

DETERMINING ORGANIC WASTE POTENTIAL OF MOBILE PUBLIC BAZAARS IN SAMSUN (REVIEW)

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Abstract

Mobile public bazaar is an important part of our culture in Turkey. This bazaar settles down every day in a certain place of the towns or city districts in Turkey. Turkey has 81 provinces and 957 towns in total and a public bazaar settles down in a town every day. If you take into consideration the number of towns, theoretically 957 mobile public bazaars must be settling down every day in Turkey. This number is enough to imagine the size of this market in our country. These are mainly food markets for the local people. Mainly vegetables and fruits are sold in these mobile local markets but, you can also find olive, fish and some animal products such as cheese, egg, sausage, salami, etc. Textile products are also sold in these markets. In this study, the structure of a mobile public bazaar is analysed. Organic waste potential of this bazaar is determined and some advices for evaluation possibilities of this organic waste are given.

Key words: organic waste, compost, biogas, public bazaar, organic manure, energy.

INTRODUCTION

Solid waste is a serious environmental problem in both developed and developing countries. In recent years, most developing countries have started to improve their municipal solid waste management practices. The increasing amount of wastes generated by rapid urbanization in these countries is usually not properly managed. Solid waste management systems in developing countries must deal with many difficulties, including low technical experience and low financial resources which often cover only collection and transfer costs, leaving no resources for safe final disposal (Collivignarelli et al., 2004; Moghadam ET AL., 2009). Inadequate management of solid waste in most cities of developing countries leads to problems that impair human and animal health and ultimately result in economic, environmental and biological losses (SHARHOLY ET AL., 2008).

Samsun is the biggest and more developed city of Black Sea region in Turkey. It's located in northern part of Turkey, on the Black Sea cost. Atakum is one of the three central districts of Samsun province with the population 156000 and spread over 34500 ha (URL 1, 2014). Mobile public bazaar is an important part of our culture. A mobile public bazaar moves every day and settles down along a street in a district of a city. For example, the mobile public bazaar in Atakum tours fifteen different places in a week. The public bazaar settles down early in the morning and generally ends after sunset in the evening. This bazaar is generally a food market for the locals. Mainly different kinds of seasonal vegetables and fruits are sold in this market but, some animal products such as egg, butter, milk, yoghurt, honey, salami, etc. and some other products like textile, plastics, paper products are also sold in this every day mobile public market. In this study, the structure of the mobile public bazaar touring in Atakum district is analysed. Organic waste potential of this bazaar is determined and some advices for evaluation possibilities of this organic waste are given.

Structure of mobile public bazaar

Atakum central district has a very rich organic waste potential. The public bazaar tours 15 different places in a week in Atakum. The structure of public bazaar and average waste amounts are given in table below.



Bazaar Place	Days	Number of Stallholders	Average Waste Amount (kg/day)
Altınkum	Monday	25	400
Yeşildere	Monday	30	450
Salı	Tuesday	240	3500
Kurupelit	Tuesday	30	500
Denizevleri	Wednesday	40	500
KamalıToki	Wednesday	20	150
Çatalçam	Wednesday	30	600
Atakent	Thursday	85	1300
Cuma	Friday	160	6500
Cuma	Friday	170	4000
Çakırlar	Saturday	30	500
Kurupelit	Sunday	35	500
Atakent 2	Sunday	40	500
Kuleli	Sunday	100	2500
Taflan	Sunday	70	1000
Total		1105	22900

Tab.1. - The capacity of public bazaar and waste amount in Atakum distrcit

(URL 2, 2014)



Fig. 1. – Some views from the bazaar

Waste potential of bazaar

According to the results of this research it's found that a total of 22900 kg/week organic waste is extracted from public bazaar in Atakum. This waste contains mainly vegetable residues (60 %), and then 20 % residues from fruits, 10 % paper, textile and plastic wastes and the remaining 10 % is other kinds of wastes.





Fig. 2. – Public bazaar wastes at the end of the day

These wastes swept out by sanitation workers of Atakum municipal and they are transported to landfill by garbage trucks. These organic wastes from the bazaar are very suitable for composting and biogas production. However, they are not used for those purposes. Although, Samsun Metropolitan Municipality has waste management plant but, they just produce electricity from solid wastes. Organic wastes extracted from public bazaars could be a very good source for organic manure production or even for biogas production if they are combined with agricultural residues in this region (URL 2, 2014).

