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Determination of the Possible Effects of Noise and Dust Levels in the Cotton Ginning Industry of Diyarbakır in Terms of Worker Health and Environmental

Diyarbakır Pamuk Çırçır Endüstrisinde Gürültü ve Toz Seviyelerinin İşçi Sağlığı ve Çevresel Yönden Olası Etkilerinin Belirlenmesi

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ABSTRACT

Noise and air pollution have negative effect on the worker's body, health and on different occupational safety and environmental risk factor. Noise and air pollution may be the cause of various types of diseases and disturbances during operations of machines. In this study, it is aimed to determine the effect of ginning factory on worker's health and environmental in Diyarbakır province, Türkiye. Noise and dust levels were measured for this purpose in ginning enterprises. The study has been carried out in cotton ginning factory of Diyarbakır province from December to November in 2019. The mean noise levels of the ginning machines were measured by Mastech MS6300, the dust level was measured by DT-9880 particle counter device. Measurements were made at a distance of about 1.50 m above the floor or work platform and at least 1 meter from walls in various directions. The ginning factories have some differences in terms of the number of machines and their placement in workshop. According to standards of the International Labor Organization (ILO) and National Institute of Occupational Safety and Health (NIOSH), temporary and permanent hearing loss warning limit is 85 dBA and danger limit is 90 dBA. According to results of tests, all measurements showed that the level of noise was above permissible limit (90 dBA). Some textile machinery's highest noise level has been recorded at 95 dB. So, In the light of measured values, these values have accepted as dangerous limit for worker's healthy and negative effect on occupational safety. Therefore, it is necessary to do research to reduce noise levels under 85 dBA. Also, the average dusts concentrations were found more in all facilities than limit concentrations level. Dust particles sizes were changed between 0.3 to 10 µm (0.3, 0,5, 1.0, 2.5, 5.0 and 10). The number of dust particles measured in all enterprises is involved in the red group.

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ÖZET

Gürültü ve hava kirliliğinin, çalışanın vücuduna, sağlığına, farklı iş güvenliği ve çevresel risk faktörlerine olumsuz etkileri vardır. Makinaların çalışması sırasında oluşan gürültü ve hava kirliliği, çeşitli hastalık ve rahatsızlıklara neden olabilir. Bu çalışmada Diyarbakır ilindeki çırçır fabrikalarının işçi sağlığı ve çevre üzerine etkilerinin belirlenmesi amaçlanmıştır. Bu amaçla çırçır işletmelerinde gürültü ve toz seviyeleri ölçülmüştür. Çalışma, 2019 yılı Kasım ve Aralık aylarında Diyarbakır ilinde bulunan çırçır fabrikalarında gerçekleştirilmiştir. Çırçır makinalarının ortalama gürültü seviyeleri Mastech MS6300 çevre ölçüm cihazı ile, toz seviyeleri ise DT-9880 partikül sayıcı cihaz ile ölçülmüştür. Ölçümler zeminden veya çalışma platformundan yaklaşık 1.5 m yükseklikte ve duvarlardan en az 1 m mesafede yapılmıştır. Çırçır fabrikaları, makina sayıları ve makinaların yerleşimleri açısından bazı farklılıklara sahiptir. Uluslararası Çalışma Örgütü (ILO) ve Ulusal Mesleki Güvenlik ve Sağlık Enstitüsü (NIOSH) standartlarına göre geçici ve kalıcı işitme kaybı uyarı limiti 85 dBA ve tehlike limiti 90 dBA'dir. Yapılan testlerin sonuçları, tüm gürültü ölçümlerinin izin verilen sınırın (90 dBA) üzerinde olduğunu göstermiştir. Çırçır fabrikalarının hepsinde maksimum gürültü seviyesi 95 dBA'in üzerinde bulunmuştur. Ölçülen değerler ışığında, söz konusu değerler işçinin sağlığı ve iş güvenliğine olumsuz etkileri bakımından tehlike sınırı olarak kabul edilmiştir. Bu nedenle gürültü seviyelerinin 85 dBA'in altına düşürülebilmesi için araştırmalar yapılması gerekmektedir. Ayrıca tüm fabrikalarda ölçülen ortalama toz konsantrasyonları sınır konsantrasyon seviyesinden daha yüksek bulunmuştur. Toz partikül boyutları 0.3 ile 10 µm arasında değişmiştir. Ölçülen toz partikül sayısı bakımından tüm işletmeler riskli olan kırmızı grupta yer almaktadır.

