

## Evaluation of Olive and Date-plum Tree Heartwoods' Essentials Oils' in Cologne Production and Determination of Consumer Attitudes

### Zeytin ve Kara Hurma Ağacı Öz Odunu Uçucu Yağlarından Kolonya Üretimi ve Tüketici Tutumlarının Belirlenmesi

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#### Abstract

In this study, the possibilities of evaluation of olive (*Olea europaea* L.) and date-plum tree (*Diospyros lotus* L.) heartwoods essential oils in cologne production were investigated and the effects of the obtained odors on consumers were tried to be determined with the help of survey study. For this purpose, essential oils of olive and date-plum tree heartwood were first obtained and the essential oil of the orange peel has been utilized as support scent. Later, 5 different colognes which contain 70% ethanol (70°) were produced using these essential oils. According to the used volumetric proportions of the essential oils, the colognes were coded as follows, 1: 100% olive tree heartwood essential oil (OTEO), 2: 100% date-plum tree heartwood essential oil (DPEO), 3: 50% OTEO + 50% DPEO, 4: 66.6% OTEO + 33.3% orange peel essential oil (OEO), 5: 66.6% DPEO, and 33.3% OEO. The produced colognes were tested on some students of the Department of Forest Industrial Engineering at Karadeniz Technical University. The students were asked some survey questions to determine their odor culture and the likelihood of tested colognes. The Statistical Package for the Social Sciences (SPSS 21.0) package program was used to evaluate the survey questions. It was found that 92% of the participants used cologne and 56% of this group used the cologne several times a week. The most favored cologne among the produced colognes was cologne No. 5 (66.6% DPEO + 33.3% OEO combination). It has also been found that the cologne which produced by using mixed half of the date-plum tree heartwood essential oil and olive tree heartwood essential oil is more favored than the cologne produced by using these essential oil alone.

**Key words:** Cologne, date-plum heartwood, essential oil, olive heartwood.

#### Öz

Bu çalışmada zeytin (*Olea europaea* L.) ve kara hurma (*Diospyros lotus* L.) öz odunlarının uçucu yağlarının kolonya üretiminde değerlendirilme olanakları araştırılmış ve elde edilen kokuların tüketici üzerindeki etkileri anket çalışması yardımıyla belirlenmeye çalışılmıştır. Bu amaçla ilk olarak zeytin ve kara hurma öz odunlarının uçucu yağları elde edilmiş, destek koku olarak da portakal kabuklarının uçucu yağından faydalanılmıştır. Daha sonra bu kokulardan 70°'lik 5 farklı kolonya üretilmiştir. Kullanılan uçucu yağların hacimce oranlarına göre kolonyalar şu şekilde kodlanmıştır. 1: %100 Zeytin ağacı öz odunu esansı (ZÖE), 2: %100 Kara hurma ağacı öz odunu esansı (KÖE), 3: %50 ZÖE + %50 KÖE, 4: %66,6 ZÖE + %33,3 portakal kabuğu esansı (PKE), 5: %66,6 KÖE + %33,3 PKE. Üretilen kolonyalar Karadeniz Teknik Üniversitesi Orman Endüstri Mühendisliği Bölümü öğrencilerinin bazılarında test ettirilmiştir ve öğrencilerin koku kültürünü ve test edilen kolonyaların beğenilirliliğini belirlemek için anket formunda sorular sorulmuştur. Anket sorularının değerlendirilmesinde SPSS 21.0 paket program kullanılmıştır. Yapılan değerlendirmeler sonucu katılımcıların %92'sinin kolonya kullandığı, bu grubun %56'sının kolonyayı haftada birkaç kez kullandığı bulunmuştur. Üretilen kolonyalar arasında en çok beğenilen kolonya, 5 numaralı (%66,6 KÖE + %33,3 PK kombinasyonu) kolonya olmuştur. Ayrıca kara hurma ve zeytin ağaçlarının öz odunları uçucu yağlarının yarı yarıya karıştırıldığı kolonyanın, bu esansların tek başına kullanılarak üretilen kolonyalardan daha büyük beğeni topladığı görülmüştür.

