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TÜBİTAK
ULAKBİM

Proceeding Article

Food Tablet Manufacturing Strategies: Research Data on Effervescent Food Supplements

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Abstract

In this proceeding, food supplement effervescent tablet manufacturing strategies have been carried out. Activated phenolic antioxidants, bioactives and probiotics that have been naturally extracted to be highly potent and easily absorbed by using food tablets. For safety manufacturing; unit dose, temper evident, solid preparations of active ingredient and ingredient mix, powder quality should be monitored. Through the powder forming, the flexible design of dosage forms as technical manufacturing parameters has been considered. Due to supplement manufacturing, consumer demand, routes of drug delivery, oral utilization capacity should be examined. In this context, the bulk density, the tapped density as pre-compression parameters have been confirmed while thickness , hardness, % weight variation, % friability, % in- vitro drug release as post-compression parameters have been carried out as physiochemical properties. Not only chemical profiles, functional properties, but also detailed clinical nutrition data of expressed effervescents.

Keywords: Food Effervescent, Tablet, Strategy, Manufacturing, Quality, Property

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Introduction

Recently, the potential efficacy of the bioactive phenolics from natural sources has been the focus of great attention owing to their health benefits to human health for reduced risk of coronary heart problems and selected cancers. Food tablets as dietary supplements, and/or fortificated foods, food by-product based food powders may be great value-added products for getting healthy bioactive components. The functional constituents of the foods, some preferable functional foods or some functional plant/fruits/ vegetables/spice foods has been standardized as the nutraceutical product and generate under good manufacturing practices (GMPs) (Table 1). Meanwhile these plants have been used in effervescent food supplements such as effervescent food tablets (Tokusoglu 2018; Tokusoglu and Swanson,2015; Tokusoglu and Hall,2011).

Nutraceutical food tablets has been prepared by direct compression method through selected tablet machines and has been manufactured according to established prescription methods. The functional constituents of the foods, some preferable functional foods or some functional plant/fruits/ vegetables/spice foods has been standardized as the nutraceutical product and generate under good manufacturing practices (GMPs). Primarily, a nutraceutical or selected food must be detected for "non-toxic food constituent strategy" by advanced toxicity analyses , then it must be detected and analyzed in terms of health benefits including disease treatment and/or prevention (Tokusoglu 2018; Pham,2015; Prabhakar and Krishna,2011; Stahl,2003)

Table 1. Plant Parts and Their Main Constituents Utilized as Food Products

Plant Parts	Main Constituents	Uses as Food Products
Fruit	Sugars	Fresh fruits
	Vitamin C	Marmelades
	Betalains	Juices
	Polyphenols	Candys
	Fibre	Liquors
		Syrup
Cladodes	Fibre	Salad Vegetable
	Mucilage	Pickles
	Minerals	Flour and Addidives
	Chlorophyl derivatives	
Flowers	Flavonoids	Infusions
	Betalains	Salad Vegetable
Seed	PUFA, MUFA and sterols polysaccharides	Cosmetic products
Root	Flavonoids	Infusions

Activated phenolic antioxidants are derived from the healthiest of plants,fruit, vegetable and/or spices. A wide range of free radicals are neutralized by absorbtion of antioxidant phenolics through effervescents; thence body cells are protected from damage and inflammation.

Uniquely containing activated phenolic antioxidants that have been naturally extracted to be highly potent and easily absorbed by your body in food tablets. Activated phenolic antioxidants are derived from the healthiest of plants,fruit, vegetable and/or spices. A wide range of free radicals are neutralized by absorbtion of antioxidant phenolics through effervescents; thence body cells are protected from damage and inflammation. Effervescence tablet has been proved its utility as an oral delivery system in the pharmaceutical and dietary industries for decades

Food Effervescent Tablet Properties

In effervescent nutraceutical technology; a balanced ratio of acids and carbonates are used for forming a buffer and it has optimal compatibility with the stomach. Gas bubbles occur from the liquid after chemical reaction by adding water; alkali metal bicarbonates and acids (majorly citric or tartaric acids) are utilized to produce effervescence. In effervescent system, when organic acid and bicarbonate get together in the water, CO_2 is released; the solving process is performed in 17–20°C water. The foam of them helps to kill the local bacteria.

Food tablet is described as unit dose, temper evident, solid preparations including one or more active ingredients or whole food powder. Patient and/or consumer demand, routes of drug delivery, oral utilization capacity, the flexible design of dosage forms as technical manufacturing parameters has been considered; also the bulk density (g/ml), the tapped density (g/ml) as pre-compression parameters have been confirmed while thickness (mm), hardness (kg/cm^2), % weight variation, % friability, % in- vitro drug release as post-compression parameters have been carried out as physiochemical properties. Among the alkali sources, sodium carbonate is preferred due to its low cost, high solubility and intensity of reaction than potassium carbonate and bicarbonate.

Polyvinylpyrrolidone (PVP) is used as binder in effervescent; its form is as dry powder or wet forms of aqueous or hydroalcoholic solutions Water-soluble lubricants, colors, flavorings and sweeteners are also added as other ingredients. Mannitol and PEG 6000 are other utilized effective binders. At production stage in tablet machine, relative humidity should be low (≤25%) and ambient temperature should be at room temperature (24±1°C). Tablet forming quality parameters (weight, hadrness, pH, solution time and friability) are inspected.

Dyes or lake color pigments have been added to manufacture colored solutions or products. In effervescent tablets, color stability is also significant. These should be chosen as anhydrous materials. Generally dried flower bud, herbs, chamomile extract may be utilized for this purpose, their percentage may be lower than 1–2%. The remain part of the 0.1–2% in effervescent should be consisted of vitamin E,

squalene, almond oil and cosmetic esters. Besides, PEG-30 castor oil, laureth 4, polysorbate 80 or 85 can be used as emulsifiers.

