MEMORANDUM OF UNDERSTANDING

For

Academic Collaboration for the promotion and assistance in research of the most advanced methodologies and technologies for the postharvest preservation of food.

BETWEEN

UNIVERSITY OF ALLAHABAD

AND

WORLD PRESERVATION CENTRE LLC

UNIVERSITY OF ALLAHABAD
University road, Old Katra,
Allahabad, Uttar Pradesh-
211002
INDIA

WORLD FOOD PRESERVATION
CENTRE LLC
P.O. Box- 1629
Shepherdstown. WV 25443
USA

1. PREAMBLE:

Following discussion and exchanges of correspondence between University of Allahabad located Allahabad, Uttar Pradesh-211002 India and the World Food Preservation Center LLC, a limited liability company in Shepherdstown, WV 25443 and incorporated in the State of West Virginia, USA, a formal memorandum of understanding is hereby made between the University of Allahabad (hereinafter "UoA") and the World Food Preservation Center LLC (hereinafter "COMPANY"). Collectively, UoA and the COMPANY will hereafter be known as the "PARTIES."

UoA and COMPANY both recognize that the world is facing one the most urgent problems of our time that is how to feed a rapidly ballooning population. It is estimated the world's population will grow one-quarter by 2050 and reach 9.6 billion people. This means that we will have to double our food production by 2050 in order to feed this expanded population. It has been shown that given our present capability to annually increase crop yields we are going to fall far short of enough food to feed the world's population by 2050. Therefore, a new strategy is needed other than just producing more food. The UN FAO has shown that one-third of the world's food that we already produce is actually lost after it is harvested and before it is consumed. The logical solution to the world's pending food shortage is to find ways to save more of the food that we already produce.

There are a number of good programs in place to reduce the postharvest loss of food in developing countries. However, most of these are dependent on the continual input of experts from the developed world with uncertain budgets in order to be sustainable. Also, because we have invested only 5 % of our agricultural resources into the preservation of food as opposed to 95% into its production, we find ourselves with a shortage of competent postharvest professionals in developing countries and a paucity of technologies that we can recommend to developing countries for the preservation of their food.

In order to address these shortcomings, UoA and World Food Preservation Center LLC are partnering to form a World Food Preservation Center™ at the University of Allahabad. The World Food Preservation Center™ at the University of Allahabad will provide a world-class education (M.S. and Ph.D.) to young students/scientists in developing countries and conduct research on much needed new technologies to preserve food targeted to the needs of developing countries.

With experience of 37 years; in the development of biologically based technologies for the postharvest preservation of food as alternatives to synthetic pesticides; Dr. Charles L. Wilson; worked with number of young scientist from developing countries all over the world. While conducting research at the USDA ARS Agricultural Research Station in West Virginia; came with the idea of an excellent model for a **WORLD FOOD PRESERVATION CENTER** that would be more self-sustainable than other programs to reduce postharvest food losses in developing countries. Most postharvest food loss programs in developing countries depend on the continual input of experts from the developed world in order to be sustainable.

The objective of the **WORLD FOOD PRESERVATION CENTER ™LLC** is to provide young students/scientists in developing countries an excellent education [M.S., Ph.D.] in the most advanced methodologies and technologies for the postharvest preservation of food. In addition, to conduct research and development on much needed innovative technologies targeted toward the postharvest preservation of food in developing countries. The **WORLD FOOD PRESERVATION CENTER ™LLC** fills a major gap in the world's higher education system.

World Food Preservation Centre LLC: The World Food Preservation Center LLC is a consortium of eleven major research universities and a research institute (ARO Volcani Center, Israel) on six continents dedicated toward providing an advanced world-class postharvest education (M.S. and Ph.D.) to young students in developing countries and supporting their research on much needed new postharvest technologies. The non-profit World Food Preservation Education Foundation has recently been formed to solicit scholarship funds for students to attend "Sister" Universities of the World Food Preservation Center LLC.

Department of Botany- UoA: University of Allahabad has always occupied an esteemed place among the universities of India for over a century now. Established in 1887, it is the fourth oldest university of India after Calcutta, Bombay and Madras University by passing Act XVIII which established the University of Allahabad. Like the Universities of Calcutta, Bombay and Madras, the University of Allahabad also started as a degree conferring institution. Between 1887 and 1927 at least thirty-eight different institutions and colleges of this area were affiliated to University of Allahabad. Department of Botany has been imparting M.Sc. since 1923, and Ph.D. programs in various sub-disciplines of Botany. The Course is of 2 years which is now based on Semester pattern and has been revised twice since 2012. The latest revision will be effective for the M.Sc. batch of July 2015. There are ***10*** existing Faculty (Professors). The infrastructural

facility includes total floor space which is about 21,000 sq. ft. Most of this is occupied by class rooms and fairly well equipped research laboratories. The department has computerized library with a large reading Hall, a Botanical Museum, a Reference Collection of Slides, A Herbarium, A Seed Bank, Workshop and a Auditorium (D.D. Pant Auditorium; Seating capacity- ***200***). Several of the alumni of this Department are well placed in the country and abroad. The research groups in this Department have published extensively in the areas of Microbiology, Physiology, Ecology, Cytogenetics, Palaeobotany, and Plant Pathology. The department presently has expertise in Molecular Biology, Free Radical Biology, Microbiology, Proteomics, Immunology and Biotechnology. The number of Ph.D. scholars produced by botany faculty is over ***250***; most of them are well placed academicians settled in India and abroad.