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Handling Editor: M. Sevindik

**Anahtar kelimeler:** Kolonya, kara hurma öz odunu, uçucu yağ, zeytin öz odunu.

## 1. Introduction

Odor is defined in the Turkish Language Association (TDK) dictionary as "the emotions evoked by the tiny particles that scattered from the objects in the special nerves on the nose". This feeling has made it possible to distinguish between objects/events since mankind's existence. It has even been reported that smell is the most convincing feeling among the five senses and the sense of smell mediates the formation of 75% of human emotions (Lindstrom 2007). It has been reported that good smells can reduce blood pressure at the time of stress, can slow the respiration and thus reduce the severity of pain (Redd et al. 1994), while bad smells have the opposite feelings, that is, increased stress and anxiety (Schweitzer et al. 2004). It is seen in today's applications that pleasant smells in an environment calms the mind and body (Sakıcı and Var 2013), and even smell sensation is an important criterion in choosing the living space. For example, smell maps were created in the Munich city of Germany and some people take into account the maps when they rent or buy a house (Tezcan and Kara 1995).

Smell nice preserved its significance throughout humanity because of the desire to be accepted. Good fragrances have become rituals in many parts of a person's daily life. One of the fragrance tools that are so widely used in human life are colognes. Cologne is actually "Eau de Cologne", brought from Köln by French soldiers when they return to their country after the war with Germany, although the composition is slightly different (Topal 2007). Cologne has also an important place in Turkish culture. It is a very common behavior to serve cologne for guests, firstly during the bairam and other days. Because it is cheap and refreshing, it is in almost every house. In addition to good odor, for patient visits are brought as a gift that indicates the hygiene also.

Cologne is a fragrant liquid that comes from a mixture of ethyl alcohol, water and various essences. Although lemon cologne is the most consumed cologne in our country, colognes in different smells are produced, too. These usually include essences made from fragrant plants such as lavender, jasmine, rose (Yeğenoğlu and Sözen-Sahne 2013). In our country many specific plants have also been used in cologne producing and they are present as souvenir in markets (Topal 2007). This type of cologne can be exemplified by the tea cologne of Rize, the anchovy and hazelnut colognes of Trabzon, the apple cologne of Amasya, the rose cologne of Isparta, and the white lily cologne of Balıkesir (Yentürk and Yentürk 2001). It is also known that some tree species have a pleasant smell such that pine cologne is one of the loved colognes. However, when looking at the literature, it was seen that tree woods were not much included in the cologne production. In this article, the possibilities of evaluating the heartwoods of olive trees and date-plum trees which are realized to have aromatic odor during a laboratory study, were investigated.

For this purpose, essential oils obtained from the heartwood of date-plum and olive trees were evaluated. In addition, essential oils of orange shells have been produced to alleviate the strong odor of heartwood and

were used as support fragrance. Colognes produced by mixing at different ratios and they were tested by students and consumer attitudes were tried to be determined.

## 2. Materials and Methods

### 2.1. Materials

Examples of olive (*Olea europaea* L.) and date-plum (*Diospyros lotus* L.) tree woods were obtained from Artvin province, Yusufeli district, Havuzlu village. Orange samples were bought from a commercial grocery store.

### 2.2. Cologne production

Cutting trees were brought to the laboratory, kept in room conditions and brought to equilibrium moisture. Later, the trees were cut off by separating the heartwood and the sapwood. The milled heartwoods have been made coarse-grained. Wood samples were added 5 times pure water compared to wood weight, and essences (volatile oil) were obtained in the Clevenger apparatus. The orange peel was cut into small pieces without drying and essential oil was obtained using the same method. Five different cologne were produced in this study. The colognes were prepared as the ratio of ethyl alcohol was 70% (70°C). The essential oil rates of produced colognes are given in Tab. 1.

