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THE TRADITIONAL ALEXANDRIA SEMIDRY SAUSAGE 1- QUALITY ATTRIBUTES OF MARKET PRODUCT

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SUMMARY

The examined market traditional Alex. semidry susage revealed that; the accepted product appearance is the marble cure. Deviations were, over cure, fading, browning, foreign colours, mouldy, slimy and greening of the core. The normal flavour reported is the fleshy cure one. But rancid, putrid and sour flavour were reported as deviations.

The main technical defect reported was the fat smearing, which is a mincing error. The ripening/ drying defects reported were softening, collapsing, case hardening and joint sours beside irregular curing.

The tests applied for freshness attributes evaluation revealed that a pH value lower than 4.8 is indicative of undesirable sourness. The malonaldehyde content/gm of extracted fat is a reliable test for fat oxidation evaluation in the product, and a value higher than 40ug/gm fat is to be considered border-line.

The chemical analysis of the product revealed a reasonable fat and moisture content, but unnecessary high carbohydrate on the expense of the protein.

The microbiological analysis of the market samples revealed an aveage count of $1.1X10^7$, $1.5X10^3$, $3.7X10^3$, $1.8X10^3$ and $1.2X10^2$ for the total aerobic, anaerobic, Staph.aureus, enterobacteriaceae, mould & yeast counts respectively. Salmonellae failed detection while E.P *E.coli.* could be isolated from 7 samples.

The deviation from the accepted orgamoleptic attribute had been discussed. The impact of oxidized fat, overdosing of nitrite as well as the pathogenic *E. coli* to man health had been high lighted.

INTRODUCTION

The Alex. sausage is a semidry naturally fermented air dried beef product, natural beef rounds are the traditional used. The product is usually presented in a double or triple chains of fingers or in a ringform. Sometimes being smoked but not cooked . Most of the market presentation is done hanged at room temperature. The product is long known in Cairo, Alexandria and Port-Said. Its production was initiated by some Egyptian citizens of Armenian origin (over 100 years ago), and still some members of these families beside other Egyptians do the job.

Nouman (1997) described the processing operation as follows; fresh frozen beef i.e. not long stored with about 20% fat, or lean beef and fresh beef fat are better used. Meat and fat are minced frozen at 4mm. The mincing set used must be enough sharp to avoid squeezing. In a baddle blender; meat is placed, a portion of a previous meat mix is sometimes added ; then the curing salts including; common salt, nitrite, ascorbic and sugars but no phosphates, no water were added. Tne mix is then blended for few minutes, spices are then added, blended again but not to develop binding. Some processors fill the mass in a curing vats overnight in a cold chamber then being filled next morning. Ripening is made by keeping the the stuffed product over night inside the plant then left to dry under a shade in the open. During the ripening/ drying time a gradual pH reduction as well as gradual loss of moisture from the sausage occur. Within a couple of days complete ripening develop which is noted by firmness of the product as well as the characteristic cure colour and aroma of the product. The sausage is them dispatched. Beside the firrm tixture and the specific cure colour and aroma of the product, the cut surface of the sausage characterised by the marble fat particles distribution over the cured leen is background. It is important to report that; most of basterma producers, do produce that Alex. sausage as a side product, to make use of the trimmings coming out of the basterma meat preparation. Another observation to be reported is that; because the market competition now - a- day is running pricewise, many producers incorporate none-meat extenders with colourants to reduce the final cost and hence the original product attributes are nearly lost.

The dry and semidry sausages are studied intensively by many investigators among of them (Niven et al, 1949 & 1959; Youssef et al, 1966; Takacs & Simonfly; 1970 ; Awad & Youssef; 1973; Stolic, 1975; Tatini et al. 1976; Rust, 1977; USDA, 1977; Terrel et al, 1978; Schneider, 1980 and Ingolf & Skjelkvale, 1982). But this very traditional product escaped the interest of our local inestigators. Therefore this work had been planned to study the quality attributes of the market product as regard the organoleptic, freshness parameters , naturitional contribution as well as the microbiological state. The accepted attributes.

deviations and errors shall be determined and defined. The possible solution for deviations and errors are to be dealt with in a separate work.

MATERIALS AND METHODS

The producers of the traditional Alexandria semidry sausage were first determined, their production sites were visited, evaluated visually then being sorted according to the hygiene condition, production practice, machinery up dating and availability or not of any quality certifications and any quality assurance system into grades. In fact none of the visited sites could be sorted as grade I but only grade II and III were report. The product of five plants of each of grade and II and III factories were looked for in the market and sampled. Twenty samples for each factory grade (total 40 samples) were taken from the market, transfered to the lab. For further investigation.