Probiotics are living microorganisms that confer benefits on the recipient health when administered in appropriate amounts. Probiotics are mainly utilised in nutritional supplements owing to their positive impacts on health (Do Espirito et.al,2011) An adequate selection among different probiotic strains has to be performed to allow manufacturing probiotic-supplemented food and plant consuming products. The aim in administering probiotics is to induce a balanced enteric microbiota, that will have a favorable effect on consumer health. Table 2 shows main probiotic species applied commercially in food and supplements (Anadón et.al,2010) (Table 2).

Table 2. Main Probiotic Species Applied Commercially in Foods and Food Supplements

Lactobacillus	pseudocatenulatus	Leuconostoc
acidophilus	catenulatus	mesenteroides
johnsonii	bifidus	Pediococcus
plantarum	infantis	acidilactici
rhamnosus	longum	Enterococcus
delbruecki	thermophilus	faesium
reuteri	adolescentis	Lactococcus
fermentum	Streptococcus	lactis
Brevis	intermedius	Saccharomyces
lactis	salivarius	boulardii
cellobiosus	cremoris	Propionibacterium
paracasei	lactis	freudenreichii
helveticus	Aspergillus	
Bifidobacterium	niger	
lactis	oryzae	

The strain selection process guarantees the survival of the probiotic microorganisms in the demanded products during its manufacturing and storage, in addition to provide that the product will confer sufficient technological properties (Bansal and Garg,2008).

The food effervescent matrix selected for incorporating probiotic strains should be carefully fortified so that an adequate selection of the probiotic strain-food pair is attained. The compatibility and adaptability among the selected strains and matrixes is principal. Varied lactic probiotic products, chiefly the fermented as well as some non-lactic products, have been improved as fruit effervescent containing probiotics and have been achieving interest in the global marketplace. To define the composition of effervescent probiotics in tablet form, an assessment of the component`s effects on the viability of the microorganisms are performed. Table 3 shows the advantages of probiotic food supplements from different perspectives, in a comparative criterion (Table 3).

Table 3. The Advantages of Probiotic Food Supplements

	Description	
	Supplement	Food
Efficiency (in the product and in GIT)	Transfer of considerably higher numbers of viable probiotics into GIT without considerable loss during the storage. Therefore, they are preferred when specific therapeutic functions are required.	Good to excellent matrix protection for probiotic cells during delivery in GIT.
Hedonism	-	Being consumed for hedonism and comprise sensory attributes.
Product and market development	-	Have higher potential of variation and therefore, product and market development
Simplicity of production (probiotic stability in product during the storage and sensory properties)	Simpler design and formulation from production point of view; namely, the stability of probiotics during the process and storage as well as not having negative effects of added probiotics on sensory properties of final product.	-
Regulatory administration and legislation		Foods are subjected to more difficulties

Prebiotics are food ingredients that induce the growth or activity of beneficial microorganisms (e.g., bacteria and fungi). Approximately 47% of chicory root fiber contain the prebiotic fiber inulin; inulin nourishes the gut bacteria, improves digestion and helps relieve constipation. Tablets including prebiotics have metabolic properties and improves the intestinal ecosystem and colon cells, stimulating the peristalsis, improves lipids and reducing the cholesterol and triglyceride serum levels and also facilitates the mineral salt absorption (Brunser and Gotteland,2010).

The powder blend has been thoroughly mixed with talc and magnesium stearate and compressed into a 300-400 mg tablet using single rotatory punching machine based on tablet processing strategy. Among the trial /serial tablet formulations; "mesir effervescent tablet" could be more efficacious owing to majorly cinnamaldehyde (as v/v) whereas "black mulberry effervescent tablet" could be more beneficial due to the presence of morusin and apigenin phenolic anticarcinogenics and also "mandarin peel effervescent tablet" could be salutary because of its naringenin and hesperidin flavonone phenolic bioactives, also ''tomato peel effervescent tablet" could be important due to its lycopene and anthocyanidin phenolic antioxidants.

In this context, the innovative and conventional food tablet processing strategies has been focused to chemical characterization, functional properties, their unique bioactive features, antioxidative, anticarcinogenic reports of above-mentioned developed tablets. General usage, bioactive materials from plants and probiotic /prebiotic fortification are so important than ordinary supplement materials. Specific applications are more efficient and are required to meticulous manufacturing.

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Proceeding Article

Determinations of Adaptation Level of Wine Grape Varieties in Terms of Climatic Data in Aegean Region

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Abstract

Wine grapes are adapted to a wide range of climate; the best production occurs in regions that meet certain specific climatic conditions. Temperatures during the growing season can affect grape quality and viability. Beneficial climatic conditions will improve the wine's quality. In this study it was aimed that to determine suitable wine grape varieties for the cultivation in some areas of Aegean Region with related to climate requirements. For this reason, long-term climatic data were collected by meteorological stations including Güney, Çal, Menderes, Seferihisar and Urla. In this study heliotermic and hdyrothermic indices were calculated and evaluated for appropriate viticultural practice in this region. It was found that Alicante Bouschet, Carignan, Cabernet Sauvignon in İzmir and Çalkarası, Öküzgözü, Boğazkere, Kalecik Karası, Syrah, Merlot, Cabernet Sauvignon, Chardonay can be adapted and grown well in terms of climatic conditions in Denizli respectively.

Keywords: Wine grape, Growing, Adaptation, Climatic data

Introduction

Viticulture is one of the important agricultural branches regarding to area that it covers and the income that it provides to the national economy in Turkey. Turkey is among the important viticulturist countries with its 478.000 ton of viticulture field and 4, 26 millions of ton of grape production. (5th one for the area and 6th one in the production) 52.9 % of table grape, 36.3% to be dried, 10.8 % for wort and wine (Anonym, 2010).

