet. Fragrance helps the leather to get rid of the initial unpleasant smell of animal skin, but leather products must still retain the characteristic of animal skin odor.

Leathery odor is a type of scent related to the smell of animals, it is like the smell of animal skin but not the smell of sweat. The smell of leather gives people a natural feeling, so many people enjoy and like it. Leathery scents are commonly used in leathery products, cosmetics, and fragrances.

Nowadays, leathery products are very popular and diverse such as leathery shoes, leathery bags, leathery gloves, leathery belts, leathery seat covers... Leathery products often have the original smell of leather due to proteins, fats, and the smell of chemicals that treat the leather make it uncomfortable for the user. Therefore, leathery products are often added with an artificial leathery fragrance created by humans to create attractiveness for the product.

Leather is obtained from mammals such as buffalo, cow, sheep [2]. Leather is prepared to remove hair, fat, and protein by various methods [3,4]. Tanning is the process of treating animal hides to produce finished hides, which are more durable and harder to break down materials. Tanning raw hides into finished hides is a process that changes the protein structure of the leather. Rawhides are made by removing the meat, fat, and then the fur using a lime-water solution, then shaved off and then dried. The solution to remove hair also works to clean the fiber networks of the leather and allow the tanning chemicals to penetrate [5,6].

Studies found that the amount and ratio of the natural crosslinks in sheep, deer skins and cowhides are significantly different. They have shown that different species have different basic molecular compositions of the skin, leading to differences in skin properties. This discovery will help modify existing leather processing processes to produce more durable leather [7].

Studies were carried out on the role of microorganisms in the decomposition of ancient vegetable-tanned leather. It was shown that neutralization of leather causes an abundant development of microorganisms accompanied by chemical changes [8]. Leather depends on the process of using and preserving it [9,10,11].

Tanning can be done by either vegetable tanning or mineral tanning. Before tanning, the hides are de-haired, degreased, desalinated, and soaked in water for a period of 6 hours to 2 days. To prevent leather damage caused by bacteria from growing during soaking, bactericides and fungicides can be used to protect wet leather from mold growth.

The botanical method of tanning is to use tannin in the process [12]. Tannins are a class of astringent polyphenol chemicals that are naturally present in the bark and leaves of many plants. The tannins bind to the collagen proteins in the leather and coat them, making the leather less absorbent and less susceptible to bacteria and mold attack. This process also makes the leather softer.

Chemical leather tanning is the use of Chromium, Alum, Zirconium salts, Titanium, Iron, in the tanning process. These steps include: shaving, liming (impregnation with alkalis such as Sodium hydroxide), deliming to restore neutral pH, enzyme softening, and pH-lowering pickling of raw hides with Salt and Sulfuric acid. Chemical leather tanning is faster than vegetable tanning. Several studies have investigated collagen structure during leather processing and the aging of the skin after leather processing [13,14].

After the tanning process, the fragrance is added to make the leather more attractive. In the past, people used resins such as Styrax, Labdanum, Birch bark, Amber, or Camphor to create leather scents. These woody aromatics are combined with Musk to create a leather-like fragrance (Table 1).

Today, due to the advancement of science, people can extract many kinds of aromatic substances from plants and synthesize many

kinds of fragrant substances to create the perfect leathery smell. Blending fragrance from chemical synthesis is cheap but not good for users. The trend of creating a completely natural leathery scent is the current trend of fragrant blending researchers. The purpose of this research is to create leathery scents from natural compounds to replace chemical synthesis for leathery products and perfume.

2. MATERIALS AND METHODS

2.1 Materials are used to Prepare the Fragrance

Materials are used to prepare the leathery fragrance as Eugenol, Isoeugenol, Clove oil, Cinnamaldehyde, Musk Civet absolute, Ambergris absolute, Camphor, Sytrax resin, Labdanum resin, Poumu oil, Sandalwood oil, Cedarwood oil, Vetiver oil, Orris absolute, Galbanum oil, Guaiacwood oil, Basil oil, Ionone, Methyl ionone, Ionol, Ionyl acetate, Allyl ionone, Linalool, Linalyl acetate, Linalyl cinnamate, Linalyl formate, Linalyl butyrate, Terpineol, Terpinyl acetate, Jasmin oil, Ylang ylang oil, Cassia oil, Citronellal, Hydroxy citronellal, Geraniol, Geranyl acetate, Geranyl butyrate, Geranyl formate, Citronellol, Citronellyl acetate, Citronellyl butyrate, Citronellyl formate, Orange oil, Mandarin oil, Grapefruit oil, Lemongrass oil, Verbena oil, Coriander oil, Marjoram oil, Ginger oil, Pepper oil, Pimento oil, Cinnamon bark oil, Benzoin resin, Canarium resin, Agawood resin were taken from the project on Vietnam essential oils and related natural products. In our experiments, we used the volatile solvent is a solvent of alcohol 96%, and an odorless solvent diethyl phthalate (DEP).