**Table 1.** Essential oil rates of produced colognes.

Sample code	Essential oil of olive tree heartwood	Essential oil of date-plum heartwood	Essential oil of orange shells
1	%100	-	-
2	-	%100	-
3	%50	%50	-
4	%66.6	-	%33.3
5	-	%66.6	%33.3

### 2.3. Testing of colognes and determination of consumer attitudes

To determine the effects of the produced colognes on consumer behavior, all odors were tested by the students who were trained in Forest Industrial Engineering Department Forest Industrial Engineering Department. A questionnaire consisting of 20 questions and 3 sections was answered by the 25 students. These sections can be categorized as personal information, consumer habits, and evaluation of produced colognes. The students answered the first two chapters (a total of 19 questions) before smelling the colognes, then they scored 1 to 10 after smelling the colognes one by one. Statistical Package for Social Sciences 21.0 (SPSS) package program was used to evaluate the surveys.

## 3. Results and Discussion

52% of the survey participants were female and 48% were male students. 92% of the participants indicated that they use cologne. 8% of non-consuming cologne was asked to

answer only 3 questions and it was considered to have completed the questionnaire. Fifty percent of participants reported that because of habit, and the other fifty percent due to allergic reasons they don't use cologne. 100% of the participants reported that they used perfume. It was observed that 72% of participants used perfume daily, 6% used once a week, 18% used several times a week, and 4% used perfume several times a month. In response to which type of cologne you are prioritizing, 64% of participants reported that they used lemon cologne, 8% tobacco cologne, 8% lavender cologne and 20% other colognes (Fig. 1). As understood from these answers, lemon cologne remains the most preferred cologne. However, it can be said that the use of alternative (other) colognes is also significantly high. Therefore, new colognes can be placed on the market shelves. Because these results show that consumers are open to new smells.

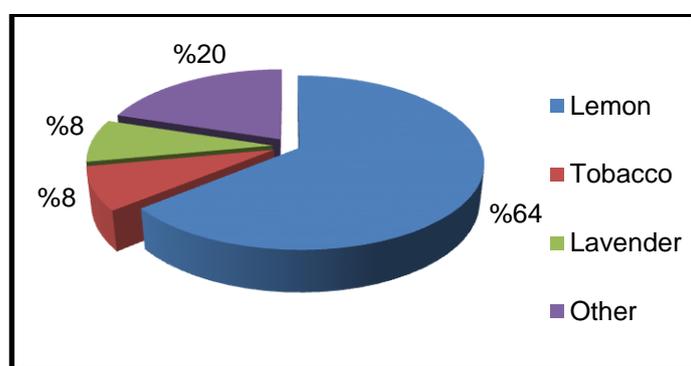


Figure 1. Primary bought/used cologne type.

When asked about the use frequency of cologne, it was determined that 8% of the participants use every day, 12% once a week, 56% a few times a week, 12% once a month, 12% a few times a month. Compared to perfume use, it is understood that consumption of cologne is less frequent. 82% of the participants reported that they purchased the cologne from the market, 6% from the bazaar, 6% from the pharmacy and 6% from other places (Fig. 2). Therefore, it can be said that market is an important selling point for the cologne.

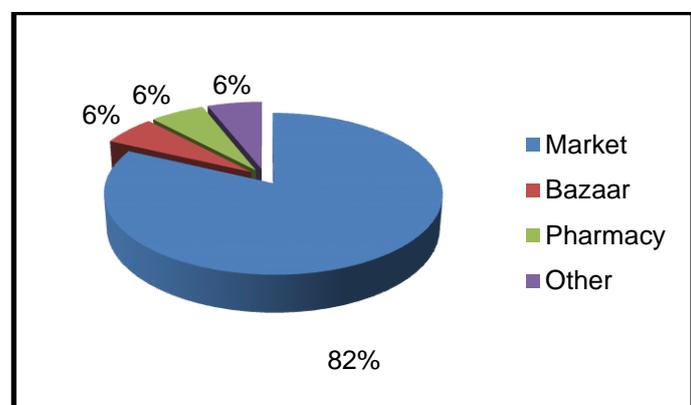


Figure 2. Place the cologne is purchased.