Güney and Çal counties in Denizli provinces; Menderes, Seferihisar and Urla counties in İzmir provinces of the Aegean region, being the study area has 329 km2 of total area. Wine grape area of the examined study area is 8720 ha and total wine grape production amount is
48750 tons. (Table 1) Çal county has the largest viticulture field (4000 ha) and it is Güney county that has the furthest production amount (21250 tons). Average yield of the study area is 56.34 kg / ha (Table 1)

Geographic features of the countries

Urla

Urla county is surrounded by Güzelbahçe in the east, Alaçatı and Çeşme in the west, İzmir Bay in the North andAege-an Sea and Seferihisar county in the South. County lands, being consist of undulating plateaus, take place in the west of İzmir, in the middle of Karaburun peninsula. There is Karan Mountain in the southwestern part of the country. The height increases by going towards west and east from Urla. The highest point is Akdağ in the Karaburun Peninsule (1,218 m). The height passes 1,000 m in Kızıldağ, known as Çatalkaya, in the east of Urla.

Seferihisar

Having a coast to the Aegean seas, Centrum of the Seferihisar County is 5 km inland. Seferihisar is situated in the southeastern coasts of Urla Peninsula (1695 km) which is the biggest peninsula reaches towards Aegean Sea.

Menderes

There is İzmir in the southwest, Gaziemir County in the North, Torbalı county in the east, Aegean sea in the South and Seferihisar county in the west of the Menderes county. The county generally consists of plateaus. There are mountains in the North and west. The highest point in the North is Çatalkaya. It is Efemçukuru plain that lies from here to the west.

Çal

There is Uşak city and Bekilli County in the north, Çivril in the northern east, Baklan in the east, Honaz in the South and Güney County in the west of Çal County, being in the northern west of Denizli.

Güney

Güney County is surrounded by Çal in the east, Buldan in the west, Uşak-Eşme and the villages of the Centrum in the north. Menderes River passes by the middle of the county being mountainous from place to place; it is partially covered by forests.

Turkey has a very rich genetic potential as it is the gene center of grapevine. The climatic conditions have a very important role in the constitution of the maturity, yield and quality values of the grape variety. The criterias determining the relations between the Vitis vinifera and the climate and if the substrate is convenient for the grape vine farming cultivation have been presented in the studies (Branas, 1974; Constantinescu, 1967; Huglin, 1986; Işık, 1988)

Specific temperature data is the basic information for any grape variety. Reaching to the phonologic phases, key for any varietys, is possible when 10 °C heat accumulation is used as base. (Van Leeuwen et all, 2008). Each variety of grapes needs a specific heat accumulation starting from the beginning of the vegetation period until the maturity period. (Winkler et all., 1974). Maturity period of grapes is closely connected to the local climate conditions and phenological growth of the variety. Phenological growth is a genetic feature varies from variety to variety (Van Leeuwen et all, 2008).

It has been detected that effective heat summation demand is between 1210 0C (Cardinal) and 1500 0C (Müşküle in Ankara conditions; 1033 0C (Uslu) and 1538 0C (Alphonse L.) in Mediterranean conditions (Uzun, 19969). If a grape variety cannot mature its grape in the demanded level in ecology, it means that it cannot be recommended to be cultivated for hat region

Oraman (1970), has emphasized in the study that he has performed that regular sunshine duration is important as well as the temperature and that the annual sunshine duration of a grape wine should not be less than 1300 hours. According to Çelik et all (1998a) this value should not be less that 1500-1600 hours in an economical grape wine cultivation and that the vegetation duration must be more that 180 days.

Other conditions apart from the vegetation are also important in the grape variety choice of regions (especially in the regions with frost risk). The resistances of the grape varieties to the lower temperatures are very different. Accordingly, it has been detected in the studies held that if the temperature is lower than-20,5 oC in 3 or less times 10 years, that region is convenient for the grape wine cultivation (Çelik et all. 1998a)

Not only the heat accumulation but also sunshine and amount of precipitation should also be taken into the consideration for the convenience to the environment during the vegetation period of a grape variety. According to (Branas, 1974;

Constantinescu, 1967; Huglin, 1986; Karantonis, 1978). Karantonis (1978) the temperature values of the environment is not the unique important factors for the grape cultivation; what is really important is the balance between the temperature and sunshine. It is stated that the heliothermic proportion (X*12-3/H*10-3) value 1 or higher environments are convenient for the grape cultivation.

The method of detecting the varieties that might be convenient in a specific area by studying the relations between Grape varieties and environmental conditions (climate, land) has been applied in many countries of the world. The grape varieties that might be cultivated according to the climate data of the Aegean Region and Marmara Region have been detected with the studies that have been held in our country. To improve the wine grape cultivation in Aegean Region, the climate factors of the region have seen to have accorded with the region. The studies regarding the detection not only the domestic wine grape but also qualified wine grapes of foreign origins have gained a lot importance in the recent years.

MATERIAL AND METHOD Material

In this study was the first group material was provided wine grape growers in Denizli (Güney and Çal) and İzmir (Menderes, Seferihisar, Urla) provinces of the Aegean Region. Other materials consist of the climatic data (temperature, rain etc) of long years provided from the meteorological stations of the counties.

Method

Denizli and İzmir, two of the provinces having an important place and varieties in the wine grape production in the Aegean Region, have been the sampling area. The samples had been taken from Seferihisar and Urla in İzmir city and Güney and Çal in Denizli. The counties have been chosen so as to provide 50% of the wine grape production. 40 Wine grape growers from each county have been interviewed with telic sampling method.

