The Impact of Using Pistacia Lentiscus and Raw Boswellia Carteriiwidely spread at the Popular Level for Incensing on Minimizing HDM Population Density

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Abstract: *Pistacia Lentiscus* and *Boswellia Carterii* (Raw), which are widespread in the popular culture and sold by spice shops for incensing houses, are used for fighting House Dust Mites (HDM), for the purpose of identifying their impact on minimizing the prevalence of HDMs. The field experiment was conducted in thirty rooms (separate fifteen rooms for incensing by using *P. lentiscus*, and the remaining fifteen rooms for incensing by *B. Carterii*), through using traditional incense burner, and placing the tested substance in clay crucible on the flame for quarter hour on daily basis during the first week, 30 minutes during the second week, 45 minutes during the third week, and 60 minutes during the fourth week. Surveyed rooms were prepared under similar conditions with regard to living standard and type of furniture containing ceramics covered with thick carpets, windows were tightly closed and air was denied access throughout the study period (one month), except for once a week (the seventh day of each week after taking the samples), then windows were tightly closed again, and daily incensing for a certain period for each tightly closed room. next, collection process was made by mean of using one Vacuum cleaner, and then the mortalities were counted at a rate of fifty grams of dust collected from each separate room on a case-by-case basis, and then average sample score was set. Findings showed the effectiveness of used substancesin relatively limiting the prevalence of HDM. Findings also revealed an increase in mortalities rate in the rooms incensed by*P. Lentiscus*as compared to rooms incensed by *B. Carterii*. *Dermatophagoides pteronyssinus*, *Dermatophagoides, Suedasia nesbetii*, *Blomia fremani* and very low numbers of *Dermatophagoides pteronyssinus*, *Dermatophagoides farinae*, *Clyetus malcinyiss*, and *Tyrophagous putrescentiae* were identified.
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1. Introduction:

Amongthe mites having both medical and veterinary importance areHouse Dust Mites(HDMs), sometimes referred to as floor mite (Wharton, 1976). It is a microorganism that neither absorbs blood nor attacks the human body. However, it exists in the surrounding environment of humans, sharestheir residence, and inflicts damage upon general hygiene in some or many ways (Arlian *et al*, 1982; Edress, 2006).

HDMs exists in air passages and lung of some mammals, and this kind of mites has no respiratory system as gases are exchanged through body wall because the mite's size is tiny, in order to carry out bioprocess.(Arlian, 1989).

HDMs isprevalence in house dust, it may exists in birds and animals nests, and sometimes it is found in stored substances. (Baker & Wharton, 1959; De Leon and Saulog, 1965; Fain, 1967; Hughes, 1976; Krantz, 1978; Koraiem & Fahmy, 1999).

Most world countries are of the view that the danger of these species of House dust mites is increasingly growing, and this danger is represented in damages caused for humans e.g. allergy whether Bronchial asthma, Rhinitis, or skinallergy, in addition to affecting immune proteins (IgE). These species are characterized by the ability of sexual reproductionand producing many generations in the same year. (Chang-young *et al*, 1995; Edrees,2006).

House dust consists of a mixture of substances, that may cause allergy, which are the tiny grains covering the house floor, surfaces, corners, under pieces of furniture, doss, in bed rooms and living rooms (Bronswijk, 1981). This mixture is an organic and inorganicsubstances. It differs in accordance with place and activity within the house, whether or not there are pets and the nature of used furniture. For instance, the fiber existing in the dust forms a cotton layer from furniture covers, in addition to industrial fiber (nylon) from carpets and mats. The dust includes human hair, pollen grains, insects' moulting skins and their dead bodies, dry saliva, and pet's excretory substances. The chemical analysis of dust showed that it consists of many substances including Aluminum, calcium, potassium, iron, in addition to protein andcarbohydrates. Besides, pieces of bread falling in dust represent an important organic material in dust components in addition to Bacteriaand fungi

(Bronswijk and Sinha 1973). The previous researcher said that fungi play an important role in feeding house dust mites, as they performs a partial digest process of protein and fatty organic substances existing in dust. (Robinson 1996) said that the nature of house dust differs in accordance with geographic regions, standard of living and the house site. In general, we find that in house dust, organic substances are a source of food for mites. (Tovey, 1993.Phanuvich *et al*.,1997).

Incensingis used in this study for limiting the prevalence of house dust mites in house environment, and for this purpose, two kinds of natural substances are used which are *P. lentiscus* and *B.carterii*.