Participants were asked about the criteria they paid atten-

tion to while purchasing cologne. 58% of the participants marked odor, 28% brand, 6% persistence, 4% price, and 4% other options (Fig. 3). Odor is the leading cause of use of cologne. Therefore, the production of alternative odors can be beneficial to both consumers and producers.

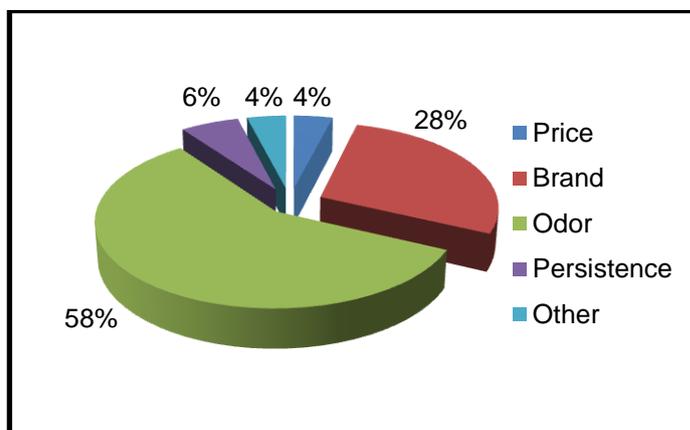


Figure 3. The most noticeable feature while purchasing of cologne.

In the question about the cause of using of colognes in the questionnaire, 50% of the participants answered that thanks to the good smell, 30% hygienic, 14% habit, and 6% for cleaning purposes (Fig. 4).

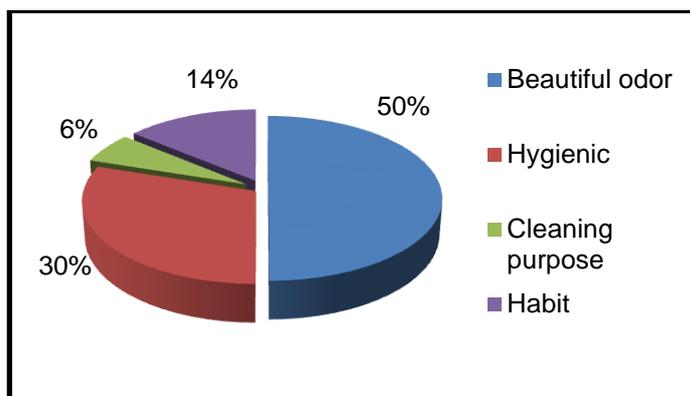


Figure 4. Reason of cologne usage.

Togan et al. (2014) conducted a study titled "Knowledge and behavior of coiffeur employees about hepatitis in Aksaray city center" and they reported that 27.3% of the injured ones reported dry cotton and 6.8% of them used cologne. In addition, researchers have reported the colognes with 25.4% of the most commonly used solutions for cleaning the razor. This study also emphasizes the use of cologne as a source of hygiene.

Demirci et al. (2012) conducted a study titled "Complementary and Alternative Medicine Usage in Skin Diseases and the Positive and Negative Impacts on Patients". In this study, researchers have reported that 27.3% of the complementary and alternative medical methods preferred by patients are known techniques such as cologne. A different usage area of the cologne is also revealed in mentioned study.

72% of the participants who used cologne reported that

cologne prices were appropriate. 8% thought it was expensive and 20% said there was no opinion on this issue. 30% of the participants reported that the person most using the cologne at home was the mother, 14% were children, and 10% were other people. The father has had the highest ratio in the answer to this question with 46%.