'Effective heat summation (EHS)', being one of the efficient parameters to determine the needs of the wine grape varieties in the specific region, has been calculated. In the calculation of this value expressed as Day-Temperature, 10°C (threshold temperature), which is accepted as the average temperature when the grape wine growth starts, has been selected as baseline (Çelik and, 1998). The assessments have been formulated as the date and day when the average of many years in several stations for 10°C, threshold of the grape vine growth, reaches to threshold temperature (end date and day of the vegetation) and the accumulation of the temperatures that the average temperature for each day in this period is higher that the threshold temperature.

$$EHS = \sum(T-Te)$$

EHS = accumulation of the effective temperature (°C-day)

T= daily average temperature (°C) Te: threshold temperature (°C)

Hydrothermic indices was calculated to determine the possibility of supplying the water need of the grape vine from the natural ways. In this calculation it will be determined that if the water consummation related to the temperature change of the varieties in the May-July period and rain, can be provided from the natural ways.

Hydrothermic indices: $(\sum P*10)/ \sum T°$

$\sum P$ = Total rain (mm),

Heliothermic indices have been calculated to determine the balance between the temperature and sunshine for the grape production.

Heliothermic indices: X*12-3/H*10-3

X: accumulation of the effective heat temperature during the vegetation period

H: total hours of days (daytime)

RESULT AND DISCUSSION

Denizli (Güney and Çal) and İzmir (Menderes, Seferihisar, Urla) two of the cities where important wine grapes are being produced in the Aegean Region, have been the study area. topographic conditions of the study area. The effects of the variety of the terrestial level, annual total rain and altitude difference have been observed. Average temperature value of the study are for many years have been measured   between 7.8 0C (Menderes) and 14.5 0C in Çal (Table 2). Extremely high temperature values are between 42.4 0C (Seferihisar) and 39.4 0C (Çal). Peak value of the low temperatures varies between -10 0C (Çal) and -4.3 0C (Urla) (Table 2)

When we assess the bio climatic values in the climatic surface in the regard of productions of the wine grape varieties (Table 3) it has been detected that the vegetation period starts between 7 March (Menderes) and 6 April (Çal). It has been understood that the potential vegetation duration was between 205 days (Çal) and 255 (Seferihisar); and the total temperature was between 4154 (Çal) and 6425 (Seferihisar).   Heliothermic indices, presenting the combination of the vegetation days and temperature factor, were high in all counties examined in the scope of the wine grape cultivation and that there were important differences between counties. The heliothermic indices values are between 5.79 (Çal) and 9.15 (Seferihisar) and these values are appropriate for the cultivation of the varieties of the wine grape cultivation in the examined area (according to the vegetation duration and Effective temperature). A parallelism has been found between the counties in terms of precipitation amount and dispersion in the vegetation period. It is seen that wine grape cultivation is possible in the examined regions without watering in the wine grape growing.

As a result of the assessment made in Aegean region it was seen that the EHS was 3875 0C (Table 3) and the temperature need of Alicante B grape variety was 1398 0C (Table 4) and temperature need of Carignan grape variety was 1547 0C . Total efficient temperature in Urla county was 3605 and the needs of grape varieties were as follows: Cabernet Sauvignon 1382 0C, Syrah 1399 0C and Alicante B. 1398 0C (Table 4). EHS of Güney county in Denizli was 2390 0C and the temperature needs of the varieties are as follows : Syrah (1399 0C), Kalecik Karası (14210C), Boğazkere (1525 0C), Merlot (1402 0C), Öküzgözü (1542 0C), Cabernet Sauvignon (1382 0C), Çalkarası (1395 0C) and Sultani Çekirdeksiz (1380 0C) and the temperature need of these grape varieties demand a lower total temperature than these values. The total efficient temperature of Çal county was 2104 0C and the total temperature needs of the varieties were as follows: Öküzgözü 1542 0C, Çal Karası (1395 0C), Boğazkere 1525 0C, Merlot1402 0C and Sultani Çekirdeksiz (1380 0C)(Table 4)

According to the climatic data of the meteorology station and to the assessment made with the wine grape growers it has been detected that was found that Alicante Bouschet, Carignan, Cabernet Sauvignon in İzmir and Çalkarası, Öküzgözü, Boğazkere, Kalecik Karası, Syrah, Merlot, Cabernet Sauvignon, Chardonay can be adapted and grown well in terms of climatic conditions in Denizli respectively.

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Table 1: Surface area of the counties (km2), viticulture area (ha),
production (ton) and yield (kg/da) values (Anonym, 2010)

Counties	Surface area of the counties (km^2)	Viticulture area (ha)	Production (ton)	Yield (kgh.a)
Menderes - İzmir	775	965	7720	80
Seferihisar - İzmir	371	325	2600	80
Urla - İzmir	728	80	2200	15
Güney - Denizli	534	2900	21250	69.8
Çal - Denizli	1521	4000	14800	37
TOTAL	3929	8270	48570	281.8

Table 2: Climatic data in the Study Area

STATIONS	LATITUDE (^{0}N)	LONGITUDE (^{0}E)	ALTITUDE (m)	AVERAGE ANNUA TEMPERATURE (^{0}C)	AVERAGE ANNUAL RAINFALL (kg/m^2)	TERRESTIAL LEVEL (^{0}C)	MAX. TEMPERATURE (^{0}C)	MIX. TEMPERATURE (^{0}C)
SEFERIHISAR - İZMİR	38°11'	26° 50'	28 (CENTRAL) 145 (AVERAGE OF VILLAGES)	16.3	582	18.3	42.4	-6.2
MENDERES - İZMİR	38°16'	27°08'	53 (CENTRAL) 143 (AVERAGE OF VILLAGES)	17.8	590	18.6	40	-5.4
URLA- İZMİR	38°19'	26° 45''	75 (CENTRAL) 177 (AVERAGE OF VILLAGES)	17.2	535	18.1	41.1	4.3
GÜNEY-DENİZLİ	38° 09'	29° 04'	847(CENTRAL) 795 (AVERAGE OF VILLAGES)	15.3	514	21.7	37.7	-8.7
ÇAL - DENİZLİ	38° 05'	29° 23'	911 (MERKEZ) 858 (AVERAGE OF VILLAGES)	14.5	477	22.4	39.4	-10.4