1. INTRODUCTION

Türkiye is one of the most important countries in the world in terms of cotton production, consumption and the textile industry. So, the textile industry plays a vital role for the Turkish economy. However, domestic cotton production is less than the consumption demand of the country. Cotton is cultivated primarily in the Southeastern Anatolia, Aegean, and Mediterranean regions (including Çukurova and Antalya). With the start of GAP (Southeastern Anatolian Project) irrigation projects in Türkiye, the irrigated farmland and cotton production in Southeast Anatolia region has increased rapidly since 2000 (Sessiz and Esgici, 2015; Sessiz et al., 2016; Basal et al., 2020). Nowadays, more than half of the Türkiye's cotton production is produced in Southeastern Anatolia region. The increase in cotton production has increased the development of the cotton ginning industry (Sessiz et al., 2016). The ginning rate averages about 41% in the Aegean, about 39% in the GAP and 38% in Çukurova regions (Basal ve Sezener, 2012; Sessiz et al., 2016). Therefore, cotton plant has strategic importance for the region's cotton ginning sector and agricultural mechanization improvement. Major cotton producer provinces in this region are Şanlıurfa, Diyarbakır and Mardin. Cotton industry is mainly composed of cotton ginning factories. Despite the increase in ginning enterprises in the region and Diyarbakır province, there are some important problems during the cotton processing.

The most important of these problems are noise and air pollution because the machines are very old models. So, this situation has become threatening of working conditions on workers as physical and psychological health. Dust in the cotton textile industry is a major problem; the ginning section is where this issue is most serious. Cotton ginning is a method of separating lint cotton from the seed-cotton. Dust consists of small and microscopic particles of various substances that exist as suspended particles in the air and can be carried over long distances in the air, according to a classification system established by the international cotton testing methods committee. Particles found in cotton dust can be distinguished according to particle size such as garbage, dust, micro and dust (Anonymous, 2022).

The other problem is noise in ginning factory. The machine noise is loud during ginning. Noise is called as excessive or unwanted sound which potentially results in annoyance and/or permanent or temporal hearing loss and it can be from occupational and/or non-occupational sources. In other words, noise is a sound disturbance as well as a nuisance which results in health problems and adverse social consequences (Confer and Confer, 1999). Noise can have negative effects on employee health in terms of physical, physiological, psychological and performance (Sabancı and Sümer, 2015; Çiçek and Sümer, 2021). This unwanted sound can cause serious health problems in ginning industry and it has become a crucial occupational hazard to its workers. The ginning machines and the other devices used in cotton ginning factory are highly diverse in its nature and most of them emit high noise levels due to frequent operation of noise generating components such as pneumatic elements and other fast moving mechanical components. During the operations of machines, the workers exposed to high noise for 8-12 hours on daily basis that results noise-induced hearing loss (NIHL) problems of the workers (Shakhatreh et al., 2000; Arslan and Aybek, 2005; Roozbahani et al. 2009; Dube et.al. 2011; Soomro et al., 2015; Bhar, 2016; Azadboni et al. 2018; Suhardi et al., 2019). Recently, the productivity of ginning machines has highly increased with increase information technology. However, parallel to technological and economical progress, ever increasing noise problem in factories reached to an alarming level with the incident of undesirable consequences and adverse health effects to its workers (Jayawardana et al., 2014; Iyer, 2020; Abbasi et al., 2011; Sangeetha et al., 2013). Some textile machinery's highest noise level

has been recorded as 95 dB. This limit is very dangerous on human health. Also, noise and dust pollution can cause reduce worker's efficiency. Whereas, ILO (International Labor Organization) and NIOSH (National Institute of Occupational Safety and Health) recommends that workers should not be exposed to noise at a level that amounts to more than 85 decibel for 8 hours (NIOSH, 1972).

A significant issue in the cotton textile business, in addition to noise pollution, is cotton dust in the workplace; the ginning section is where this issue is most serious. Because, ginning is the first step of processing from the cotton balls to the cotton fiber. So, large amounts of cotton dust occurred in this step.

However, despite of such an important issue, there are no sufficient data and scientific study according to World Health Organization standards on the noise and air pollution level in the ginning companies that active in Diyarbakır province, Türkiye. So, in this study, it was aimed to analyze the quality of noise and air pollution and distribution pattern inside a cotton ginner's factory in Diyarbakır province, Türkiye.

2. MATERIALS AND METHODS

2.1. Some properties of ginning factories

The data of this study were obtained from 13 cotton ginners that were actively working during the 2019 ginning season in Diyarbakir province, Türkiye. Three of them are saw-gin type. Others are cotton ginning enterprises that have roller-gin machines. Some views of the ginning machines during the ginning operations are given in Figure 1.