B.carterii is a mixture of Resin, gum, volatile oil, and is useful for phlegm and treatment of coughs and common cold. As it contains volatile oil which includes (ncensole cacetate); a material which has a good smell, *B.carterii*is one of main components of incense and one of the main components of some types of perfume. *B. Carterii* is used for absorption of humidity. A study showed that the effective material responsible for Therapeutic efficacy is called boswellic acids. It is shown that this acid is Analgesic, and strengthens the immune system, liver, blood cancer and is Anti-inflammatory. This effectiveness is based on the effect of *B. Carterii* on lipoxyjenas enzyme and it also reduces asthma and ulcer of large intestine.

Some aromatherapy researches conducted on mice proved the efficiency of volatile oil existing in *B.carterii* in treating depression, and some nervous system diseases in the event it is incensed and smelt. It is also used for treating burns and inflammation and helps in healing wounds, abscesses and pyorrhea (Bebb *et al*, 2003; Takahashi *et al*, 2013).

Since long times, *P.lentiscus* was usedfor incenseing. It is also used in perfumes, cosmetics, ending tooth decay and caries of which, and in calming nerves. *P.lentiscus* is one of the most fine and expensive types of resins.

P.lentiscus is used in popular medicine for treating common cold, all types of headache, stopping bleeding, treating dyspepsia, liver, and spleen. *P.lentiscusis* also used for strengthening gingival and tooth. *P.lentiscus* contains 2% of volatile oil, 20% of resin substances, mastic acid andother substances (Paraschos *et al*,2007; Tingshuang *et al* 2008).

At the level of popular medicine, *P.lentiscus* is used for treating stomach and ulcer of which, mouth and tooth, colon and its disorders, cancer and its effects, protection against cancer, mouth and tooth diseases as the health of gingival and tooth is mainly based on mouth safety from bacteria. Studies indicated that *P.lentiscus* reduces the growth of bacteria causing tooth decay by 41.5%, besides the benefits of which for stomach. Studies indicate the role played by P.lentiscus in activating the growth of natural cells ofstomach, and in getting rid of Spirochaetes existing not only in stomach but also in the mouth. (Bebb *et al*, 2003; Takahashi *et al*, 2013; Paraschos *et al*,2007; Tingshuang *et al* 2008).

Different HDM speciesare deemed internationally prevalence pests in all environments all over the world. It exists in the six continents namely, Australia, the Americas, Europe, Africa and Asia. Many of these species are a source of allergy. ((Fain, 1965; Bronswijk and Jorde, 1975; Blythe *et al*., 1976; Brandt,1976; Arlian *et al*., 1978; Bronswijk,1978; Cunnington, 1980; Arlian *et al*., 1982; Feldman-Mausham *et al*.,1985; Fernandez-Caldas *et al*., 1988&1994; Platts-Mills *et al*., 2000).

Pyroglyphidae is one of house dust mites' most important families. It is defined by ecologists and taxonomists, includesDermatophagoides genus identified by (Bogdanov,1964), in addition to Entomological Society of America (ESA). House dust mite is identifiedand it has two major species which are European house dust mite, *D.pteronyssinus* (Trouessart) and American house dust mite, *D.farinae* Hughes (Wressell,1970) of which many species exist in dust that provides them with food and protection as long as appropriate humidityis available,(Tovey and Blado, 1999). Numbers of mites increase in places having high level of humidity that exceeds 70%; places of poor ventilation and that are covered by carpets. The seasonal distribution and large quantities of mites differ in accordance with seasons of the year and the places' geographical conditions; and within the same house, they differ on the basis of room's type.Arlian, 1989; Arlian *et al*., 1990; Koraiem & Fahmy, 1999; Fain *et al*., 1990; Boquete *et al*., 2000; Raccewiez, 2001; Neal *et al*., 2002; Sener *et al*., 2003; Kalpaklioglu *et al*., 2004; Hesselmar *et al*, 2005; Suzuki *et al*.,2006, Edrees 2006).

Numbers of mites prevalence increase in bedrooms more than any other room within the house, and the population density increase on a large scale within the same house.We find that the mites numbers exist largely on doss, Pillows, mattresses, floor and rooms more than other furniture(Charlet *et al*., 1978). The population dynamics of mites increase on the floors covered by carpets and moquette of tall fine terry more than short terry because tall terry forms an appropriate environment for collecting food, contents of mites' body, excrement, secretions, in addition to humidity appropriate for reproduction and living more than wooden floors, ceramics and cork(Arlian *et al*., 1982; Uchikushi *et al*., 1982). Houses age, furniture, carpets, and whether or not there are cats affect the Population dynamics of house dust mites.

