A Study of Mycodeterioration of Bottle Gourd (*Lagenaria Siceraria* (MOL.)) Seed During Storage

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RENU PUBLISHERS

New Delhi, Kolkata

This First Edition Published in 2024

Title: A Study of Mycodeterioration of Bottle Gourd (*Lagenaria Siceraria* (Mol.)) Seed During Storage

Author: Dr. Rajesh Kumar

Description: First edition | Renu Publishers 2024 | Includes bibliographical references and index.

Identifiers: ISBN 9788169386029 (Print) | 9788169386036 (eBook)

Cover Design: Renu Publishers

RP

RENU PUBLISHERS

Head Office: 90, Sainik Vihar, Mohan Garden, New Delhi, India

Corporate Office: 7/28, Room No. 208-209, Vardaan House, Mahavir Lane, Ansari Road, Daryaganj, New Delhi, India

Branch Office: 216, Flat-GC, Green Park, Narendrapur, Kolkata, India

Tel: 011-23256188, 011-45130562, 9971676330, 9582248909

Email: renupublishers@gmail.com

Website: www.renupublishers.com

Acknowledgement

Writing this book has been a journey made possible through the support, guidance, and encouragement of many individuals and institutions.

I am deeply thankful to Professor (Dr.) Anand Kishor, PG Department of Botany, Veer Kunwar Singh University, Ara Bihar, my Mother Manju Devi, wife, Mrs. Neelam Kumari my son Prakhar Rudransh & my Daughter Shubhangi Jaya, whose love, patience, and unwavering belief in me gave the strength to persevere through challenges and long hours of writing.

I am equally indebted to librarians, researchers, and staff members who provided access to resources and engaged in thoughtful discussions that enriched my understanding to accomplish this task.

My heartfelt appreciation goes to the editorial team at Renu Publishers publication, New Delhi, for their meticulous work and patience.

Abstract

A scheme was undertaken with a view to observe the biochemical contents in the seed leachate of Bottle gourd (*Lagenaria siceraria* (Mol.)) seeds on artificially created faulty storage of the seed i.e. high RH, high temperature and storage with a common mould i.e. *Aspergillus flavus*. The biomass of the seedlings raised from such seeds & the chlorophyll contents of the cotyledonary leaves were also investigated. The length of root & shoot of the seedlings raised from such seeds stored for one month was also investigated.

The RH of the storage was maintained at 52.0, 63.3, 71.4 and 80.0% for one and two months at 30 ± 2°C. The equivalent moisture content of seeds increased with rise in the level of RH, the magnitude of which was more on prolongation of storage from one to two months. The germination of the seed gradually declined with rise in the RH. Its value further lowered with the involvement of the fungus and prolongation of the storage period. The electrical conductivity of the seed leachate increased with increase in RH and with prolongation of storage. This value was significantly ($P > 0.01$, $>> 0.01$) higher due to the influence of the fungus.

Pentose and hexose sugars and total amino acid increased with rise in the RH level significantly ($P > 0.05$, >0.01, $>>0.01$, $>>>0.01$) and also the prolongation of storage period from one to two months ($P > 0.05$, > 0.01, $>> 0.01$). The fungus imparted more leakage of these biochemicals from the seeds than without it. The four individual sugars i.e. glucose, fructose, maltose and sucrose that were detected in the leachate were found to increase at 80.0% RH due to the fungus except maltose which declined in concentration. All other sugars than maltose increased in concentration due to the fungus up to 63.3% RH and showed their absence at 71.4% RH due to the fungus. A reverse trend of maltose and glucose was shown when stored for two months with the storage fungus.

Altogether 10 amino acids were recorded in the leachate of the seed. Most of them were observed increasing in the seed leachate due to *A. flavus* when stored at 80.0% RH for one & two months period. At lower RH, some amino acids increased due to inoculation while others decreased. Generally, they were found in higher concentration due to prolongation of the storage period.