2.2 Method of Preparation and Assessment Odor

The experiment with a small scale (10g) was continued until the desired result is obtained and then proceeded with a large scale (100 g) and finally subjected to fragrance test of the product obtained. The fragrance was tested leathery shoes 0.3%, on leathery product 0.2%, perfume 5% by weight.

The structure of the fragrance in this experiment included the Top notes, the Body note and End note.

In the field of fragrance, the smell is mainly measured by the human olfactory [15]. The fragrance is diluted 10-20 times by odorless solvent diethyl phthalate (DEP), then use special paper and olfactory of the nose to evaluate the aroma.

3. RESULTS AND DISCUSSION

3.1 The Composition of Leathery Odor for Leather Shoes

The leathery odor for leather shoes (FLS) has the function of eliminating the initial unpleasant scent of the skin and the odor created by human foot sweat. So the composition of leathery odor for leathery shoes was combined between the leathery scent and spicy notes. Since ancient times, people have known to use the scent of Cinnamon bark to rub on shoes to eliminate the smell of sweat, people grind Cinnamon bark into a powder to put in shoes. Later time, people distilled Cinnamon essential oil and put it in the soles of shoes to eliminate the smell of sweat. Today, the scent of Cinnamon bark is a spicy note, and use it in leather and many other fragrances. The chemical composition of Cinnamon essential oil has Cinnamaldehyde which is a very strong and warm odor [16,17].

Leathery note based on Woody notes of Sassafras oil, Ambergris absolute, Cassie oil, Styrax resin, Labdanum resin, Poumu oil, Sandalwood oil, Cedarwood oil, Vetiver oil, Orris absolute, Galbanum oil, Guaiacwood oil, Ionone, Methyl ionone, Benzoin resin, Canarium resin, Agarwood resin and floral odor of Ionol, Ionyl acetate, Allyl ionone, Vanillin, Linalool, Linalyl acetate, Linalyl cinnamate, Linalyl formate, Linalyl butyrate, Terpineol, Terpinyl acetate, Jasmin oil, Ylang ylang oil, Cassia oil, Hydroxy citronellal, Geraniol, Geranyl acetate, Geranyl butyrate, Geranyl formate, Citronellol, Citronellyl acetate, Citronellyl butyrate, Citronellyl formate.

Spicy notes based on Clove oil, Cinnamaldehyde Coriander oil, Basil oil, Ginger oil, Pepper oil, Pimento oil, Cinnamon bark oil (Table 2.).

3.2 The Composition of Leathery Odor for Leathery Products

The leathery odor for leathery products (FLP) is to remove the original smell of leather and create a pleasant leathery smell for the user. The composition of leathery odor for leathery products is almost the same as the composition of FLS. The difference between FLS and FLP is

Table 1. Main notes in the leathery scent

N^0	Notes in leather scent	Fragrant substance	Attention
1	Woody notes	Labdanum, Birch tar, Cade, Styrax, Cassie, Cedarwood, Sandalwood, Guaiac wood, Agawood	Main ingredient
2	Animalic notes	Civet, Castoreum, Hyraceum, Musks, Indol	Main ingredient
3	Amber notes	Peru balsam, Vanilla, Benzoin, Patchouli, styrax, Labdanum.	Main ingredient
4	Smoky notes	Tobacco	Sub-ingredients
5	Sweet notes	Vanilla, Tonka, Coumarin, Benzoin, Styrax	Sub-ingredients
6	Incense notes	Frankincense, Myrrh, Opopanax.	Sub-ingredients
7	Fruity notes	Orange, Manderin, Grapefruit	Sub-ingredients
8	Floral notes	Jasmine, Rose, Ylang-ylang, Tuberose, Orange blossom, Mimosa	Sub-ingredients

Table 2. The composition of leathery odor

N^0	Material	Fragrance Wt%			Note
		Leathery shoes (FLS)	Leathery products (FLP)	Perfume (FP)	
1	Eugenol		4	1	Top note
2	Isoeugenol		1	4	
3	Clove oil	1			
4	Cinnamaldehyde	4			
5	Sassafras oil	1	1	1	Body note
6	Ambergris absolute	1	1	2	
7	Cassie oil	2	3	2	
8	Styrax resin	5	6	2	
9	Labdanum resin	5	6	2	
10	Poumu oil	5	6	5	
11	Sandalwood oil	7	8	7	
12	Cedarwood oil	4	4	4	
13	Vetiver oil	4	4	6	
14	Orris absolute	4	4	4	
15	Galbanum oil	4	4	1	
16	Guaiacwood oil	3	3	1	
17	Ionone	2	2	5	
18	Methyl ionone	2	2	4	
19	Ionol	1	1	3	
20	Ionyl acetate	1	1	3	
21	Allyl ionone	1	1	3	
22	Musk Civet absolute	1	1	3	
23	Vanillin	2	2	3	