Figure 1. Some views of the ginning machines of factories

2.2. Measurement of noise and dust particle

Noise level of the ginning machines in factories was measured as decibel by Mastech MS6300 device (Figure 2). A sound level meter can be used to measure the noise directly in dBA units. Measurements were made for about 5 min with three replications at a distance of about 1.50 m above the floor or working platform and at least 1.0 m from walls in various locations where the ear of standing average person (TS EN ISO 9612:2009).

The average dust particle in air were measured by CEM-DT-9880 particle counter device (Multifunction environment tester) (Figure 2). Particle counter device has five different size dust particles measure cannel (0.3, 0,5, 1.0, 2.5, 5.0 and 10 μm). The device has the properties of classifying as green, yellow and red according to the number of particles it measures.

Figure 2. Noise level meter(left) and particle counter device (right)

3. RESULTS AND DISCUSSION

The average noise and dust level values for each ginning factory are given in Table 1. As seen in this table, the noise level was above 90 dB in almost all factories. The level of noise values obtained were above permissible limit 85 dBA. In the middle part of the enterprises, these values varied between 95 and 100 dB. Similar results were obtained in all enterprises in terms of noise and dust levels. According to these obtained values and United States Department of Occupational Safety and Health Administration-OSHA (1983), we can expressed that noise is associated with hearing loss, and in addition to the auditory effects, many other adverse effects such as stress, annoyance, sleepiness, hypertension, reduced cognitive performance and cardiovascular disease are also attributed to noise exposure. Similar results were expressed by Talukdar (2001), Hammersen et al. (2016), Burns et al. (2016), Ehlers and Graydon (2011), Azadboni et al. (2018).

Table 1. Average values of noise and dust particle level

Factories	*Number of ginning machines*	*Noise (dBA)*	*Dust level (Size of dust particles-µm: Number of dust particles)*
1	76 (Roller-Gin)	91.4	0.3: 374293 0.5: 148148 1.0: 30979 2.5: 8965 5.0: 1170 10 : 675
2	120(Roller-Gin)	93.6	0.3: 56481 0.5: 5958 1.0: 4539 2.5: 19146 5.0: 38216 10 : 8046
3	80(Roller-Gin)	91.2	0.3: 543813 0.5: 216797 1.0: 43051 2.5: 11818 5.0: 1192 10 : 686
4	80(Roller-Gin)	92.8	0.3: 945127 0.5: 401856 1.0: 88229 2.5: 28171 5.0: 3506 10 : 2008
5	74(Roller-Gin)	92.6	0.3: 840544 0.5: 1216713 1.0: 568174 2.5: 364663 5.0: 90233 10 : 58532
6	2 (Saw-Gin)	96.6	0.3: 473196 0.5: 194533 1.0: 40687 2.5: 12010 5.0: 1397 10 : 785
7	120(Roller-Gin)	95.4	0.3: 644946 0.5: 806281 1.0: 305757 2.5: 98693 5.0: 17472 10 : 8788
8	76(Roller-Gin)	89.9	0.3: 704326 0.5: 255304 1.0: 50506 2.5: 14220 5.0: 1765 10 : 1018
9	63(Roller-Gin)	88.00	0.3: 624172 0.5: 243589 1.0: 49839 2.5: 13861 5.0: 1835 10 : 1064

Factories	*Number of ginning machines*	*Noise (dBA)*	*Dust level (Size of dust particles-µm: Number of dust particles)*
10	84(Roller-Gin)	94.3	0.3: 1012727 0.5: 1493524 1.0: 484158 2.5: 243976 5.0: 55003 10 : 27354
11	52(Roller-Gin)	90.4	0.3: 777729 0.5: 339562 1.0: 67253 2.5: 17529 5.0: 1900 10 : 1021
12	3(Saw-Gin)	93.6	0.3: 761194 0.5: 329013 1.0: 67563 2.5: 17656 5.0: 1643 10 : 887
13	3 (Saw-Gin)	92.1	0.3: 746717 0.5: 318856 1.0: 64881 2.5: 16522 5.0: 1713 10 : 934