Table 3: Potential bioclimatic values of the study area in terms of wine grape cultivation (Daily average temperature ≥10 0C Period) Hydrothermal

STATIONS	BUDBURST (DATE)	TIME (DAYS)	∑T (C)		AVERAGE TEMPERATURE (C)	RAINFALL (mm)	HELIOTERMIC INDICE	HYDROTERMIC INDICE (May- July)
			TOTAL	EFFICIENT				
SEFERIHISAR-İZMİR	11.3	255	6425	3875	25.2	207.9	9.15	0.85
MENDERES-İZMİR	7.30	254	6042	3502	23.7	245.2	8.40	0.72
URLA - İZMİR	10.3	252	6125	3605	24.3	227.3	7.53	0.83
GÜNEY-DENİZLİ	2.40	207	4460	2390	21.5	210.7	6.49	0.50
ÇAL-DENİZLİ	6.40	205	4154	2104	20.2	212.0	5.79	0.45
DIFFERANCE	22	50	2271	1771	50	34.5	3.36	0.40

Table 4: Features of some grape wine varieties and their temperature needs (Çelik at all, 1988 a)

Grape Varieties	Temperature Needs C)
Boğazkere	1525
Öküzgözü	1542
Wine Kalecik Karası	1421
Sultani Çekirdeksiz	1380
Cabernet Sauvignon	1382
Merlot	1402
Syrah	1399
Carignan	1547
Alicante B.	1398
Bornova Misketi	1250
Çal Karası	1395

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Proceeding Article

The Relationship Between Emotional Eating Behaviour and Nutritional Status in Adult Individuals: Istanbul Case Study

Destegül Gizem[1]*,   Gök İlkay[1]

Abstract

In this study, it was aimed to determine the relationship between emotional eating levels of individuals and food and beverage choices. For the purpose of collecting research data, Personal Information Form and Food Consumption Frequencies Form and Emotional Eating Scale were used. The sample of the study consists of 127 women and 180 men in total 307 participants in Istanbul. Independent sample t-test and one-way variance (ANOVA) analyzes were conducted to determine whether Food Consumption Frequencies and Emotional Eating levels vary according to demographic variables. Correlation analysis was conducted to find the relationship between the food and beverage choices of the participants and their Emotional Eating levels. As a result of the research, a significant relationship was found between food and beverage choices and emotional eating levels. According to the research results; It has been revealed that all participants in the central districts of Istanbul Province exhibit uncontrolled eating behavior. Explanatory factor analysis (EFA) of the scale used in the study was made to determine its suitability to the discovered structure and it was concluded that it was suitable. It has been revealed that Emotional eating is the dimension that explains the eating behavior scale the most.

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Introduction

Factors affecting people's eating behavior in different varieties may vary according to the place where these people live, their gender, economic and cultural conditions, the person's own perception, the foods he / she observes, the experiences about the foods and the nutritional status he has made a habit. The tendency that creates these thoughts of the person is expressed as "Eating Behavior". (Altıntaş & Özgen, 2017). It is thought that environmental effects that put the person in a state of eating more than his / her own needs, some genetic sensitivities that stimulate excessive eating, and sedentary lifestyle lead to the epidemic of obesity (Wadden et al., 2002).

The sense of nourishment is no less important than other feelings people experience. People, like other living things, need nourishment in order to survive. Bruch stated that eating disorders are the main point of problems such as difficulty in understanding the emotions that individuals encounter in daily life and in distinguishing emotions (emotional expressions and responses to the sensations of internal organs and understanding them) (Bruch, 1964). In various studies, it has been observed that the cause of an individual's eating disorder is related to his mood. It has been acknowledged for many years that the emotional changes experienced by the individual affect the food choices, followed by the behavior in eating, and finally the emotions (Levitan & Davis, 2010).

It is observed that people with eating disorders often feel emotionally hungry. However, the need for approval from different people, frequent depressive moods, anxiety experienced by the individual, and low self-esteem are prominent features of eating habits (Nolen-Hoeksema, 2004). In an experimental study, a comparison was made between individuals with eating disorders and those without this disorder. As a result of the research, it has been found that people with emotional eating disorders tend to consume foods with more energy (Konttinen et al., 2010b). In another similar study, it was observed that people with high emotional eating disorders prefer foods with high carbohydrate value, such as cake, cake and biscuit more (De Lauzon et al., 2006). Obese individuals, children and adolescents are considered to be in the high risk group for emotional eating disorders. High amount of fat storage in the body, excessive and malnutrition can cause obesity. Mental, physical and biological problems may occur in individuals with obesity. These individuals' quality of life decreases and they are exposed to psychological, genetic and social influences. Briefly, a chronic energy metabolism disorder can be called

obesity (Agras et al., 2004; Aronne, 1998; Gedik, 2003; Klein et al., 2004; Maffeis, 2000; Söderlund at al., 2009; Figueredo & Yiğit, 2006). Obese individuals have been found to use food to suppress the emotional changes they experience and the problems they encounter and to reduce the stress they experience. It has been reported that they show suppressing or reducing hunger behaviors. In a study conducted, normal individuals were compared with obese individuals, and in this comparison, it was concluded that obese individuals in stress and anxiety have higher emotional eating values than normal individuals (Oliver et al., 2000; Fay & Finlayson, 2011; Adriaanse et al., 2011). In the study conducted by Laitinen et al. (2002), it was concluded that food consumption caused by the stress experienced by people with obesity caused weight gain. However, as a result of different studies, it has been determined that individuals with normal and healthy weight also try to regulate the stress they experience by eating (Macht, 1999; Macht et al., 2002; Macht & Simons, 2011).