It is found out that concrete homes made of stones include a larger number of mites comparing to wood-made buildings (Barnes *et al*.,1997) as humidity increases in them, and consequently the number of mites increases. Numbers of mites existing in the dust differ in accordance with the building with regard to whether it is a concrete or a wood-made building, as great numbers of mites are recorded in old houses in Russia, India, and Egypt (Rao, 1975; Cacares and Fain, 1979; Rezk 1993). prevalence of mites also increase in lower floors. There is strong relationship between the level of allergen resulting about mites and the house's type, age, internal temperature, the number of residents, usage of feather pillow and high internal humidity (Chang-young *et al*., 1995). As a result of the human's attempts to control climatic conditions within the house by means of using Conditioners that control temperature 18-23 C° and relative humidity 30%-70% considering the fact that seasons of the year are different (Arlian *et al*., 1990), conditions become more appropriate for mites' prevalence and reproduction, relative humidity within houses is the factor defined for house dust mites growth as there is direct relationship among the numbers of mites, increasing humidity (Robinson., 1996; Colloff *et al*., 1997; Kalpakioglu *et al*., 1997; Vander-Heid *et al*., 1997 and Arlian *et al*., 1998), and the production of allergy factors that, in turn, cause allergic diseases (Pedro Cabrera *et al*., 1995; Kawamoto *et al*.,.1999, Edrees,2006). These species of mites die below 40% of relative humidity and live for a short time under 45 C°. mites rarely live within dry environment conditions. This means that relative humidity is one of the most important factors that affect the mites' sexual reproduction, living, and remaining within houses. We also find that there is strong relationship between house dust mites and internal environment changes (within the house). This means that in the event house ventilation decreases, this increases the possibility of exposing to house dust mites that, in turn, results in allergic diseases (Harving *et al*., 1992).

2.Material and methods

Collection of House Dust:

House dust mites Species are collected from thirty rooms in 15 houses in Jeddah governorate representing similar environment conditions. House dust species were collected from bedroom's carpets. Samples are collected by 1 M² for two minutes (about 50 gm)by BocshVacuum cleaner, model T191, 220 volt. House dust species are collected in sacks to be changed with each dust sample i.e. new sack is used for each new dust species in each visit, provided that samples must be put under 4C° until they are isolated by modified Berlese apparatus (Baker&Wharton.1959, Hughes, 1976; Krantz, 1978). Samples are collected once every week over a month.the temperature and humidity of each surveyed house are recorded through Digital Thermohygrometer.

Isolation of Mites by Modified Berlese Apparatus:

Each house dust sample is isolated, so that fifty gram of which are placed on a piece of gauze within a sieve above the glass funnel, and above them there is 60 W projector lamp. Samples are left for 12 hours until mites become isolated therefrom and isolated mites are collected in a container containing distilled water under the funnel (Sinha and Bronswijk, 1971).

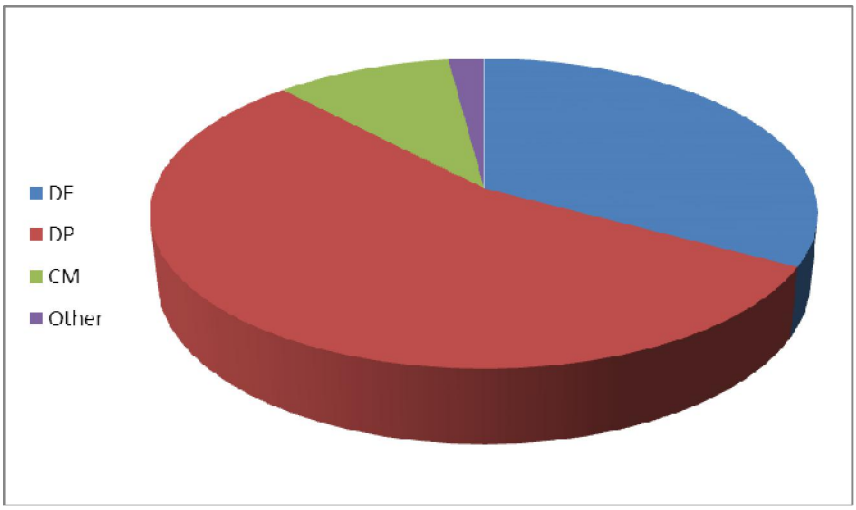
Two natural substances that are commonly used in popular culture are used in incensingprocess in their raw form namely, mastic, scientifically known as P.lentiscus, affiliate to Anacardiaccae family and frankincense, scientifically known as B.carterii, affiliate to Burseraceae family which are available in spice dealer shops, with the aim of identifying their effect in limiting the prevalence of house dust mites.

