Vitis 18, 161—164 (1979)

Indian Institute of Horticultural Research, Bangalore, India

Nature of yeasts present on grapes grown in south India and in their wines[1])

by

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Die Hefenflora südindischer Trauben und ihrer Weine

Zusammenfassung. — Die aus Traubensaft, gärendem Most und Wein der Rebsorten Bangalore Blue und Black Champa isolierten Hefen gehörten 6 Gattungen an, nämlich *Kloeckera, Torulopsis, Candida, Rhodotorula, Cryptococcus* und *Saccharomyces.*

Während der frühen Gärungsphasen überwogen *Kloeckera apiculata* und *Torulopsis spp.;* im Wein waren *Torulopsis spp,, Saccharomyces chevalieri* und *S. cerevisiae vorhanden.*

Kloeckera apiculata, Saccharomyces chevalieri, Torulopsis spp., Rhodotorula rubra und *Cryptococcus albidus* var. *albidus* wurden aus indischen Traubenmosten erstmals isoliert.

Introduction

Although occurrence and distribution of various yeasts in musts and wines have been reported from various parts of the world (Mrak and McClung 1940, Galzy 1956, Domercq 1957, Toledo *et al.* 1959, Bréchot *et al.* 1962, Minárik 1964, Takeda and Tsukahara 1969, Davenport 1974), only a single report (Relan and Vyas 1971), is available on the nature of yeasts present on grapes and in wines from India. In the present paper, the nature of yeasts associated with grapes grown in Bangalore (south India) and their wines is reported.

Materials and methods

Two grape varieties, namely Bangalore Blue harvested in April, 1978, and Black Champa harvested in August, 1978, from the Experimental Station of the Indian Institute of Horticultural Research, Hessaraghatta (Bangalore), were used for isolation of yeasts. The juice, fermenting juice and wines were properly diluted and plated on yeast extract peptone glucose agar. Morphologically different colonies were isolated, purified and identified according to the methods described by van der Walt (1971).

Results and discussion

The yeast colonies isolated from these two varieties at different stages represented 6 different genera, i.e. *Kloeckera, Torulopsis, Candida, Saccharomyces, Rhodo-*

[1]) Contribution No. 705 of the Indian Institute of Horticultural Research, Bangalore.

Yeast flora of musts and wines
Hefenflora von Mosten und Weinen

Grape variety	Must	During fermentation	Wine	Mat
Bangalore Blue	*Kloeckera apiculata* *Torulopsis* spp. *Rhodotorula rubra* *Cryptococcus albidus* var. *albidus*	*Kloeckera apiculata* *Torulopsis* spp. *Rhodotorula rubra* *Saccharomyces chevalieri*	*Torulopsis* spp. *Saccharomyces chevalieri*	
Black Champa	*Kloeckera apiculata* *Torulopsis* spp. *Candida* sp.	*Kloeckera apiculata* *Torulopsis* spp. *Candida* sp. *Saccharomyces cerevisiae*	*Torulopsis* spp. *Candida* sp. *Saccharomyces cerevisiae*	*Torulopsis* sp.

torula and *Cryptococcus* (Table). The predominant organisms in juice and fermenting musts belonged to the asporogenous rather than to the sporogenous group. This is contradictory to the earlier report from India (RELAN and VYAS 1971) in which the authors have mentioned that the sporogenous group was prevalent. This difference may be due to the climatic difference between north India and south India. North India has generally very high temperatures during summer and low temperatures during winter as compared to south India. Difference in yeast flora due to climatic variation has been reported by CAPRIOTTI (1954).

Among the sporogenous yeasts, only 2 species belonging to the genus *Saccharomyces*, namely *S. cerevisiae* and *S. chevalieri*, were isolated. This is the first report on the isolation of *S. chevalieri* from grape musts from India. RELAN and VYAS (1971) did not mention the isolation of this yeast. Though other species of *Saccharomyces* have been reported to be present in grape musts and wines, we were only able to isolate these 2 species.

Asporogenous yeasts were predominantly present on the grapes of both the varieties. They include *Kloeckera apiculata*, *Torulopsis* spp., *Candida* sp., *Rhodotorula rubra* and *Cryptococcus albidus* var. *albidus*. This is similar to Italian and French (Bordeaux) fermentations where the non-spore-forming yeasts like *Kloeckera* and *Torulopsis* initiate the fermentation (CASTELLI 1955, DOMERCQ 1957).

Only one species of *Kloeckera*, i.e. *K. apiculata* was isolated from these grape varieties. It is the first time that the occurrence of *Kloeckera* in Indian grape musts has been reported. Its isolation is not mentioned by RELAN and VYAS (1971). However, this yeast has been isolated from musts in other countries (MRAK and MCCLUNG 1940, GALZY 1956, DOMERCQ 1957, OHARA *et al.* 1959 and BRÉCHOT *et al.* 1962).

Torulopsis spp. isolated from juice and fermenting juice resembled *T. bovina* in sugar and nitrate assimilation tests but differed from it in other characters. Their identity is not established. Occurrence of *Torulopsis* in grape musts has also been reported by MRAK and MCCLUNG (1940), GALZY (1956), DOMERCQ (1957) and OHARA *et al.* (1959).

Only one species of *Candida*, i.e. *C. valida*, was isolated from Black Champa. *Candida* is present in grape musts according to DOMERCQ (1957), TAKEDA and TSUKAHARA (1969), and MINÁRIK (1971).

One species of *Rhodotorula*, i.e. *R. rubra*, was isolated from Bangalore Blue, but it was not predominant. Occurrence of *Rhodotorula* in musts has been reported by

MRAK and MCCLUNG (1940), GALZY (1956) and MAVLANI and GULYAMOVA (1968).

Generally, *Cryptococcus* does not occur in grape musts. One species of *Cryptococcus*, i.e. *C. albidus* var. *albidus* was isolated from Bangalore Blue. However, the survey on the species of yeasts present in grapes and wines by GALZY (1956) indicates the occurrence of this yeast.

The nature of yeasts and their sequence during fermentations is similar to other regions of the world. That is, *Kloeckera* spp. and *Torulopsis* spp. present on the grapes initiate and *Saccharomyces* spp. complete the fermentation.

Summary

Yeasts isolated from juice, fermenting juice and wines made from the varieties Bangalore Blue and Black Champa fell into 6 genera namely *Kloeckera, Torulopsis, Candida, Rhodotorula, Cryptococcus* and *Saccharomyces.*

Kloeckera apiculata and *Torulopsis* spp. were predominant during initial stages of fermentation. *Torulopsis* spp., *Saccharomyces chevalieri* and *S. cerevisiae* were present in the wine.

This is the first report on the isolation of *Kloeckera apiculata, Saccharomyces chevalieri, Torulopsis* spp., *Rhodotorula rubra* and *Cryptococcus albidus* var. *albidus* from grape musts from India.

Acknowledgement

The authors are thankful to Dr. G. S. RANDHAWA, Director, Indian Institute of Horticultural Research, Bangalore, for his keen interest in this work and for providing necessary facilities.

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Eingegangen am 18. 12. 1978

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