The maximum noise level of all ginning textile factory has reached above 95 dBA. The recommended permissible noise levels and duration of noise exposure by the OSHA (1983) are shown in Table 2. When we compare Table 1 and values of OSHA (1983) (Table 2), the noise level inside all ginning factory is above the limits specified by NIOSH and it amounts to be hazardous. Majority of the areas having more than 95 dBA or above sound level inside the covered plant and daily working time of workers are 8 hours in duration. The human beings can't withstand this high noise levels at 8 hour. According to OSHA (1983) values, this time is 4 hours. The effects is start at 45-55 dBA. This value is 8 hours for 80 dBA in the European Union (Neitzel, 2018). So, in the light of measured values, these values have accepted as dangerous limit for worker's health and have negative effect on occupational safety. NIOSH recommends that workers should not be exposed to noise at a level that amounts to more than 85 decibels for 8 hours (Jayawardana et al., 2014). Also, a worker distracted with noise may become less make production and even irritable. If noise levels are too loud, the worker may not be able to hear warning signals or instructions. High noise levels over prolonged periods of time can lead to permanent hearing loss. When any of these conditions exists, it is important to control, contain, reduce, or eliminate the noise source so a safe work environment can be maintained (OSHA, 1983). Therefore, it is necessary to do research to reduce noise levels under 85 dBA. Similar situation was expressed by Roozbahani et al. (2009), Jayawardana et al., (2014), Soylu and Gökkuş (2016). Noise-induced hearing loss can affect worker of all. The high noise level may be due to the high number of parts in the machine and the old machines. Many different type gears are used for the motion in different parts of a ginning machine. Similar results were expressed by Azadboni et al. (2018).

Table 2. Permissible noise exposures (OSHA, 1983)

Duration per day (h)	***OSHA (US)***
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
< ¼	115

Similar situation can be said for dust levels. The average dusts concentrations were found more in all ginning factory than limit concentrations level. When the number of particles measured in all channels was collected cumulatively, the number of particles was found to be very high. These values can be stated to be very dangerous for human health and the environment. Maximum particle size were obtained 0.3 µm channel. However, the number of dust particles measured in all enterprises is involved in the red group, which will adversely affect human health. We can expressed that, high dust levels have a negative impact on employees in the textile industry.

4. CONCLUSION

This study was carried out in 13 of the ginning factories in Türkiye to explore the problem of noise and dust pollution. The noise and dust levels obtained in all factories were found to be high. Both visibility and dust level are at a level that can threaten human health. Considering that the daily working time of the employeers in the visited ginning factories are 8-10 hours, the daily working times should be reduced. According to OSHA (1983) this working time 4 hours. In addition, determining the daily noise exposure levels and equivalent sound pressure levels, taking into account the working hours of the employees in the factories, periods such as resting, toilet and eating, will be more useful to evaluate the effects on employees' occupational health and safety.

REFERENCES

Abbasi, A. A., Marri, H. B., and Nebhwani, M. (2011). Industrial noise pollution and its impactson workers in the textile based cottage industries: An empirical study", Mehran University Res. Journal of Engineering and Technology, 30, 35-44.

Anonymous (2022, April 20). Environmental health hazards spinning mill control. http://www.textilemates.com/

Arslan, S., and Aybek, A. (2005). Bazı tarıma dayalı sanayi kuruluşlarında toz düzeyleri. Tarım Makinaları Bilimi Dergisi. 1(1), 29-35. Retrieved from https://dergipark.org.tr/tr/pub/tarmak/issue/11563/137796

Azadboni, Z. D., Talarposhti, R. J., Ghaljahi, M., Mehri, A., Aarabi, S., Poursadeghiyan, M., and Abbasi, M. (2018). Effect of occupational noise exposure on sleep among workers of textile industry. Journal of Clinical and Diagnostic Research, 12(3), LC18-LC21. https://doi.org/10.7860/JCDR/2018/26084.11334

Basal, H., and Sezener, V. (2012). Turkey cotton report. In 11th Regional Meeting of the International Cotton Advisory Committee, 5-7 Nov. 2012. Antalya, Turkey.

Basal, H., Karademir, E., Goren, H. K., Sezener, V., Dogan, M. N., Gencsoylu, I., and Erdogan, O. (2020). *Cotton Production in Turkey and Europe.* In Cotton Production (eds K. Jabran and B.S. Chauhan). https://doi.org/10.1002/9781119385523.ch14

Bhar, H. C. (2016). Indian textile industry and its impact on the environment and health: A review. International Journal of Information Systems in the Service Sector, 8(4). https://dx.doi.org/10.4018/IJISSS.2016100103

Burns, K. N., Sun, K., Fobil, J. N., and Neitzel, R. L. (2016). Heart rate, stress, and occupational noise exposure among electronic waste recycling workers. International Journal of Environmental Research and Public Health, 13(1), 140. http://dx.doi.org/10.3390/ijerph13010140

Confer, R. G., and Confer, T. R. (1999). *Occupational health and safety: Terms, definitions and abbreviations*. Second Edition, CRC press, 1999.

