Advances in Environmental Biology, 6(2): 747-749, 2012
ISSN 1995-0756

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Enumeration and identification of yeasts isolated from Kurdish traditional fermented food

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ABSTRACT

The yeasts in 30 samples of the Kurdish traditional fermented product, Dooina, taken from farms and households were enumerated and identified.The yeast counts ranged from $<10^2$ to 8.8×10^5 $cfug^{-1}$. Yeast isolates wereidentified using the API ID 32C test kits and the simplified identification Method (SIM) as well as reference to the standard taxonomic keys. From the 30 sample, a total of 5 different yeast species were identified.Saccharomyces (S) cerevisiae (6 isolates) and Candida (C) colliculosa (4) were the predominant species identified. C tropicalis, S. dairensis and S.pastorinus were identified less often. Two of the S.cerevisiae isolates were able to assimilate DL- lactate. The analyzeddooina samples contained a wide variety of yeasts, but only a few species predominated and these could possibly contribute to the characteristics of the fermented product in the fermentation.

Key words: yeasts, Fermented product,Dooina, Enumeration, Identification.

Introduction

Fermented food is an important part of the traditional diet in Kurdistan of Iran. The fermented food produced at household level is called *Dooina.* This product consists oftraditional drink yogurt, salt,parboiled wheat meal, and added oregano which are then allowed to ferment for 10 days and then sun dried.Organic acids formed during fermentation periodand after fermentation excess moisture is removed by drying.It is usually reconstituted withwater and served as a hot soup.

There are similar products with different names such askishk in Egypt, Syria, Lebanon and Jordan, Tarhana (Turkish) trahanas (Greek), tarkhīneh (Persion), trahana (Albanian), трахана/тархана (Bulgarian) and kushuk (Iraq) [4,15,1,2]. Apart from causing spoilage in products such as yoghurt and sour milk, yeasts are also important because they product desirable flavors as in cheese ripening [12,7]. The fermentative and spoilage activities of yeasts are well known in many modern food, but little consideration has been given to the specific occurrence and significanceof yeasts in traditional dairy products.There is increasing interest in the role of yeasts in dairy fermentations and especially their potential use as starter cultures [6,7,11]. To establish the role of yeasts in dooina, the yeasts have to be isolated and identified and then their technological properties studied. The aim of this study was to isolate, enumerate and identify the yeasts in the Kurdish fermented food, Dooina. This is the first report on the characterization of yeasts ofDooina in Iran.

Materials and Methods

Sampling:

Thirty samples of dooina, which had been dried, were collected from small farms and homes in Iran in sterile plastic pouches and brought to the laboratory in a cooler box.

Enumeration and isolation:

The yeasts were enumerated on spread plates of yeast extract glucose chloramphenicol agar.

Colonies with distinct morphological differences such as colour, shape and size were picked and purified by streaking at least three times on malt extract agar.

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Adv. Environ. Biol., 6(2): 747-749, 2012

Identification:

The yeast were identified based on their physiological and morphological properties as described by Deak and Beuchat [3], Van der Walt and Yarrow, and also by using the API ID 32C test strips for yeast (bio- Merieux, Marcy I`Etoile, France). The tests included the fermentation of sugars, liquid assimilation of carbon compounds, liquid assimilation of nitrogen compounds, growth at 37`C, growth on 50% (W/V) glucose yeast extract agar, growth in vitamin - free media, growth in media containing 16% NaCl, resistance to 0.01% cycloheximide, and urease activity. API ID32 C strips have 30 coupules containing different carbohydrates and one containing actidione (cycloheximide). The strips were used according to the manufacturer's instructions.

Results:

Enumeration of yeasts:

The yeasts counts ranged from less than 10^2 – 8.8×10^5 $cfug^{-1}$ (Table 1).

Identification:

Thirteen strains of yeast were isolated and identified. Table 2 shows the yeast species identified and their distribution among the samples. Seven different yeast species were identified. The predominant species were S.cerevisiae (2 strains) and C. colliculosa (2), While C. tropicalis(1), S. pastorianus, (1) and S.dairenensis (1) were identified less often.

Table 1: Colony counts of yeasts isolated from Kurdish traditional fermented product.

Sample	Source	Strain ref. number	$Cfug^{-1}$
101	ShahrakSaadi- Sanandaj	- [b]	$<10^2$
102	ShahrakSaadi- Sanandaj	- [b]	$<10^2$
103	Koseihajij - Uraman[a]	1	4×10^5
104	Kola hasareh	- [b]	$<10^2$
105	Najaf abad	-	$<10^2$
106	Chaharbagh-sanandaj	2	2.8×10^5
107	Govazmarivan[a]	3	2.4×10^5
108	Payegalan- marivan[a]	- [b]	$<10^2$
109	Takhte - Uraman[a]	- [b]	$<10^2$
110	Ta- Kamyaran[a]	4	5×10^4
111	Uraman- Takht[a]	5	5×10^4
112	Tangisar - Kamyaran[a]	6	5.3×10^5
113	Moochesh - Kamyaran[a]	7	8.8×10^4
114	Farsiabad - Uraman[a]	- [b]	$<10^2$
115	Tayne - - Kamyaran[a]	8	2.8×10^5
116	Palebar - Uraman[a]	9	2.7×10^5
117	Kherkah[a]	10	2.4×10^5
118	Lown[a]	- [b]	$<10^2$
119	Kamaleh[a]	11	8.8×10^5
120	Khoshkedole[a]	- [b]	$<10^2$
121	17- Shahrivarsanandaj	- [b]	$<10^2$
122	Marenj[a]	- [b]	$<10^2$
123	kilagalan[a]	12	10^5
124	Dooshan	- [b]	$<10^2$
125	Hawanlah[a]	- [b]	$<10^2$
126	Toodarsahraii[a]	- [b]	$<10^2$
127	Kanisavaran[a]	- [b]	$<10^2$
128	Boraban[a]	- [b]	$<10^2$
129	Bonsie - olya	- [b]	$<10^2$
130	Gashki- kamiaran[a]	13	7.2×10^5

(a) Samples were taken from household.
(b) No isolations were carried out.