It is stated that the act of eating has psychological importance along with its biological need (Özgen, Kınacı, & Arlı, 2012: 32). When people feel psychologically under pressure, when they are stressed, when they are angry, sad,

joyful, or so on. In situations, they may exhibit different eating behaviors than the eating behavior they normally eat. It is stated that there are many studies on the effect of psychological / emotional states on people's eating behaviors (Bellisle et al., 1990; Macht, 1999; Macht and Simons, 2000; Canetti et al., 2002; Laitinen et al., 2002; Macht et al., 2002; Adam & Epel, 2007; Torres et al., 2007; Macht, 2008; Groesz et al., 2012). These studies state that especially stress and negative mood can both increase and decrease food intake and eating. For this reason, psychological factors are also taken into consideration while evaluating the eating behaviors of people. As a result of these studies; It is stated that the concepts of cognitive limitation, emotional eating and uncontrolled eating behavior have emerged (Seven, 2013: 3).

Method

This research was carried out to determine the eating behaviors of people living in Istanbul and its central districts. It aims to determine the sub-dimensions that affect the eating behavior of individuals, to determine the most effective one among the determined dimensions, and to reveal whether there is a significant difference between demographic characteristics and eating behaviors.

Research Hypotheses

According to the basic assumption of the research; There are some factors that affect the eating behaviors of the participants. Within the scope of this basic assumption, the problem and hypotheses of the research were determined.

H. (Hypotheses)1= There is a significant relationship between the age variable of the participants and their food consumption frequency.

H.2 = There is a significant relationship between the age variable and emotional eating scale and its sub-dimensions.

H.3= There is a significant relationship between the participants' gender variable and their food consumption frequency.

H.4= There is a significant relationship between the gender variable and emotional eating scale and its sub-dimensions.

H.5= There is a significant relationship between the marital status variable and the frequency of food consumption.

H.6= There is a significant relationship between the marital status variable and the emotional eating scale and its sub-dimensions.

H.7= There is a significant relationship between the education level variable and the frequency of food consumption.

H.8= There is a significant relationship between the education level variable and the emotional eating scale and its sub-dimensions.

H.9= There is a significant relationship between occupation variable and food consumption frequency.

H.10= There is a significant relationship between occupation variable and emotional eating scale and its sub-dimensions.

H.11= There is a significant relationship between monthly income variable and food consumption frequency.

H.12= There is a significant relationship between the weight of the participants and their food consumption frequency.

H.13= There is a significant relationship between participants' weight and emotional eating scale and its sub-dimensions.

H.14= There is a significant relationship between the height of the participants and their food consumption frequency.

H.15= There is a significant relationship between the participants' heights and the emotional eating scale and its sub-dimensions.

H.16= There is a significant relationship between BMI values of the participants and their food consumption frequency.

H.17 = There is a significant relationship between BMI values of the participants and emotional eating scale and its sub-dimensions.

H.18= There is a significant relationship between the frequency of food consumption and emotional eating scale and its sub-dimensions.

In order to determine the distributions according to demographic variables, frequency (f) and percentages (%) were calculated. Item totals and averages of the dimensions of the scales were found. Means and standard deviations were calculated. Independent samples t-test and one-way analysis of variance were conducted to determine whether the Food Consumption Frequencies and Emotional Eating levels vary according to demographic variables. Correlation analysis was conducted to find the relationship between the Food Consumption Frequencies of the participants and their Emotional Eating levels. The significance level (Sig.) Was accepted as 0.05 in the tests performed and values below 0.05 were found to be significant.

In the Anova test, the variance between groups is measured due to the differences between the means of the groups. The greater the variance between groups, the more likely the group averages are considered different from each other. Within-group variance refers to the variance between values in each group and measures variability due to random causes. The greater the intragroup variance, the less likely the group averages will differ from each other.

Results and Discussion

The findings and comments of the research, which aims to determine the socio-demographic characteristics of the participants, the determination of eating behaviors, the factors that affect the determination of eating behaviors, and the verification of the three-factor eating behavior scale, are included.

127 (41.4%) of the participants participating in the study are female and 180 (58.6%) are male participants. 181 of the participants (59.0%) are between 18-30 years old, 40 (13.0%) are between 31-40 years old, and 86 (28.0%) are between 41 years old and above. 108 of the participants (35.2%) were married, 199 (64.8%) were single participants. 39 (12.7%) of the participants in the study were primary school graduates, 41 (13.4%) were secondary school graduates, 49 (16.0%) were high school graduates, 162 (52.8%) were university graduates. 16 of them (5.2%) have a master's degree.

36 (11.7%) of the respondents were public employees, 19 (6.2%) self-employed, 14 (4.6%) housewives, 87 (28.3%) private sector Its employees are 39 (12.7%) retired and 112 (36.5%) students. 63 of the participants (20.5%) between 1600 TL and below, 84 (27.4%) between 1601 TL and 2500 TL, 73 (23.8%) between 2501 TL and

3500 TL, 53 (17.3%) have a monthly income between 3501 TL and 4500 TL, 18 (5.9%) between 4501 TL and 5500 TL, and 16 (5.2%) have a monthly income of 5501 TL and above.

The majority of the study is male, single, university graduate, student and individuals with a monthly income between 1601 TL and 2500 TL.

The results regarding the Socio-Demographic characteristics of the individuals included in the study are shown in Table 1.

The basic procedure to examine the conformity of the scale scores to the normal distribution of the data used in the study was determined to be between +3 and -3 and show a normal distribution of skewness and kurtosis values. The kurtosis and skewness values obtained from the scale scores between +3 and -3 are considered sufficient for normal distribution (Groeneveld & Meeden, 1984). As a result of the Independent-Samples t-Test conducted to determine whether there is a significant relationship between the gender of the participants participating in the study and self-control, which is the sub-dimension of the emotional eating scale, a significant difference was found between the two variables (p =, 003). According to the perceptions of male and female participants,

the level of self-control is not at the same level.

