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Research Note

The Sensitivity of *Mucor* to Preservatives

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Salting of fish followed by drying is a simple processing technique and it yields a product with relatively long shelf life. The effectiveness of the process depends on the reduction of water activity to control micro-organisms and intrinsic enzymes. In tropical and sub tropical countries fish are dried under the influence of sun and wind. The tropical ambient temperature and humidity favour the growth of fungi during processing, storage, transportation and marketing of dried fish. *Mucor* is a commonly occurring fungus in dried fish along the West Coast of India (Gupta and Samuel, 1985). It is also common in salted and dried fish at Visakhapatnam and Kakinada (Chakrabarti and Varma, 1997; 1999). Aeromycological study reveals that *Mucor* is a common air borne fungus in the East Coast of India (ibid). The present study was undertaken to find out the sensitivity of *Mucor* to different preservatives.

The fungi isolates from the salted and dried fish samples of Visakhapatnam coast were purified and identified as per Pitt and Hocking (1985). The potato dextrose agar (PDA) slants of *Mucor* were stored in refrigerator. To study the sensitivity to sodium chloride, *Mucor* was spread on PDA (3% agar) containing 0,10,14 and 18% sodium chloride separately. After incubation at 28±2°C, the extent of fungal growth was observed at regular interval.

Salted PDA (3%) medium containing 10% sodium chloride was used to study sensitivity to preservatives. Salted PDA media containing different levels of propionic acid (PA) i.e., 50, 100 and 200 ppm were prepared by adding mesasured volume of 10% (v/v) PA to the sterile melted medium aseptically. After adjusting pH quickly to 3.5 with saturated tartaric acid each type of melted medium was spread in sterile petri dishes. Similarly salted PDA (3% agar + 10% NaCl) media containing different levels of potassium sorbate (PS) in 200 ppm were prepared. The PDA (3%) with 10% NaCl was also used in the preparation of media

Table 1. Growth characteristics of *Mucor* on Potato Dextrose Agar (3%) containing different concentration of NaCl

Concentration of NaCl%	Incubation Period (28±2°C) in days							
	0	1	2	3	4	5	10	15
0.0	—	White colony	Pale grayish colony	Dense grayish colony	Dense grayish colony	Dense grayish colony	Dense grayish colony	Dense grayish colony
10.0	—	—	—	—	White colony	Pale grayish colony	Dense grayish colony	Dense grayish colony
14.0	—	—	—	—	—	—	—	—

'—' indicates no visible colony

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Table 2. Sensitivity of *Mucor* to propionic acid, potassium sorbate and sodium benzoate in salted potato dextrose agar (3% agar + 10% NaCl)

Name of preservative	Concentration of preservative ppm	Incubation period at 28 + 2°C, days									
		0	1	2	3	4	5	10	15	20	30
Propionic acid	00	–	+	2+	3+	3+	3+	3+	3+	3+	3+
	50	–	–	–	+	+	2+	3+	3+	3+	3+
	100	–	–	–	–	–	+	2+	3+	3+	3+
	200	–	–	–	–	–	–	–	–	–	–
Potassium sorbate	50	–	–	–	+	+	2+	3+	3+	3+	3+
	100	–	–	–	–	–	–	+	2+	3+	3+
	200	–	–	–	–	–	–	–	–	–	–
Sodium benzoate	25	–	–	+	+	+	2+	3+	3+	3+	3+
	50	–	–	–	–	–	–	±	2+	3+	3+
	100	–	–	–	–	–	–	–	–	–	–

'–' No visible colony; '+' visible white colonyl '2+' pale gray colony; '3+' dense gray colony

containing different levels of sodium benzoate (SB) i.e., 25, 50 and 100 ppm. *Mucor* was spread on each type of plates and incubated at 28±2°C. The growth characteristics of the fungus on the different types of media were observed at regular intervals up to one month.

Table 1 shows the growth characteristics of *Mucor* on potato dextrose agar. Visible colony on control PDA appeared on the first day while the same on salted PDA appeared in 4 days only. No visible colony was noticed in PDA containing 14% NaCl even after 15 days. *Mucor* could not grow on the medium containing 200 ppm PA or 200 ppm PS or 100 ppm SB even at the end of one month incubation (Table 2). Chakrabarti and Varma (2000) reported that other three common halotolerant fungi in dried fish were *Aspergillus niger*, *Aspergillus flavus* and *Penicillium sp*. It was reported that the *A. flavus* and *A. niger* could grow up to the level of 400 ppm PA, while *Penicillium sp* could not grow. *A.niger* and *penicillium* sp. could grow on medium containing 100 ppm PS while *A.flavus* could not grow. *A.niger* could grow only on medium containing 200 ppm SB while others failed to grow.

It is therefore likely that PA (600 ppm) or PS (200 ppm) or SB (400 ppm) in media are adequate to inhibit all four common halotolerant fungi, viz. *A. niger*, *A. flavus*, *Penicillium sp* and *Mucor* isolated from salted and dried fish.

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