The experiment is conducted in thirty rooms (fifteen separated rooms for incensing with *P.lentiscus*, and fifteen rooms for incensing with *B.Carterii*), by mean of using incense burner, and putting the tested material within clay crucible on the flame for quarter hour on daily basis over the first week, 30 minutes over the second week, 45 minutes over the third week, and 60 minutes over the fourth week.

Surveyed rooms are put under similar conditions with regard to standard of living and type of furniture characterized by ceramics covered with thick carpets, as well as closing windows and preventing air renewing along study period (which is one month), except for once per week (the seventh day of each week after taking samples), then windows are closed again, and daily incensing for a certain period for each tightly closed room. Then, collection process is conducted by mean of using one Vacuum cleaner, and then the amount of mortalities are calculated in consideration of fifty gm of dust collected from each room, and concluding the average of samples according to the material used in incising process.

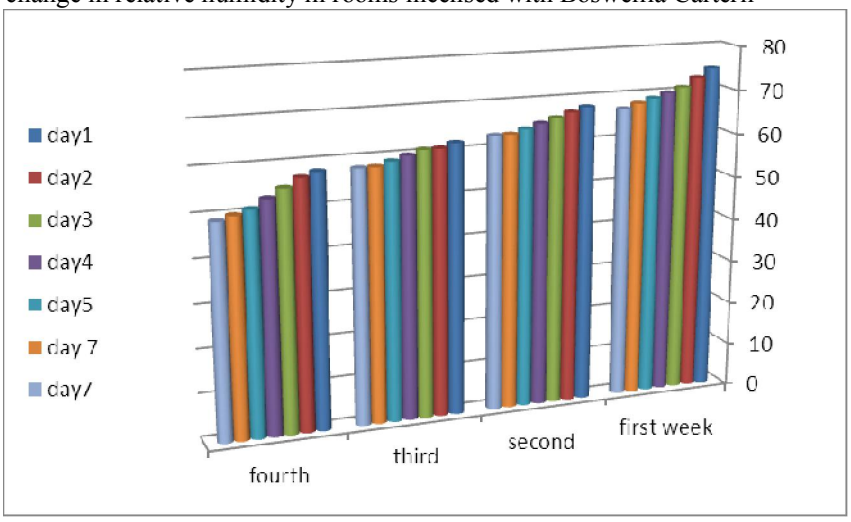
3. Results:

Histogram 1: the percent of HDM species in collected samples.

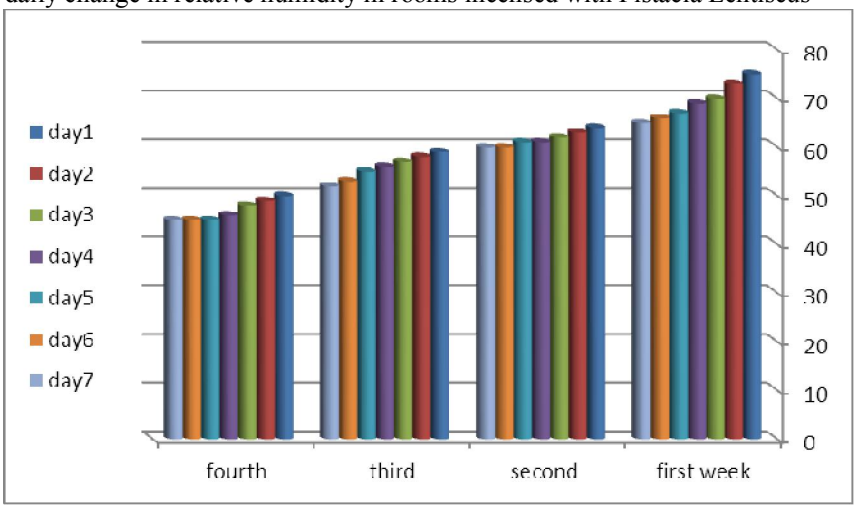


DF: D.farinae, DP:D.pteronyssinus, CM: C.malcinyiss.

