

## The Level of Mite Dermatophagoides' Allergens (Der-p 1 and Der-f 1) in Birjand

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Article information	Abstract
<p>Article history: Received: 23 Mar 2011. Accepted: 13 July 2011 Available online: 24 Apr 2013 ZJRMS 2014; 16(4): 38-40</p> <p>Keywords: Asthma Allergy Mite</p>	<p><b>Background:</b> House dust mite allergens especially pyroglyphid species are among the most important indoor allergens and have an important role in development of asthma and allergies.</p> <p><b>Materials and Methods:</b> In current study, the level of two main allergens from mites including Der-p1 and Der-f 1 in dust of 28 homes in Birjand city was measured by ELISA method.</p> <p><b>Results:</b> All samples were negative for Der-p1. Low level of Der-f 1 was detected in one sample. Prevalence of asthma, rhinitis and rhinoconjunctivitis was 2%, 28% and 15% respectively.</p> <p><b>Conclusion:</b> The results of this study suggest that House dust mites could not grow in Birjand climate.</p>

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### Introduction

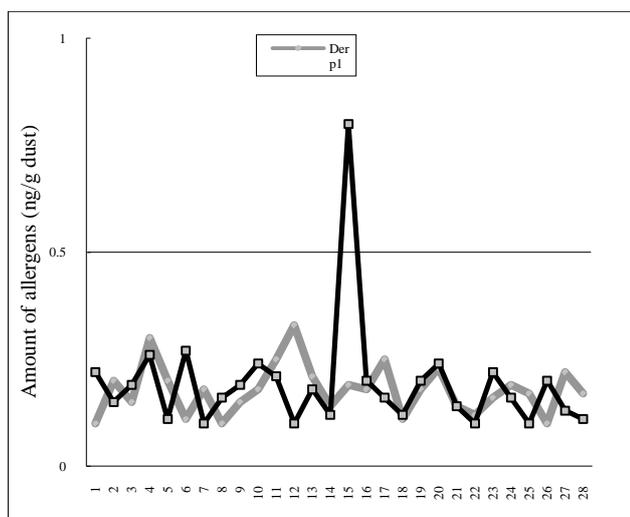
Prevalence of asthma and other allergic disorders has increased throughout the world during the last decades [1]. Most patients suffering from asthma and other respiratory allergies are sensitized to indoor allergens such as dog, cat, cockroach, molds, and especially mite allergens. Exposure with these allergens can lead to worsening of symptoms and exacerbation of diseases [2]. Different studies have confirmed the importance of mite's allergens in asthma and allergy and have shown that 60-100% of asthmatic patients are sensitized to mites' allergens [3]. Mites from *Dermatophagoides species*, including *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*, feed on human skin scales and their two major allergens are Der-p 1 and Der-f 1, respectively; known as the dominant allergens which can cause symptoms. Mites need moderate temperature and high humidity for their growth and therefore, they cannot grow in dry places or in areas with large temperature variation [4]. Although several studies have shown the importance of mite allergens in asthma and allergy, geoclimatic conditions may inhibit the growth of mite in some areas. Studying to find the most important triggers of allergic disorders in different areas particularly those with unique geoclimatic conditions can be helpful for better prevention, treatment and control of allergic diseases. The aim of the present study was to measure two dominant house dust mites' allergens in Birjand residences and the correlation of allergen levels with allergic symptoms in house inhabitants, hoping to find the importance of mites in exacerbation of asthma and allergies in our area.

### Materials and Methods

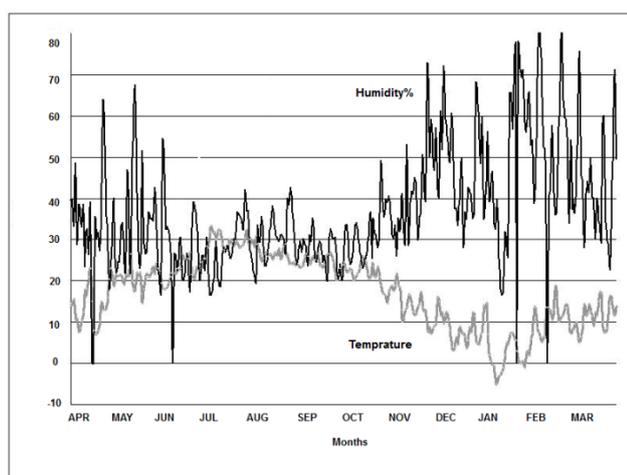
In an experimental study, from May to June 2007, 35 houses in Birjand city randomly selected and the households were asked not to clean their carpets for at least five days. After that, one square meter of a living rooms' carpets that was away from direct sunlight, vacuumed for 2 min with a 1200-Watt, vacuum cleaner equipped with a dust collector and filter (Indoor Biotechnologies, Charlottesville, Virginia, USA). After vacuuming, filter was removed and kept in zip-lock plastic bags in 4°C. For extraction, dust samples were sieved through a 345 µm mesh and fine dust was weighted and then 2.0 ml PBS-T (0.05% Tween 20 in phosphate buffered saline, pH= 7.4) was added and mixed on shaker. Samples less than 30 mg were excluded from analysis. After centrifugation, supernatant was removed carefully and kept at -20°C until analysis. The amount of Der-f 1 and Der-p 1, was measured by using commercial ELISA kits (Indoor Biotechnologies, Charlottesville, USA) as described in manufacturer's instructions. All samples were tested in duplicate and the average values were used. Level of allergens was expressed as ng/g of dust. The lower detection limit for both allergens was 0.5 ng/ml. Prevalence of asthma, rhinitis and rhinoconjunctivitis in house inhabitants was checked by a questionnaire. Metrological data in Birjand city among study year was adopted from Islamic Republic of Iran Meteorological Organization (www.irimet.net). Statistical analysis was performed by using SPSS-11 software and *p*-Value less than 0.05 considered significant.