60% of the participants “yes” and 40% of the participants “no” answer gave for the question; “If there is a cologne peculiar to the place you are traveling in, do you purchase it?” So, it can be deduced that locally-specific, or innovative smells on the market can be preferred by the consumer. Within the scope of the study, it was tried to draw attention to the colognes produced using wood chips. 92% of participants reported that they would attract the attention of colognes produced from wood chips. Participants may not be able to evaluate this question objectively because they are students in the Forest Industrial Engineering Department. But it is estimated that the colognes produced using wood chips will attract the attention of all consumers.

After the questions asked in order to understand the odor culture of participants, questions about the produced colognes were asked. 84% of participants said that they generally liked the colognes odors. When asked to the participants “how much you are ready to give the money that you liked odors you like, while the same size of lemon cologne is 3 Turkish Liras (TL)”. It was observed that the 26% of participants 1-3 TL, 34% was 3-5 TL, 34% was 5-7 TL was ready for the pay. It can be concluded that the participants think that special scents can be sold at higher prices. It is clear from the study that the use of perfume is more than the use of cologne.

Participants were asked what needed to be done to increase use of cologne. 50% stated that cologne should be produced in different odors. 30% participants noted that it should be avoided from common scents, 6% participants stated that the prices should be reduced. and 16% them said that they had no idea. 8% of the participants stated that they were interested in cologne manufacturing earlier and 92% were not interested.

The produced colognes were coded as given in Tab. 1. The participants were asked to the score between 0 and 10 (0 no favorite, 10 very good) according to their liking the colognes, respectively, without mentioning what is inside. The average of all participants' answers was calculated and assumed as the score of appreciation of the cologne. A graph of appreciation of the produced colognes is given in Fig. 5.

As seen in Fig. 5, the 1 and 2 code colognes which produced using only olive oil or date-plum heartwood essential oil has the lowest score. However, the addition of the orange shell used as support scent has increased the liking rates of the two types of cologne. This situation may have occurred because orange peels lighten and refresh the sharp/dense smell of wood. In addition, cologne (number 3), in which olive and date-plum heartwood essential oils were mixed together in the same ratio, was also highly liked than only one type of wood essential oil. It is possible to say that odors may have a synergetic effect when combined with each other.

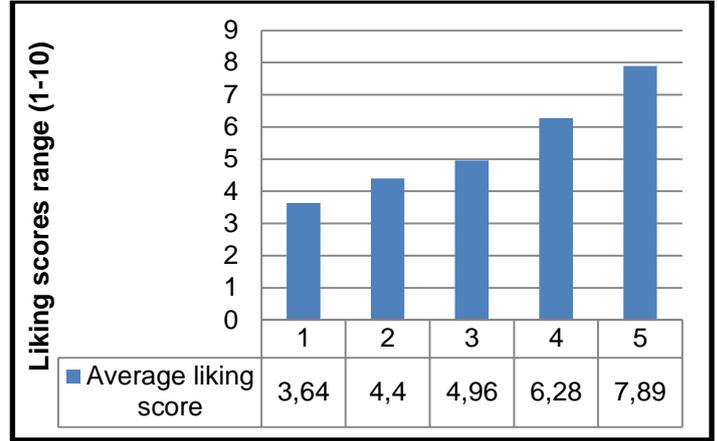


Figure 5. Score graph of the produced colognes.

#### 4. Conclusion

This study is basically composed of two parts. The first is to reveal the odor cultures of the participants, and the second is to determine the effects of produced colognes on consumer attitudes. Five different colognes have been produced using the essential oils of date-pulmand olive tree heartwoods and the following important findings were obtained as a result of the survey.

- The use and usage frequency of perfume is more than cologne.
- The lemon cologne is the most consumed cologne.
- The colognes specific to locality have the potential to attract consumers' attention. Colognes produced using wood essential oils have attracted attention and have been highly appreciated.
- The orange-shell-assisted formulation has been more appreciated in terms of lightening the sharp/dense smell of wood.

As a result of this work, it has been revealed that wood chips may be the subject of cologne production. Cologne production should be diversified with more wood species additives and more supportive odors. In addition, the introduction of these new smells into the market should be facilitated.

**Conflicts of Interest:** No conflict of interest was declared by the authors.

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