Histogram 2: daily change in relative humidity in rooms incensed with Boswellia Carterii



Histogram 3: daily change in relative humidity in rooms incensed with Pistacia Lentiscus



NB: temperatures ranged from 30 to 33 C° and relative humidity ranged from (45 to 70%).

The data distribution is not following the normal curve, so Kruskal-Wallis test was applied to compare between death numbers in the four week, as every week has a certain period of smoking according the following table (Table 1):

Table 1: Death numbers of house dust mites differences in week 1,2,3 and 4. A comparison according to period of smoking

Week	Period
Week 1	15 Minutes
Week 2	30 Minutes
Week 3	45 Minutes
Week 4	60 Minutes

Table 2: The result of Kruskal-Wallis test is shown as follows:

Mean Rank				Chi-Square (χ^2)	Sig (P.Value)
Week1	Week2	Week3	Week4		
15.53	53.62	74.37	98.48	91.853	.000

It noticed from the results of this test that P.Value is (0.000), this value is smaller than the significant value of 0.05. So the null hypothesis that the number of S.N. death is equal on the four weeks of smoking is rejected. It is shown through the table that week4 has highest number of house dust mites. death then week3 then week2 and lastly week1.

To recognize the source of difference within the four weeksMann-Whitney analysis was conducted to each two components within the group. The differences are presented in the following table:

Table3: The comparison within the four weeks:

Sig (P.Value)			
	Week2	Week3	Week4
Week1	.000	.000	.000
Week2		.001	.000
Week3			.000

It is noticed from the results of the previous analyses that P.Value was smaller than 0.05 in all cases of smoking periods. Therefore it could be concluded that there are significant differences between the death numbers of S.N. at the four weeks. And the most effective period was 60 minute at the week4, and the less effective period was 15 minute at the week1.

Because the data distributionis notnormally distributed Mann-Whitney analysis was conducted to compare between death numbers resulted by two kinds of frankincense smoking, which are Mastic and Oliban, The result of the test is shown table (4)

It noticed from the results of this test that P.Value is (0.000), this value is smaller than the significant value of 0.05. So the null hypothesis that the number of house dust mites. death in Mastic and Oliban smoking is equalis rejected. It is shown through the table that Mastic smoking is more effective that Oliban smoking statistically significant.

Table4: Death numbers of house dust mites. differences in the according to the type of frankincense smoking.

Mean Rank		Mann-Whitney U	Sig (P.Value)
Mastic	Oliban		
75.12	45.88	923.0	.000

4. Discussion:

This study is conducted in Jeddah governorate which lies in the West of the Kingdom of Saudi Arabia on the cost of Red Sea from The Arabian Peninsula's side. Due to its extreme width, this city is characterized by having different internal geographic and climatic conditions that vary between its western regions overlooking the cost and distinguished by high humidity degrees, while Eastern regions are distinguished by the very dry desert climate. Within this city, people prefer to remain within homes as a result of climatic conditions characterized by very high temperature and relative humidity. Accordingly, they are more prone tofriction and breathing house dust mites. House dust is among the harming factors in the human environment. We find that lung and skin are exposed to it for many hours along the day.

The general feature which characterizesthe human houses is the existence of house dust that covers the floor and other surfaces or exists under furniture and doss. The air carries house dust which falls on the floor. It is a mixture of organic and inorganic substances that represent the human behavior and activity. This is assured by both, (Bronsjwik, 1972). Using moquette or carpets become widespread. They are an appropriate environment for the growth of house dust mites as the mites gathers within the gaps existing between the carpets' terry, thus, it provides heat, humidity and food (skin peel, hair, and small pieces of bread) (Tovey,1993,Phanuvich *et al*.,1997). Robinson *et al* (1993) has mentioned that the nature of house dust's composition differs on the basis of geographic regions, standard of living and house site.