Evaluation possibilities for public bazaar wastes

Organic materials can positively affects physical, chemical and biological properties of soils (FLAIG ET AL., 1977) in dependence on organic matter content and quality of the materials (CLAPP ET AL., 1986). Agricultural production is intensively realized in Black Sea region. As a consequence of that this region has a very big potential of agricultural residues. The main products in this region are hazelnut, tea, maize, sunflower and cereals. Especially, hazelnut is the major agricultural product in Black Sea region with a yield of 660000 tons per year (FAO, 2012). The shelter of hazelnut is used as a solid fuel in the region (ANON., 1996; ZEYTIN AND BARAN, 2003). Hazelnut processing produces large quantities of husk and shell waste.

Husk is the green part of the hazelnut fruit after it's separated from the shelled hazelnuts. Husk generally holds 3 or more shelled hazelnut fruit. Unfortunately, this husk is not evaluated in any form and it's left in the hazelnut gardens as a waste or it's exterminated by burning it casually under uncontrolled conditions (Fig. 3). Approximately, it's assumed that 200 thousand tons hazelnut husk has been produced per year



from the hazelnut production as an agricultural residue. Having that big potential of hazelnut husk as an agricultural residue in our country, made it unavoidable to utilize it in some way. It can be used for solid biofuel production, in the form of briquettes or pellets (GÜRDIL ET AL., 2014). In this way you just burn the material for heating purposes but, another better solution can be using this potential for composting purposes. It's been reported in some researches that hazelnut husk is very good material for composting (UZUN, 1996; ÖZÇELIK AND PEKŞEN, 2007) and for biogas production.

It's been observed from the literature search that generally the researches were focused on evaluating the shell of hazelnut plant but, no researches were come across for evaluation of hazelnut husk. Although there is a big potential of hazelnut husk residue in our country they are not utilized in any way and they are being removed by burning them randomly under uncontrolled conditions or they are left for decomposition. For this reason, utilization of hazelnut husk residue for composting purposes would be very useful for our country. The content of hazelnut husk is given in table below. The husk covering the shelled hazelnut fruit and random burning of husk on the field under uncontrolled conditions are given in the figures below.

Tab. 2. – The content of hazelnut husk
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Content	Value	
рН	6.05–7.37	
CaCO ₃ (%)	0.55–0.88	
N, (%)	1.96–2.67	
K, (%)	2.99–4.90	
Mg, (%)	0.25–0.41	
Mn, ppm	406–488	
P (%)	0.15–0.37	
Ca, (%)	0.46–1.21	
Fe, ppm	4187–7314	
Zn, ppm	46–78	
Cu, ppm	28–46	
O.M. (%)	65.5–74.9	



(a) (b) Fig. 3. – Hazelnut husk (a), random burning of hazelnut husk residue



RESULTS AND DISCUSSION

Atakum central district has a very rich organic waste potential. 144 tons of solid waste is collected daily in Atakum district. These wastes can be utilized as biocompost or RDF (Refuse Derived Fuel). But, utilization of solid wastes for organic manure production will be more useful than burning and wiping it out without any purpose.

CONCLUSIONS

A mobile public bazaars starts early in the morning and generally ends in the evening after the sun set and the stallholders move to the next bazaar place in that district for the next day. Of course, an important amount of organic residues is left after departing of the stallholders. In this study a research has been done to determine the organic waste potential of mobile public bazaars in Atakum district in Samsun Turkey. It's found that this public bazaar tours 15 different places in a week in Atakum district in Samsun and a total of 1105 stallholders involve in this event in a week. The amount of organic residue from these bazaars is estimated as 23000 kg per week. This resi-

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According to the results of this research just from the Atakum district a total of 22900 kg/week of organic residue is produced from the mobile public bazaars. It's observed that 20700 kg/week of this organic waste could be used for composting or even for biogas production purposes in Atakum district in Samsun Turkey.

due consists of approximately 60 % vegetable wastes, 20 % fruit wastes, 10 % textile, paper and plastic wastes and the remaining 10 % is other kinds of wastes. This means 13800 kg/week of vegetable and 6900 kg/week fruit, paper and textile that is; 20700 kg per week of organic waste could be used for composting or even for biogas production purposes in Atakum district in Samsun Turkey. Implementing horizontal composter for organic manure production or tower bioreactors for biogas production in the public bazaar area could be another solution since they won't have transportation costs. But, this can be done only with the support of municipal and private sector.

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