A- The organoleptic attributes:

The parameters looked for in this survey included the determination and definition of the accepted and deviated appearance and flavour of the product, beside the determination of the accepted technical parameters and the reporting of the possible errors. The applied landmarks in this investigation are collected from (Price & Schweigert, 1971; Bacus 1984; Pearson & Tauber, 1984; Koch, 1986 and Varnam & Sutberland 1995).

B- Freshness attributes:

Include pH value of the product (ISO, 1974), and for the extracted fat the acid value (Kates, 1972; Pikul et al., 1983 and Metcalf, 1979), peroxide number (A.O.A.C., 1990), Thiobarbituric acid reactive substances (TBA). Malonaldehyde content/gm. fat according to (Tarladgis *et al.* 1960; Pikul et al., 1983 & 1989, Sinnhuber & Yu; 1985 and Yu et al.,1986). Also the total volatile base nirogen (TVBN) according to (FAO, 1980) was determined.

C- Nutritional attributes:

Include the determination of; moisture content (ISO 1973a), total, protein (AOAC 1990), fat content (ISO 1973b), total carbohysrate (Dubois et al., 1956), sodium chloride (AOAC 1990), ash content (ISO 1978) and nitrite (ISO 1975a).

D- Microbiological attributes:

The following microbial counts are determined; total aerobic (ISO, 1976), total thermoduric (Harrigan & Mc Cane 1976; and Collins & Lyne, 1984), anaerobes (Brewer & Allgeier, 1966), Staphylococcus aureus (FAO, 1992) and total yeast and mould count (Balley & Scott, 1974). Beside; a test for salmonellae (ISO, 1975) and Harvey & Prico 1981) and for enteropathogenic *E.coli* (ICMSF, 1978) .

RESULTS AND DISCUSSION

Table 1 revealed that 55% of the market product possesed the accepted marble cure appearance. Deviations in apperance as reported include; over

cure, fading, browning, greening, none-meat colour (foreign colour), mouldy, slimy and green core. It had been observed that out of 22 samples reported as normal marble cure from the outside insepection, 7 of them contained colourants when the contents were examined. Moreover, more than one appearance deviation was reported for the same sample in some of them. The over cure deviation which is a reflection of nitrite overdosing was more frequent in samples produced by producers graded as III, than those from grade II producers.

The accepted cure flavour was reported for 57.5% of the examined samples. Deviations reported were rancid, putrid and sour. The rancid and putrid flavours noted were a reflection of the use of too old raw meat (Bacus, 1984) and in this specific product the use of the basterma trimmings as had been observed magnify the problem (bad hygiene in collection and trimming). The sour flavour reported could be attributed to over fermentation; high moisture content, carbohydrate and the high micrtobial load in the samples noted as soure are collaborating factors (Fraizer & Westhoff, 1978).

The technical landmarks looked for included; the condition of fat comminution, vice; correct or smeared. The outside condition of the casing vice; regular dry, soft,, collapsed, hard and the presence of joint sour at the sausage finger extremities. Beside the homogenicity of the curing of the sausage contents. The common fault reported was the fat smearing in 40% of the samples . Such defect is commonly reported for factories using none branded or primitive mincers. Also the use of unsharpened mincing set results in meat squeezing and fat smearing during comminution. Such a faulty practice results in the afore mentioned sausage error (W.E.P., 1985). The reported fermentation and drying errors i.e. soft sausage, collapsed casing, case hardening and joint sour, are basically due to the lack of controls during the ripening, fermentation and drying operation. Temperature, air velocity and RH are the parameters controlling the previously mentioned operation (Bacus, 1984). The joint sour defect is due to the permanent, continous contact between the extremities of the adjacent sausage fingers without enough space for airation (Frazier & Westhoff, 1978). The irregular curing of contents of a sausage fnger could be the function of oxidized fat in the raw beef, the beef contain much collagen and/ or incorporation of much none meat extenders in the formula (W.E.P., 1985; Angelo & Bailly , 1987 and Monahan et al., 1992).

Table 2 illustrated the freshness criteria including the pH value, peroxide number and TBA value for fat in addition to the TVBN value for protein. The reported pH values seems normal for the semidry sausage except for some samples which had a pH value of 5.7 and others with 4.2 and these as revealed from the detailed results were noted as putrid or sour (Terrel et al. 1978). The detailed results also revealed that rancid samples always had an acid value higher than 3 and a peroxide number higher than 20, with an MD value

higher than 40 ug/gm extracted fat. It is important to report that the present product being naturally fermented i.e. not selective (hetero fermentation), it happened through the growth of some microorganisms capable of fat degradation either hydrolysis and or oxidation via oxidases which enhance malonaldehyde (Lechowich, 1978).