## Results

Among all 28 accepted dust samples, none were positive for Der-p1 or Der-f 1 except one that had 0.8 ng/g Der-f 1. Figure 1 shows the level of Der-f 1 and Der-p 1 in all analyzed samples. Prevalence of asthma, rhinitis and rhinoconjunctivitis in 97 residents of the selected homes was 2%, 28%, and 15% respectively. Due to very low number of positive samples, it was not possible to examine the relationship between mites' allergens and prevalence of allergic disorders. Throughout the whole year, there was no day when the temperature and humidity were suitable for grow of house dust mites (Fig 2).



**Figure 1.** The amount of Der-p1 (grey line) and Der-f 1 (black line) allergens in dust samples of Birjand houses (the horizontal line shows the lowest detection limit)



**Figure 2.** Average temperature (grey line) and humidity (black line) during year 2007 in Birjand city

## Discussion

Numerous studies around the world, especially in areas with tempered and humid climate, have shown the

importance of house dust mites' allergens as a risk factor for development and exacerbation of asthma and other respiratory allergies [3]. The present study, confirmed that mites of Dermatophagoides family are not able to grow in Birjand conditions and, therefore, their two major allergens were not detectable in house dust samples. Studies conducted in our country, have reported fairly high prevalence of allergies especially allergic rhinitis although there is a high variation in prevalence of asthma in different parts of Iran [5]. In spite of the importance of mites' allergens as a risk factor for allergic diseases, the information about the level and distribution of mites in different parts of Iran is very rare. The results of the present study revealed that house dust mites are not able to grow and proliferate in Birjand and with consideration of Birjand geoclimatic condition especially in case of temperature and humidity our finding seems reasonable. Different studies have shown that mites need optimal condition including temperature between 20-30°C and humidity over 60% for growth [7]. While, throughout the year, there is not a single day when both temperature and humidity are suitable for mites' growth, so in such a condition, mites will not able to survive.

Other studies in areas with similar geoclimatic conditions have shown that mites' growth is restricted in hot and dry climate [7]. There are some evidences which indicate that altitude may also affect the growth of mites [8]. Thus, in highland areas such as Birjand with 1500 meter altitude above the sea level, mites cannot grow well and this is in concordance with our findings. Although the density of mites in some areas may be affected by the season and place of sampling, there is little likelihood that these factors have an impact on our result, because we collected dust samples from sitting rooms' carpets which are a main source of mites and samples were collected in May when the temperature and humidity, compare to other months of the year, are closer to the optimal conditions for growth of mites.

In two other studies in Iran, mites were found in humid coastal areas in the north and south of Iran [6, 9]. Lack of information about the rate of sensitization to different allergens including mites' allergens in our area, makes it difficult to confirm the results of current study clinically but based on studies about the skin prick test reactivity to allergens in Mashhad [10], Karaj [11], and Shiraz [12], it is obvious that in comparison to plant allergens, particularly grass and trees, mites are less frequent and just around 20% of atopic patients are sensitized to them which is less than the rate of Thailand [13] and Malaysia [14] with temperate and humid climates. This is possibly due to similar geoclimatic conditions which restricted growth of mites in those cities. Based on questionnaire, prevalence of rhinitis and rhinoconjunctivitis was fairly high among house residents while the rate of asthma was very low.

Two other questionnaire based studies in Mashhad [5] and Boshrooye [15] reported similar findings and the rate of asthma in Mashhad was around 2% while prevalence of rhinitis in Mashhad and Boshrooye was 22% and 15%, respectively which is close to our rates. Dry air and wind

in Birjand and other areas with similar conditions increase pollen concentration in atmosphere and this can increase incidence of rhinitis and conjunctivitis. Restricted growth of mites and molds as the most important indoor allergens may an explanation for low rate of asthma. Although the sample size of this study was small, but the results give us an overview about the prevalence of allergies in Birjand and the low frequency of asthma is an interesting finding which can be a basis for further researches. The results of this study show that house dust mites are not able to grow and proliferate in Birjand climate and it is unlikely that they have an important role in developing and exacerbation of asthma and other allergies in areas with similar conditions.

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### Authors' Contributions

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### Conflict of Interest

The authors declare no conflict of interest.

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