Findings of this study show that the species affiliating to Pyroglyphidae family are collected in large numbers amounting to 94.25% out of the total amount of mites. This is assured by many researches that mentioned that the prevalence of mites of this family are more than other species existing with it. We find that the percentage of which amounts to 70-92 % out of the total amount of mites collected in England (Blythe et al.,1976; Rao,1975). Nadchatram *et al*.,(1981) also mentioned that Pyroglyphidae is one of the most important HDM species. (Wharton,1976)

also proves that 92% out of the total amount of house dust mites belong to Pyroglyphidae. In Columbia,(Charlet *et al*., 1978)mentioned that Pyroglyphidae is the most common type of house dust. Its percentage amounted to 60% out of the total amount. In Egypt, (Rezk,1988) recorded species affiliate to Pyroglyphidae and that amounted to 70-80%. (Koreim&Fahmy,1999) also assured that Pyroglyphidae is the most common type in the Arab Republic of Egypt. In Nigeria, it is mentioned that the most common type is Pyroglyphidae that amounted to 63% out of the total amount of house dust mites (Somorin *et al*.,1978).

The most important species of mites affiliate to *D.pteronyssinus* or (European house dust mites) and *D.farinae* is (North American house dust mites). Some studies conducted on floor and furniture mite revealed that Pyroglyphidae type formed by 83.9% (Wharton, 1976). These species are represented by large Population dynamics with regard to the remaining mites and has a major role in being infected by allergic diseases whether Bronchial asthma, Rhinitis, or skin allergy (Bronswijk *et al*, 1973).

Our relationship with house dust has changed seriously. The suggested reason behind this at the beginning of 21th century is houses narrow spaces along with the increasing temperature, high relative humidity and using carpets and furniture on a larger scale, which means the availability of more places that helps in the accumulation of dust and mites, and the lack of air circulation that takes away substances that cause allergy. House dust and the mites it contains that reaches the human lung and sticks to bronchial tubes and air bags in the lung and lung Vesicles, and these atoms and the mites they contain destroy mucus elevators that carry dust containing mites to the lung and cause a severe damage. a large numbers of mites exist in carpets' dust as carpet's dust and the mites it contain can find its way within these fibers. Any specialized cleaning way may reduce it. Carpets containing more terry have 80-170 gm of dust for each m2 of carpet (Edrees,2006).

House dust mites already moves here and there on carpets, mattresses, sheets and pillows. Old pillows already contain dead bodies and feces of house dust mites amounting to 10% of padding. Large numbers of mites exist between pillows and chairs on the floors of living rooms and bed rooms. (Edrees,2006)

Various species of mites carrying many antigen. Environmental and living studies conducted on house dust show that the numbers of this mites differ a lot in accordance with the nature of season and surveyed countries. We find that mites intensity is great at the end of summer and the beginning autumn or in autumn and winter as humidity increases relatively in some countries. Accordingly, we find that humidity plays a major role in the existence and growth of house dust mites as there is positive relation between them. House dust includes, as a result of the mites it contains, 90% of allergen. Now, there is general agreement that House dust mite is a dominant mites all over the world. It is the most important type that cause allergy. When it enters with respiration air in breathing process, it causes allergic diseases for respiratory system (asthma, Rhinitis, eye allergy, and skin allergic diseases).

Bronswijk (1972) has published many researches on house dust mites. In 1971, he mentioned that the most common floor furniture dust mite is Pyroglyphimite, particularly *D. farina, D.pteronyssinus,* and *Euroglyphus maynei* which causes Bronchial asthma and allergy. In 1972 studies showed that house dust includes many organic substances i.e. plants, animals, mites, fungi, pollen grains, and some inorganic substances. Findings show that dust is the appropriate environment for *D.pteronyssinus*. Humidity and food needs are the most important factor helping on the growth of mites. This agrees with findings of this study in which survey is conducted in bedrooms in which foods necessary for mites are available through parts falling from human body, hair and humidity resulting about breathing operations and temperature of the body laying down on beds for 8 hours on daily basis, and which increase by increasing the number of individuals within the one room. Nine species of house dust mites are found in South America and *D. pteronyssinus* mites was recorded with them. In 1973, *D. pteronyssinus* was the most common type, in addition to *Cheyletidae*, *D.pteronyssinus* exists along the year on mattresses which are an appropriate environment for mites growth. Living rooms' floors are not infected as they are not appropriate environment for mites growth. There is a strong relation between environment conditions (indoor and outdoor), number and distribution of *D.pteronyssinus* within houses and Microorganisms, vegetable fibers that mostly exist within the digestive tube of this mite (Erban *et al*, 2009; Mahakittikun *et al*., 2011; Stara *et al*, 2011; Khan *et al,* 2012)

A study conducted by Tovey *et al* (1981) in the United Kingdom revealed that the most important cause of HDM allergy is the species (*D. pteronyssinus*), as its excremental substance that contain large concentration of allergen enters the lungs. HDM mainly growth in the furniture and furnishings, and this is attributable to that the human body's evaporation increases relative humidity daily at a degree which is sufficient for and maintaining the HDM's needs, so that the HDM can move between the mattresses and hide on the floors and extend to other places of the house, and they are strongly attached to

humans due to production of allergen which are responsible for HDM allergy.