Table 3 revealed that the average moisture content was 46.5%, ranged from 41.4 to 52.1%. Such moisture range together with the pH reported for the examined samples prove that the Alex. sausage would be considered within the semidry group (Bacus, 1984). From the frequency distribution (table 4), it is evident that only 7.5% of the samples had moisture contant higher than 50%. It is also evident that grade II producers are more skillful in drying the sausage than those of grade III. The protein content ranged between 12.8 to 20.4% with an average of 16.1% Despite the moisture content may seems acceptable, yet the moisture: protein ratio was higher 2.8 in 52.5% of the examined examples.

Such a value higher than 2.8 is not accepted for the semidry sausage (A.M.I.. 1982) An explanation for that wide MPR, is the high carbohydrates incorportaed in the product, which ranged between 9.2-15.8% with a mean of 12.4%. Such values are not accepted for the semidry product (Pea rson & Tauber, , 1984). On the other hand, the fat content of all the examined samples were in the range of semidry sausage (Bacus, 1984), and so is the sodium chloride content (Terrell et al., 1978). The relative high ash contant (2.8 to 5.8%) with a mean of 4.6% is an indication for the incorporation of much nonemeat extender s in the product (Smith, 1991). The nitrite residue estimation ranged between 70 p.p.m to 180 p.p.m with a mean of 131.6 p.p.m. Such values are alarming.

Table 5, indicated the microbiological attributes of the market product. The aerobic count values could be considered in the high margin common to the semidry sausage (Bacus, 1984). While the counts for Staphylococcus and anaerobes are relatively high (Deibel et al. 1961; Acton & Dick, 1976 and Farber et al, 1988).

Seven samples out of 40 contained E.P.*E. coli*, the isolates were; O_{127}:H_7 and O_{119}: K_{69} (B_{14}). The first serotype is common with haemorrhagic colitis in man (Riley et al, 1983; Doyle & Schoeni, 1984 and Mac. Donald 1985).

The risk of oxidized fat intake to man had been discussed by Pearson and Dutson (1990) and they declared that fat oxidation products are chornic toxicants in man and contribute to the aging process, cancer and and cardiovascular disease. In the experimental animals they reported a variety of disorders including hepatic disfunction and aortic lesions. Hence the low rancid flavour of oxidized fat is to be alarming to the consumer to reject the food to protect and to be

Table (1): Organoleptic Attributes Of Market Traditional Alexandria Semidry Sausage

Factory grade	Appearance									Flavor				Technical Properties								
				Discoloured							Deviations			Fat		Casing					Curing	
	Normal marble cure	Over cure	Fading	Browning	Greening	Foreign colour	Moldy	Slimy	Green core	Normal Fleshy cure flavor	Rancid	Putrid	Sour	Correct Comminuted	Smeering Greesing	Regular dry	Soft	Collapsing	Case Harding	Joint sours	Regular	Irregular
II	13	5	4	6	3	14	6	3	4	13	6	3	1	14	6	13	4	2	4	7	12	8
III	9	8	3	6	6	15	6	4	4	10	9	3	2	10	10	9	6	4	6	8	11	9
Total	22	13	7	12	9	29	12	7	8	23	15	6	3	24	16	22	10	6	10	15	23	17
%	55	32.5	17.5	30	22.5	72.5	30	17.5	20	57.5	37.5	15	7.5	60	40	55	25	15	25	37.5	57.5	42.5

Table (2): Freshness Attributes Of Market Traditional Alexandria Semidry Sausage

Factory grade	PH value		Fat oxidation criteria					TVBN
					Malonaldhyde concentration			
	Outer	Core	Acid Value	Peroxide number	Fat %	Ug MD/gm	TBA Value	
II	5.4	4.9	2.58	18.3	19.9	38.8	0.76	17.8
III	5.2	4.8	2.9	20.0	20.1	43.0	0.86	18.8
Total mean	5.3	4.8	2.7	19.1	20.0.	40.9	0.81	18.3
Maximum	5.7	5.6	3.6	26.0	24.3	65.0	1.15	28.0
Minimum	5.0	4.2	1.6	11.0	15.1	23.0	0.54	8.0

Table (3): Nutritional Contribution Of Market Traditional Alexandria Semidry Sausage

Factory grade	Moisture	Protein	Fat	Carbohyd rate	Na Cl	Ash	Moisture Protein	Nitrite (p.p.m)
II	45.5	17.5	19.9	12.4	2.8	4.5	2.5	128.6
III	47.6	14.8	20.1	12.4	2.8	4.8	3.2	134.6
Total mean	46.5	16.1	20.0	12.4	2.8	4.6	2.8	131.6
Maximum	52.1	20.4	24:3	15.8	3.8	5.8	3.9	180.0
Minimum	41.4	12.8	15.1	9.2	2.0	2.8	2.0	70.00

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