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A review on impact of physical factors on development of post-harvest fungal diseases of fruits

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Abstract
This review highlights on impact of Relative Humidity (R.H.) and temperature on disease severity of fungal diseases of fruits. At high temperature, low temperature and low humidity, fungal diseases are not developed in fruits.

Keywords: Temperature, R.H., fruits, fungi

INTRODUCTION

Temperature and relative humidity percent (R.H. %) play important role in fungal diseases development of fruits. These factors hamper process of ripening that induce the fruit defense and these factors also cause impact on the various physiological processes of the pathogen during infection and pathogenesis [1]. Physical factors like temperature and Relative humidity (R.H.) play very important role in the development and spread of post–harvest fungal diseases [2 and 3]. Recently Rathod (2011) [4] also reported that severity of post-harvest fungal diseases depends upon temperature and relative humidity. The impact of the temperature and humidity on the decay of mango, banana, guava, papaya, pomegranate, citrus and certain other tropical and subtropical fruits have been studied by several plant pathologists [1,2,3,4,5,6,7,8,9,10,11 and 12] The impact of the environment factors, particularly temperature and humidity play a very important part in determining the nature and activity of the microflora. Thus these factors not have only direct influence on the growth of the fungi, but they can also appreciably affect the fungal advancement indirectly by increasing or decreasing the resistance of the host [3].

Temperature

Establishment and progress of post-harvest fruit diseases is depend upon the availability of a suitable temperature. The optimum temperature which favours the growth and sporulation of a pathogen in *in vitro* culture is generally also suitable for the development and spread of the corresponding fruit rot [13].

Severity of *Botryodiplodia* rot of guava fruit was maximum at 30^0 C and 100% R.H. Severity was absent at 10^{0}C and at 30% R.H. showed very less rotting of guava fruit [1]. Sumia et al. (2006) [3] reported that *Botryodiplodia* rot of mango fruits was severe at 25^{0}C – 30^{0}C and at high humidity. Jadeja (2000) [9] observed that that 30^0 C temperature was found to be optimum for stem end rot development.

Chrys (2006) [14] reported that 25-30 ^{0}C temperatures were favorable for spore germination of *C .gloeosporioides*. Sumia at al. (2006) [3] found that the temperature between 20^{0}C-30^0 C was favorable for *C. gloeosporioides* rot.

Prasad and Sinha (1981) [15] and Bagwavan and Yeole (2003) [2] found that *A. niger* rot in mango fruits is sever at 30^0 C and 10^0 C there is no symptoms of the same. The spore germination of *A. niger* was increased with time and temperature. The spore germination did not occur at 10^{0}C upto 24 hours of incubation. Maximum spore germination was at 30^{0}C and minimum at 40^{0}C. Jadeja (2000) [9] also revealed that 30^0 C temperature was found to be optimum for *A. niger* rot development. *A. niger* rot hampered at low temperature and it did not develop up to 15^{0}C. Sumia et al. (2006) [3] found similar results that optimum temperature for development of *A. niger* in tropical fruits is 30^0 C.

Bagwan and Meshram (2003) [10] reported that *Rhizopus* rot of banana was absent at 10^{0}C. Bagwavan and Yeole (2003) [2] observed that *R. arrhizus* rot in mango fruits is sever at 35^0 C and at 10^0 C there is no symptoms of the same. Thakur (1972) [5] reported that 25^{0}C is favorable for development of *Rhizopus* rot.

Relative humidity (R. H.)

Relative humidity has also profound effect on post-harvest rot of fruits in storage. The humidity has direct effect on fungal forms and host. R.H. has an important role to play in the initiation of infection and it is usually essential for the successful initiation of post-harvest fruit decay [13] . During moist environmental conditions, the affected fruits get covered with huge sporulation of fungi. As the R.H. decreases, the severity of the infection decline sharply [3].

Patil and Pathak (1993) [8] and Patel and Pathak (1995) [1] observed that at 100% R.H *B. theobromae* rot in mango and guava was maximum. Severity was less at 30% R.H. Severity was increased from 30 to 100% R.H. The spore germination of *B. theobromae was* increased with temperature and R.H. level. Maximum spore germination was at 100% R.H. and minimum at 30% R.H. Sumia et al. (2006) [3] found that *Botryodiplodia* rot of fruits was severe at high humidity.

Chrys (2006) [14] reported that 95 % R.H. was favorable for spore germination of *C. gloeosporioides*. Sumia et al. (2006) found that the 95-97 percent was favorable for *C. gloeosporioides* rot. Sharma (2000) found R.H. more than 95 percent has been

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considered favorable for anthracnose development of post harvest mango fruits. 90 percent R.H. was favorable for *C. gloeosporioides* rot.

Thakur (1972) [5] reported that 100% R.H. is favorable for development of *Rhizopus* rot. Bagwavan and Yeole (2003) [2] found that severity of *A.niger* rot of mango fruits was highest at 100% R.H and lowest at 30 % R.H. Bagwavan and Yeole (2003) [2] also reported that *R .arrhizus* rot in mango fruits is minimum at 30 % R.H. while maximum at 100% R.H.

CONCLUSION

It can be concluded at high temperature, low temperature and low humidity, Fungal diseases are not develop in fruits while at room temperature and high humidity fungal diseases of fruits are sever. Hence storage of fruits at low R.H. and low temperature reduces fungal rot of fruits.

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