Table 2: The diversity of yeasts isolated from Kurdish traditional fermented food

Yeast strain	Number of isolated	Number of samples
S. cerevisiae	6	2
C. colliculosa	4	2
S. pastorianus	1	1
C. tropicalis	1	1
S. dairenensis	1	1
C. spp	1	1
S. spp	1	1
Unknown	1	1

Discussion:

One sample (Number 119) had viable yeast counts of 8.8×10^5. This sample could have been fermented over more than seven days. Particularly low counts of yeasts ($10^2 cfug^{-1}$) were recorded for seventeen sources and the low yeast counts could possibly be explained by better hygienic practices at these sources compared to other sources of samples. Karagozlu *et al*. [8] found that the yeasts count

was 3.66±0.27log cfu/g in tarhana. The identification was carried out using API ID 32C kits (bio Merieux) and SIM key [3] as well as reference to standard taxonomic key out lined by Kurtzman and Fell [10]. Comparing to other studies, it seems that different yeast species predominate in different fermented milk products. For example, S. cerevisiae together with G. geotrichum and kluyveromycesmarxianus were the predominant strains in *makamo*, a Ugandan traditional fermented milk [13], while other strains such as C. holmii, S. dairenesis, C. stellata and Zygosaccharomyces spp. were isolated in lesser numbers. Debaromyceshansenii, Torulasporadelbrueckii and klyveromycesmarxianus were the predominant species found in South African traditional fermented milk [11].

S. cerevisiae was a common species .many reports agreed on the dominance of S.cerevisiae in yoghurts [6]. The strains successfully identified as S. cerevisiae by both the API and SIM procedures could ferment sucrose and raffinose in addition to fermenting glucose and galactose. They were not able to utilise lysine and cadavarine. Other reactions, which are considered diagnostic for S. cerevisiae, were lack of assimilation of ethylamine hydrochloride, D-ribose, D- mannitol and their inability to grow in vitamin – free medium [10].

Conclusions:

The analyseddooina samples contained a wide variety of yeasts, but only a few species predominated and these could possibly contribute to the characteristics of the fermented product in the fermentation.

References

1. Alnouri, F.F. and C.L. Duitschaever, 1974. The Use of Pure Cultures for the Preparation of Kushuk. Journal of Institution of Canadian Science and Technology Alimentary, 7: 228-229.
2. Darvishi, Sh., 2009. Dictionary of Food Microbiology.Ahmad Press, Sanandaj, Iran.
3. Deak, T. and L. R.Beuchat, 1996. Handbook of Food Spoilage Yeasts.Boca Roton, FL, CRC Press.
4. Economidou, P.L., K.H. Steinkraus, 1983. Acid-Fermented Milk and Milk/Cereal Foods. In: Steinkraus, K.H., (ed) Handbook of Indigenous Fermented Foods, Marcel Dekker, New York.
5. Fleet, G.H. and M.A. MIAN, 1987. The Occurrence andGrowth of Yeasts in Dairy Product. International Journal of Food Microbiology, 4: 145-155.
6. Fleet, G.H., 1990. Yeasts in Dairy Products-AReview. Journal of applied Bacteriology, 68: 199-211.
7. Jakobsen, M. and J. Narvhus, 1996. Yeasts and their Possible Beneficial and Negative Effects on the Quality of Dairy Products. International Dairy journal, 6: 775-768.
8. Karagozlu, N., B. Ergonul and C. Karagozlu, 2008. Microbiological Attributes of Instant Tarhana during
9. Fermentation and Drying. Bulgarian Journal of Agricultural Science, 14(6): 535-541.
10. Kurtzman, C.P. and J.W. Fell, 1998. The Yeasts: A Taxonomic Study. Elsevier, Amsterdam.
11. Loretan, T., B.C. Viljoen, J.F. Mostert, A.M. Vogeland, H.F. du, P. Jordan, 1998. A Preliminary Study of the Diversity and Technological Properties of Indigenous Traditional South African Fermented Milk (Note). In Jakobsen, M., J. Narvhus and B.C. Viljoen, Yeasts in the Dairy Industry: Positive and Negative Aspects, Proceeding of the symposium organized by Group F47, 2-3 September 1996, pp: 178-182. Brussels, Belgium.
12. Marshall, V.M., 1987. Fermented Milks and their Future Trends: I. Microbiological aspects. Journal of Dairy Research, 54: 559-547.
13. Sserunjogi, M.L., 1999. Ugandan- indigenous fermented dairy products with particular, focus on ghee. Ph.D. thesis, Agricultural University of Norway, As, Norway.
14. Van der Walt, J.P. and D. Yarrow, 1984. Methods for the Isolation, Maintenance, Classification and Identification of Yeasts. In N.J.W. Kreger- Van Rij. The yeasts: A taxonomic study, pp: 45-105.
15. Youssef, M.M., 1990. Instantization and Evaluation of Some Traditional Egyptian Foods. Food Chemistry, 38: 247-254.