In addition, Abed-Benamara *et al* (1983) pointed out that preliminary studies were conducted on furniture mite at six houses in Algeria. Two samples were taken from every house; a small sample for creating an environment for the mite and the second large sample was used to determine the quantitative and population dynamics. The findings showed that the HDM of Pyroglyphidae, including *D. Farinae* and *D. pteronyssinus* are among the most important mites which cause allergy due to their existence in the furniture stuffing ad floor dust.

The respiratory system's infection with bronchus allergy which affects all ages, and is rated among the most serious problems affecting the general hygiene. Low numbers of this mite(Pyroglyphidae) were found in the furniture manually manufactured from wool and containing a natural fat substance. In addition, *E. maynei* species was collected from three places containing wool furniture which does not contain fat substance. This species was found for the first time in lab environment.

The only source for HDM to obtain water is the extraction of active absorption from the surrounding environment when the relative humidity is high. HDM's existence in the mattresses and furniture is attributable to the human body's temperature which increases relative humidity at a sufficient level for the mite through providing it with the water vapor that is necessary for its survival. The mite can prevalenced out on the floor which is the place for its growth and propagation. (Arlian *et al.*, 1983; Malaunual *et al*, 1995).

The study conducted by Cerneic (1983) revealed that the symptoms of hypersensitivity of *D. pteronyssinus* species in the patients suffering from lung diseases are associated with the level of existence of antigen surrounding the patients; i.e. the level of its population around the residential area.

The mite was obtained in all house dust samples, and the mite's population was found 15.6 mites/ dust mg, which is high at the global level. Pyroglyphidae family was the highest in number, while *D. pteronyssinus* species was the most prevalent one. In addition, *B. tropicalis* mite was found at 96% in the examined samples at a rate of 15% of total number. Tyrophagus and Tarsonemus were found in a relatively high number in bedrooms dust, and it was found out that they play a role in causing allergy (Ine'sHurtado& Mara Parini, 1985).

In Denmark, the numbers of house dust mites, *D. pteronyssinus* species, were estimated in 96 houses for persons suffering from allergy, where the impact of exchange of air currents, humidity and relationship were studied, along with the relationship between the number of HDM and ventilation inside the house. The findings showed that the houses of infected persons contained large numbers of mites as compared to the houses of persons who do not suffer from allergy. The findings also showed a relationship between low ventilation and the increasing number of mites at houses. (Arlian *et al*, 1982; Harving *et al*., 1993; Edrees and saleh, 2008c).

In a study for finding out the impact of residential areas on allergy levels resulting from HDM; *D. pteronyssinus* and *D. Farinae,* especially in the individuals suffering from allergy. *D. pteronyssinus* species was found in 17 houses out of 17 houses at four places inside the house; namely, mattresses, bedroom floors, living room floors and furniture stuffing, during the dry and rainy seasons. In addition, it was also noticed different population levels by place, with the highest population existing in living room's furniture in both seasons. *D. pteronyssinus* species existed at high level in the net or mixed wood or at wood houses. *D. Farinae* species was found out in 9 houses out of 17 houses being studied, and its population was found out to be less than that of *D. pteronyssinus* species in both seasons. This indicates the prevalence of *D. pteronyssinus* allergen more than the prevalence of *D. Farinae* species allergen in the equatorial areas. (Kathleen et al., 1997).

The study of HDM showed that the highest number of mortalities were found in the rooms incensed by *P.Lentiscus*, while the less in number in those incensed by *B.Carterii*, as they recorded low humidity level which is inappropriate for the growth of mite. These findings are supported by the studies that shed light on the role of seasonal changes in many world countries, which differ from each other due to varying environmental conditions, especially relative humidity. On the other hand, the temperature was not exposed to remarkable change that could affect the numbers of HDM. This finding is asserted by several scientists, because temperature comes in the second place in terms of importance following relative humidity.