24	Linalool	1	1	1	
25	Linalyl acetate	1	1	1	
26	Linalyl cinnamate	1	1	1	
27	Linalyl formate	1	1	1	
28	Linalyl butyrate	1	1	1	
29	Terpineol	1	1		
30	Terpinyl acetate	1	1		
31	Jasmin oil	1	1	5	
32	Ylang ylang oil	1	1	5	
33	Citronellal	1	1		
34	Hydroxy citronellal	1	1	1	
35	Geraniol	1	1	1	
36	Geranyl acetate	1	1	1	
37	Geranyl butyrate	1	1	1	
38	Geranyl formate	1	1	1	
39	Citronellol	1	1	1	
40	Citronellyl acetate	1	1	1	
41	Citronellyl butyrate	1	1	1	
42	Citronellyl formate	1	1	1	
43	Orange oil		1		
44	Mandarin oil		1		
45	Grapefruit oil		1		
46	Lemongrass oil		1		
47	Verbena oil		1		
48	Marjoram oil		1		
49	Coriander oil	1			
50	Basil oil	1			
51	Ginger oil	1			
52	Pepper oil	1			
53	Pimento oil	1			
54	Camphor	1			
55	Cinnamon bark oil	5			
56	Benzoin resin	3	3	1	Ent note
57	Canarium resin	3	3	1	
58	Agarwood resin	4	4	8	
	Total	100	100	100	

that FLS with Spicy notes makes its scent warmer and stronger than the scent of FLP. The scent of FLP with Fruity notes of Orange oil, Mandarin oil, Grapefruit oil makes the scent of FLP sweeter and softer. The Top note of FLP is Eugenol, Isoeugenol with Carnation odor. Carnation has a pleasant and seductive odor, so it has often chosen for the Top note of many fragrances [18].

3.3 The Composition of Leathery Odor for Leathery Perfume

The leathery scent of perfume is still popular today. The leathery scent for leather perfume (FP) is a fragrance of high quality, it must make the user feel pleasant and attractive. Blending perfumer for animal skin products and even leather fragrances must strive to combine classic and modern traditional leather scents [19]. These are ingredients commonly found in classic and modern perfumes. Today, with advanced extraction technology and modern equipment, the quality of extracts is better than in the past, so the scent of perfumes is also better than in the past. We made the composition of leathery scent for leather perfume based on Woody notes, Fruity notes, Floral notes, Animalic notes, Amber notes and Sweet notes.

Woody notes of Sassafras oil, Ambergris absolute, Cassie oil, Styrax resin, Labdanum resin, Poumu oil, Sandalwood oil, Cedarwood oil, Vetiver oil, Orris absolute, Galbanum oil, Guaiacwood oil and Floral notes of Ionone, Methyl ionone, Ionol, Allyl ionone, Linalool, Terpineol, Citronellol, Hydroxy citronellal, Geraniol Jasmin oil, Ylang ylang oil, Cassia oil are main ingredient of FP.

Ionone, Methyl ionone [20,21] are a substance that has both the smell of Violets [22] and the smell of Cedarwood combined with the aroma of Poumu wood, Sandalwood [23,24], creating the attractiven%ess of leathery perfume. The odor notes of Violet, Rose, Lilac, Jasmine, and Ylang-Ylang flowers create charm and appeal for leathery perfume.

We used ingredients for natural floral scents like Jasmin oil with 5% and Ylang ylang oil with 5% by weight in fragrance FP. Ylang ylang and Jasmin flower have an attractive and pleasant natural odor that makes the fragrance of FP closer to nature, more attractive. Ylang ylang oil is included in the composition of many types of perfume because its chemical composition having many components with natural scent [25].

4. CONCLUSION

We have created the leathery fragrances FLS for leathery shoes, FLP for leathery products, and FP for perfume from ingredients derived from natural origin. FLS fragrance is a harmonious combination of leathery scent and Spicy notes with a warm, natural Cinnamon bark that is very suitable for leathery shoes. FLP is scent is leathery odor mixed with a little floral odor and fruity odor, which is very suitable for leathery products. The scent of perfume FP is a leather odor with the scent of Sandalwood, Agarwood, Vetiver, Violet flower, Jasmin flower, Ylang ylang flower, creating a seductive and attractive natural fragrance.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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