Çiçek, G., and Sümer, S. K. (2021). Noise exposure levels in black tea processing factories and its effects on employees. Tekirdağ Ziraat Fakültesi Dergisi, 18 (2), 282-291. https://doi.org/10.33462/jotaf.784585

Dube, K. J., Ingale, L. T., and Ingale, S. T. (2011). Hearing impairment among workers exposed to excessive levels of noise in ginning industries. Noise & Health 13 (54), 348-355 http://dx.doi.org/10.4103/1463-1741.85506

Ehlers, J. J., and Graydon, P. S. (2011). Noise-induced hearing loss in agriculture: creating partnerships to overcome barriers and educate the community on prevention. Noise Health. 2011;13(51), 142-146. https://doi.org/10.4103/1463-1741.77218

Hammersen, F., Niemann, H., and Hoebel, J. (2016). Environmental noise annoyance and mental health in adults: findings from the cross-sectional German health update (GEDA) study 2012. International Journal of Environmental Research and Public Health, 13(10), 954. https://doi.org/10.3390/ijerph13100954

TS EN ISO 9612: (2009). Türk Standardı, Akustik-Çalışma Ortamında Maruz Kalınan Gürültünün Belirlenmesi-Mühendislik Yöntemi.

Iyer, V. G. (2020). Environmental health impact assessment of chrome composite leather-clad rollers used by Indian cotton roller ginning industries and design and development of eco-friendly alternatives. International Journal of Emerging Trends in Health Sciences, 04(1), 36-67.

Jayawardana, T. S. S, Perera, M. Y. A., and Wijesena, G. H. D. (2014). Analysis and control of noise in a textile factory. International Journal of Scientific and Research Publications, 4(12), (ISSN: 2250-3153). http://www.ijsrp.org/research-paper-1214.php?rp=P363451

Neitzel, R. (2018). Chronic health effects and injury associated with environmental noise pollution. School of Public Health, University of Michigan. Presentation to US Centers for Disease Control, May 17, 2018. https://www.cdc.gov/nceh/hearing_loss/docs/CDCPresentationNeitzel-508.pdf

National Institute of Occupational Safety and Health (1972), Criteria for a recommended standard-occupational exposure to noise. DEH(HSM) Pub. No.73-11001. Health Services and Mental Health Administration, Washington, DC.

OSHA. 1983. Occupational noise exposure: Hearing conservation amendment; Final Rule. OSHA 29 CFR 1910.95. Fed. Register 48(46), 9738–9785.

Roozbahani, M. M., Nassiri, P., and Shalkouhi, P. J. (2009). Risk assessment of workers exposed to noise pollution in a textile plant International Journal of Environment Science and Technology, 6(4), 591-596. http://dx.doi.org/10.1007/BF03326099

Sabancı, A., and Sümer, S.K. (2015). *Ergonomics (in Turkish).* Nobel Academic Publishing, Ankara. ISBN:978-605-5426-79-8. Second edition. pp:472.

Sangeetha, B. M., Rajeswari, M., Atharsha, S., Saranyaa Sri, K., and Ramya, S. (2013). Cotton dust level in textile industries and its impact on human. International Journal of Scientific and Research Publications, 3(4), ISSN 2250-3153

Sessiz, A., and Esgici, R. (2015). Effects of cotton picker ages on cotton losses and quality. Scientific Papers. Series A. Agronomy, 58, 417-420.

Sessiz, A., Esgici, R., and Pekitkan, F. G. (2016). The relationship between mechanization and cotton ginning industry. International Scientific Journal, Mechanization in Agriculture. ISSN 0861-9638, 62(1), 24-26.

Shakhatreh, F. M., Abdul-Baqi, K. J., and Turk, M. M. (2000). Hearing loss in a textile factory. Saudi Medical Journal, 21(1), 58-60.

Soomro, N., Soomro, N., and Soomro, M. (2015). Work health and safety in cotton ginning industry: A survey of practices in Australia. Mehran University Research Journal of Engineering & Technology, 34(4), 461-466.

Soylu, M., and Gökkuş, Ö. (2016). Investigation of industrial noise pollution and application example in a textile mill. Erciyes University Journal of Institue of Science and Technology, 32(2).

Suhardi, B., Navi, M. A. H., and Astuti, R. D. (2019). Noise level analysis to reduce noise exposure at PT.IT. Cogent Engineering, 6(1). http://dx.doi.org/10.1080/23311916.2019.1666629

Talukdar, M. K. (2001). Noise pollution and its control in textile industry. Indian Journal of Fibre and Textile Research, 26, 44-49.

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