As a result of the Independent-Samples t-Test conducted to determine whether there is a significant relationship between the gender of the participants participating in the study and the stimulus, which is the sub-dimension of the emotional eating scale, a significant difference was found between the two variables (p =, 003). In this situation, according to the perceptions of the female and male participants, the control levels against the stimulus are not at the same level.In order to determine the differentiation status of the Emotional Eating Scale and Sub-Dimension levels of the people participating in the study, the t-Test was performed and the results are shown in Table 2.

Factor analysis regarding the eating behavior scale was applied. KMO criteria and Bartlett Test statistics were evaluated to verify the suitability of the factor analysis. KMO criteria, factor analysis explained whether the questionnaire was sufficient or not. It was observed that the value of KMO was between 0 and 1. It is known that the closer the value is to 1, the more suitable it is for the sample for factor analysis. The KMO value was determined as 0.897 at the end of the research. It can be said that the sample is very suitable for factor analysis. Indicates whether variables are

interdependent and Bartlett is a measure of sphericity. Bartlett Test Statistics were found as 9112.411 and p value 0.000 as a result of the research. The factor analysis results of the research are shown in Table 3.

When the results of the factor analysis were observed, 12 of the 30 items (1,2,3,4,5,6,9,10,11,12,13,18) in the Emotional Eating Scale were based on the 1st factor and 10 (7,8) , 14,15,16,17,19,20,21,22,30) to factor 2, 5 to factor 3 (23,26,27,28,29) and 2 to factor 4 (24,25). are loaded. The 4 factors are named according to the ingredients they contain:

1.Factor: Eating in Tense Situations
2.Factor: Eating to Cope with Negative Emotions
3.Factor: Self-Control
4.Factor: Control Against Stimulus

In order to cope with negative emotions, the seventh item in the eating factor is "I use food as a source of reward and pleasure", and the eighth item is "I eat when I am not hungry". For this reason, it was observed that the seventh expression adapted more to the control factor and the eighth expression to the self-control factor. The sixth expression in the eating factor in stressful situations is "I feel guilty when I exaggerate the food" and the 11th statement "I want to eat if I am depressed or upset about something" is switched to the eating factor to cope with negative emotions. It is specified.

Correlation analysis was performed to determine the frequency of food consumption of the participants participating in the study and their differentiation according to emotional eating scale and sub-dimension levels, and the results are shown in Table 5.

The statistical evaluation of the relationship between the food consumption frequency of the participants participating in the study and the emotional eating scale sub-dimensions is included. A significant relationship was found between the food consumption frequency of the participants and their responses to the emotional eating scale (p =, 000). A significant relationship was observed between the food consumption frequency of the participants and their responses to the eating sub-dimension in stress situations (p =, 000). A significant relationship was found between the food consumption frequency of the participants in the study and their responses to the eating sub-dimension in order to cope with negative emotions (p =, 000). A significant relationship was observed between the participants' food consumption frequency and their responses to the sub-dimension of self-control (p =, 000). A significant relationship was observed between the food consumption frequency of the participants and their responses to the stimulus versus control sub-dimension.

The variance test and its results are shown in Table 6 to determine the differentiation status of the participants' emotional eating scale and sub-dimension levels according to their height.

As a result of the variance test conducted to determine whether there is a significant relationship between the height of the participants participating in the study and the emotional eating scale and its sub-dimensions, a significant difference was found between the variables (p =, 000). In other words, it was observed that emotional eating levels were not at the same level according to the perceptions of the participants with different heights.

Conclusions

Emotional eating has been the subject of research only a few years ago. However, it is known that it has not yet entered the DSM-5 diagnostic criteria system. In order for the emotional eating disorder style to be included in the DSM-5 diagnostic criteria classification system, many researches and studies are needed on this subject. As a result of the research, it was determined that excessive food consumption behavior in the face of negative emotions experienced by individuals is more common in obese, women with eating disorders, individuals with a normal weight but dieting, and adolescents.

Emotional eating is an issue that should be considered in terms of metabolic syndrome, considering that individuals with obesity and dieting may also have depression and different kinds of psychiatric disorders. There is no accumulation of literature on this subject in our country, except for a few theses and reviews. However, contrary to our country, it is known that studies on this issue abroad have increased in the last few years. In our country, there is a need for scientific studies, especially in risk groups in terms of emotional eating, and scale development studies to evaluate emotional eating in a short and quick way. With the increase in resource knowledge in this area, it can be determined in which cognitive areas individuals can be supported, what can be taught as methods of coping with stress, and a road map can be drawn for preventive health practices.

It is thought that emotional eating behavior differs in men and women because of the predisposition of women to more depression and anxiety disorders. The significant difference found in the cognitive limitation dimension is that it can be said that men and women think quite differently about dieting, not gaining or losing weight. Therefore, it is thought that a statistically significant difference was found. It can be said that men and women have the same thoughts about uncontrolled eating. Most of

the participants in the study are male, single and individuals between the ages of 18-30. Most of the participants in the research are in the income range of 1601-2500 TL.

According to the simple linear regression analysis results made in the research; It emerged as the emotional eating dimension that explains the change in the scale of eating behavior at the highest level. Emotional eating dimension was found to have the greatest effect on the eating behavior scale.

Suggestions

The eating behaviors of all people in the central districts of Istanbul can be determined.

City-Rural, Coastal-Inner, Aegean-Black Sea and East-West etc. comparative studies can be done.

By adding the quality of life scale to the study, it can be measured whether the eating behaviors of the individuals affect their quality of life.

Eating behaviors of people living in Istanbul can be determined by using the eating behavior scale.