The biomass of the seedlings raised from the control seeds was maximum when stored at 71.4% RH for one month and at 52.0% RH when stored for two months. At 80.0% RH, for one month period of storage, the biomass was minimum while the seeds stored for two months inoculated with *A. flavus* failed to germinate. The involvement of the fungus deviated from this trend i.e. declined from 52.0 to 80.0% RH for both the periods of storage of course, the biomass of the seeding raised from inoculated seed was less in comparison to the control lot. Chlorophyll a was maximum in the seedlings raised from the control seed stored at 71.4% RH for one month and 63.3% RH when stored for two months. This chlorophyll was lower in amount in the cotyledonary leaves of the seedlings raised from the inoculated seeds. Nearly similar conditions prevailed for chlorophyll b and total chlorophyll also.

The length of root of seedlings raised from the seeds stored for one month without storage fungi i.e. *A. flavus* at 71.4% RH was more & less when seed stored at 52.0% and 80.0% RH for one month period. The increasing trend of root length was noted when the seeds stored from 52.0 to 71.4% RH thereafter it showed a declined trend. The length of shoot of the seedlings raised from such stored seeds shows exactly similar conditions to that of root.

When the seeds were stored at 10,20,30 and 40°C for two months, maximum germination was recorded of the seed stored at 30°C and minimum of that stored at 10°C. The electrical conductivity of the leachate of such stored seeds was maximum of the seed stored at 10°C and minimum of the seed stored at 30°C. Exactly similar pattern was observed for pentose and hexose sugars and total amino acid in the leachate. The biomass of the seedlings raised from such seeds was maximum of the seedlings raised from the seeds stored at 30°C and minimum of that raised from the seeds stored at 10°C. This value was further declined when the seeds were inoculated with *A. flavus* and stored for two months. When the chlorophyll content of the cotyledonary leaves of the seedlings was considered, chlorophyll a, b and total chlorophyll contents were more in the cotyledonary leaves of the seedlings raised from the seeds stored at 40°C and minimum was recorded in the seedlings raised from the seeds stored at 10°C.

The length of root & shoot of seedlings raised from such seeds was more of the seedlings raised from the seeds stored at 30°C & was less of the seedlings raised from the seeds stored at 10°C. The length of root & shoot of the seedlings was lower when the seeds was inoculated with *A. flavus* & stored for two months in comparison to control seed lots.

Abbreviations

Some abbreviations internationally recognized and provisionally coined are enlisted below to save time and also space in the text.

Aspergillus flavus	*A. flavus*
Aqueous	Aq.
Centimeter	cm
Concentrated	Conc.
Control	C
Degree celsius	°C
Electrical Conductivity	EC
Figures(s)	Fig
Gram(s)	g
High Significant	HS
Hour(s)	hr.
Inoculated	I
Nonometer (10-9 meter)	nm
Microgram	ug
Microlitre (10^{-6})	ul
Milligram	mg
Millilitre	ml
Millimeter	mm
Molar	M
Normal	N
Optical Density	O.D.
Part per million	ppm.
Per square inch	psi.
Pound	lbs

Ratio of the distance travelled the spot from the start-line compared with the distance travelled by the solvent front.

	Rf
Relative Humidity	RH
Rotation per minute	rpm
Standard Error	S.E.
Second	Sec.
Significant	S
Temperature	Temp.
Trace	t
Very high significant	VHS
Versus	Vs
Volume/Volume	v/v

Contents

Acknowledgement *v*

Abstract *vii*

Abbreviations ix

1. Introduction 1

2. Materials and Methods (General) 5

3. Isolation of Seedborne Storage Fungi 11

4. Germination of the Seed and Biochemical Analysis of the Seed Leachate on Storage of the Seed at Varying RH for One and Two Months Period 15

5. Germination of the Seed & Biochemical Analysis of the Seed Leachate on Storage of the Seed at Varying Temperatures for Two Months Period 41

6. Summary 51

7. Bibliography 55

APENDICES **81**

I. Medicinal Potential & Nutritional Significance of *Lagenaria Siceraria* 83

II. Genetic Diversity of Bottle Gourd (*Lagenaria Siceraria* (Molina) Stand. 99