The findings of this study revealed the effectiveness of *P. Lentiscus* incense in maximizing the number of mortalities, as compared to the *B.Carterii*, which may be attributable to low relative humidity in the rooms incensed by *P.Lentiscus* as compared to the rooms incensed by *B.Carterii*. This may be ascribed, as per views and some studies which indicated *P.lentiscus's* ability to absorb relative humidity, as well as the ability of both substances, through traditional indication and the studies being conducted, asserted their effectiveness in fighting some types of bacterium and microbes. In addition, chemical analysis of house dust revealed that it

contains types of microorganisms considered as appropriate food for HDM, and a major cause for the increase in their population dynamics. These findings are consistent with (Domrow 1970 &Kannan *et al* 1996), who showed the role of humidity in the increase in the population density of HDM. It also showed that winter season was the highest season in terms of existence of HDM while the summer season was the lowest in this study. Moreover, (Yagofarove & Galikeev 1997) recorded that the highest population dynamics of HDM was in summer season. Based on the survey conducted in Hawi in a hot and humid weather, the number of HDMs was low in summer months, while the highest population density was in winter season where the relative humidity and temperature were 68% and 23C (Solarz 1997). In Romania, Tourney et al 2000 recorded that the highest population dynamics of HDMs exists between August and November, while it goes down in winter. Brown (1994), Virginia, USA, pointed out that the highest number of HDM was collected in August. In Egypt, the studied conducted by Rezq (1993) revealed that the highest number of HDMs was collected in summer and autumn, while the spring and winter were the lowest months in population dynamics, as supported by several researches on this issue. Hence, we should know that the difference in population dynamics is attributable to different topographies and the weather of different areas, thus being associated with the difference level of internal and external humidity.This conclusion is asserted by Brownswijk 1981 and Lange & Mulla 1978, Korsgaard 1998, Arlian 1992, Harving *et al* 1993), and this is what we have seen in internal humidity of houses, showing that high humidity is the most important factor for mites growth and reproduction.

Reduction in relative humidity amounting to 45% in some houses handled by *P.lentiscus* leads to reducing Population dynamics of mites as some kinds of them disappeared completely except for *D.farinae* as it has the ability to bear dryness and it always live under low relative humidity comparing to *D.pteronyssinus*. accordingly, it leads to reduction in Population Density and a reduction in feeding process, producing antigen and fertility.(Edrees,2009)

The majority of mites absorbs water from atmosphere in the event relative humidity is high (Arlian,1977). In its living and growth, HDM depends on relative humidity. These types have the ability to adopt themselves on living within houses as man spends long times of his life within the house, particularly bedrooms, as vapor from the human body helps increase the relative humidity levelin the microenvironment.(Edrees2006)

Through this study, we find out that the incensing process and type of used substance affect the population dynamics of HDMs due to its ability to reduce relative humidity. This is consistent with the observations of old humidity-absorbing concrete houses, which were found very humid, particularly the walls and floors from which large prevalence were collected (Solarz 1997, Edrees 20062013).

The highest Population dynamics of *D. pteronyssinusmites* exists in old houses than houses that are less than 10 years old. It is also found that new houses characterized by their dryness and warmness than old houses, which is one of the most important factors inappropriate for mites growth (Malaunual *et al*.,1995; Edrees,2006, 2008a). One of the most important factors affecting Population dynamics is the existence of great numbers of individuals within the same place. This was noticed in Eastern Jeddah as the house there contained more than 17 individuals. This is assured by Arlian *et al,* 1978, Edrees,2006), pointing out that the population density of HDM is associated with the number of house residents. Also, Carswell *et al* (1982) recorded a large prevalence of mites on the bedroom mattresses, particularly those used by more than one person.

Likewise, the study revealed that at the popular areas where the living room is used as a bedroom, a large number of mites exists, because the environmental conditions; e.g. food, temperature and humidity are largely sufficient for the growth of these species. This finding is in agreement with a number of researchers. (Hart & Whitehead, 1990; Zock *et al,* 1994; Colloff 1991; Solarz 2001, Edrees 2013).

Conclusion

It is highly necessary to conduct a chemical analysis of the ingredients of substances used in this study, in order to identify the active substance and extract it in the lab to be used by subsequent studies, aiming to determine their effectiveness in minimizing humidity and fighting HDMs, while providing a healthy environment through the use of natural substances that do not have a negative effect on the environment.

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