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Table 1. Socio-Demographic Characteristics of Participants

Socio-Demographic Features	n	%	Socio-Demographic Features	n	%
Gender			**Education level**		
Male	180	58,6	Primary school	39	12,7
Female	127	41,4	Middle School	41	13,4
Total	307	100,0	High school	49	16,0
Age			University	162	52,8
18-30	181	59,0	Post Graduate	16	5,2
31-40	40	13,0	Total	307	100,0
41 and above	86	28,0	**Job Distribution**		
Total	307	100,0	Public Employee	36	11,7
Marital status			Self-employment	19	6,2
Married	108	35,2	Housewife	14	4,6
Single	199	64,8	Private sector employee	87	28,3
Total	307	100,0	Retired	39	12,7
Income rate			Student	112	36,5
1600 TL and below	63	20,5	Total	307	100,0
Between 1601 TL and 2500 TL	84	27,4			
Between 2501 TL and 3500 TL	73	23,8			
3501 TL and 4500 TL between	59	17,3			
4501 TL and 5500 TL between	18	5,9			
5501 TL and above	16	5,2			
Total	307	100,0			

Table 2. The Relationship Between the Gender Variable and the Emotional Eating Scale and Its Sub-Dimensions

Group Statistics	Gender	n	Average	Std. Deflection	Std. Average Error	Sig.
Emotional Eating Scale	Female	127	3,2344	,86361	,07663	,314
	Male	180	2,4639	,87019	,06486	
Eating in Tense Situations	Female	127	3,2105	1,10813	,09833	,493
	Male	180	2,3086	1,07068	,07980	
Eating to Cope with Negative Emotions	Female	127	3,3339	,98868	,08773	,860
	Male	180	2,4217	,97484	,07266	
Self-Control	Female	127	3,0315	,46468	,04123	,003
	Male	180	2,4981	,51362	,03828	
Control Against Stimulus	Female	127	3,3963	,99268	,08809	,000
	Male	180	3,1056	1,22435	,09126	

Table 3. Explanatory Factor Analysis

Item No	Factor 1	Factor 2	Factor 3	Factor 4
1	,797			
2	,873			
3	,847			
4	,884			
5	,915			
6	,479			
7		,838		
8		,527		
9	,944			
10	,940			
11	,901			
12	,917			
13	,946			
14		,704		
15		,959		
16		,809		
17		,828		
18	,874			
19		,942		
20		,884		
21		,840		
22		,885		
23			,853	
24				,750
25				,618
26			,636	
27			,818	
28			,720	
29			,821	
30		,723		

Table 4. Edited Factor Table

Factor	Matter	Questions	Load. Value
1	1	In difficult times, I am more prone to unhealthy behavior	,797
1	2	I eat more if I feel pressured	,873
1	3	When I'm stressed I eat more	,847
1	4	If I feel helpless I want to eat	,884
1	5	I eat more if my work gets busy	,915
1	6	I feel guilty when I overdo the food	,479
2	7	I use food as a source of reward and pleasure	,838
2	8	I eat when I'm not hungry	,527
1	9	I want to eat if something doesn't go the way I expected	,944
1	10	I want to eat more when I feel uncomfortable	,940
1	11	If I'm depressed or sad about something, I want to eat	,901
1	12	If I feel anxious or anxious about something I would like to eat	,917
1	13	When I'm bored I want to eat	,946
2	14	I want to eat when I feel alone	,704
2	15	I want to eat when someone upset me	,959
2	16	I would like to eat in similar situations that remind me of a painful experience	,809
2	17	When I'm scared I want to eat	,828
1	18	When I'm nervous I want to eat	,874
2	19	I would like to eat if I feel bad or guilty about something I do	,942
2	20	I would like to eat if I feel hurt	,884
2	21	When I'm excited I want to eat	,840
2	22	I eat to cope with my problems	,885
3	23	I feel my bait is out of my control	,853
4	24	If I see something delicious and smell it, I want to eat it	,750
4	25	If I see other people eating I would like to eat too	,618
3	26	I have willpower when it comes to diet	,636
3	27	I cannot stabilize diet in weight control	,818
3	28	I can resist delicious food	,720
3	29	If insisted on eating I can say no	,821
2	30	Food helps me deal with my emotions	,723

Table 5. The Relationship Between Food Consumption Frequency and Emotional Eating Scale and Its Sub-Dimensions

Correlation								
			Food Consumption Frequency	Emotional Eating Scale	Eating in Tense Situations	Eating to Cope with Negative Emotions	Self-Control	Control Against Stimulus
Food Consumption Frequency	Correlation coefficient		1,000	-,798**	-,799**	-,743**	-,399**	-,529**
	Sig. (2-tailed)		,000	,000	,000	,000	,000	,000
	N		307	307	307	307	307	307
**. The correlation is significant at the 0.01 level (2-tailed).								
*. The correlation is significant at the 0.05 level (2-tailed).								

Table 6. The Relationship Between Participants Height and Emotional Eating Scale and Its Sub-Dimensions

		Total Squares	df	Mean Square	F	Sig.
Emotional Eating Scale	**Between groups**	209,833	10	20,983	97,215	,000
	Within Groups	63,890	296	,216		
	Total	273,723	306			
Eating in Tense Situations	**Between groups**	324,391	10	32,439	99,922	,000
	Within Groups	96,094	296	,325		
	Total	420,486	306			
Eating to Cope with Negative Emotions	**Within Groups**	274,338	10	27,434	100,386	,000
	Within Groups	80,892	296	,273		
	Total	355,230	306			
Self-Control	**Between groups**	66,351	10	6,635	67,122	,000
	Within Groups	29,260	296	,099		
	Total	95,611	306			
Control Against Stimulus	**Between groups**	271,295	10	27,129	62,987	,000
	Within Groups	127,491	296	,431		
	Total	398,786	306			