Relevancy of the Memorandum in the current scenario of Indian agriculture: Indian subcontinent is situated in the tropical region of the world, where excess of rainfall and temperature prevails throughout the year. This leads to the development of heavy moisture in the climate. The humidity present in the atmosphere is responsible for a lot of agriculture-related aspects in which storage and post- harvest of the cereal crops, staple crops and vegetable crops is most affected. The unavailability of conventional storage commodities and inadequate post-harvest measures lead to heavy loss of agricultural produce every year which not only hampers the economy of the country but also societal needs for the food supply is severely affected. Some common cause of post-harvest cereal damage includes fungal infection mainly the *Aspergillus* species which produce aflatoxins. Aflatoxin (AF) is a toxin produced by fungi acting on staple crops (like maize, rice, cassava and peanuts) that constitute a large part of the diet of people living in developing countries. In the USA, human foods must have less than 20ppb (the threshold for cumulative genetic toxicity) but the threshold for diagnosable symptoms of acute aflatoxicosis (jaundice, vomiting, abdominal pain, hemorrhage, pulmonary edema and death) is much higher. Veterinary toxicology has shown chronic, moderate exposure results in suppressed immunity, nutrition and increased infectious diseases (Williams et al. 2004). These results from animal studies are being found relevant to humans living in developing countries. Aiming to check over the grain loss the collaborative work by COMPANY with in various developing countries is quite an impressive step. The establishment of World's Latest Postharvest Knowledge and Technology Center with WFPCT^{M} Postharvest Solutions Centers through their Owners and Operators who will be M.S./Ph.D. Graduates of "Sister" Universities of the World

Food Preservation Center LLC will definitely be a path-breaking step towards Green Revolution-Phase-II. WFPCT^{M} Postharvest Solutions Centers" are connected to the World's Postharvest Knowledge and Technology through the World Food Preservation Center LLC. With the inventions already lined by like Supergrainbag, TranSafeLiner, Rice bran, hermitic grain storage, etc.; it will easy to create the magic of Green Revolution- Phase-II. There is a worldwide need for a "Green Revolution – Phase II" which we term the "Storage Revolution" in recognition of the fact that in hot, humid climates crop yields and crop production have been greatly increased by the "Green Revolution's", breakthroughs in crop yields, but the problem of storage losses which often reach 25% (and in some cases exceed it), has received very little attention.

World Food Preservation Center ^{TM}LLC "Think Tank" Members:

Professor Leon Terry, Head of Cranfield Soil & AgriFood Institute, Environmental Science and Technology Department, School of Applied Sciences, **Cranfield University. United Kingdom.**

Professor Larry L. Murdock, Department of Entomology, **Purdue University. USA**

Professor Ahmeda El Ghaouth Maghary, Plant Biology and Technology at the **University of Nouakchott, Mauritania.**

Dr. Bautista-Banos, Instituto Politécnico Naciona, **Mexico**

Dr. Greg Johnson, Founder, Horticulture 4 Development; **President of the International Society for Plant Pathology, Australia**

Dr. Abdul Rahim Khan, Principal Investigator/Team Leader/Reserch Officer, **Post Harvest Research Centre, Faisalabad, Pakistan**

Professor Saneya El Neshawy, Head Plant Pathology Department, Agriculture Research Center (ARC) Giza/ **Egypt**.

Professor Johan Schnurer, Department of Microbiology, Swedish University of Agricultural Sciences, **Uppsala, Sweden**.

Professor Samir Droby, Department of Postharvest Science, ARO, **The Volcani Center, Israel**

Dr. Kenneth S. Marsh, Executive Director, Woodstock Institute for Science in Service to Humanity, **South Carolina. USA**

Dr. Nigel Banks, Managing Director at Postharvest Co. Limited, **New Zealand**

Dr. Alba Marina Cotes, Director Center for Biotechnology and Bioindustry en CORPOICA, **Columbia**

Dr. Shanthi Wilson Wijeratnam, Team Leader - CIDA-IDRC Collaborative Project, Ind. Tech. Inst. **Sri Lanka**

Mekbib Hilegebrile Seife, Nutrition Specialist at Mercy Corps, **Ethiopia**

Dr. Michael Wisniewski, Plant Physiologist and Lead Scientist for fruit crops **USDA-ARS, Appalachian Fruit Research Laboratory, USA**

Professor Hongyin Zhang, School of Food & Biological Engineering, **Jiangsu University**, **China**

Dr. Joe Smilanick, Plant Pathologist (Consultant formerly with USDA-ARS) **Fresno, California Area. USA**

Dr. Lisa Kitinoja, Founder of The Postharvest Education Foundation Eugene, **Oregon Area USA**

Professor Antonio Ippolito, University of Bari, **Italy**

Gen. Gage Williams, CEO West Country Renewables Ltd, **United Kingdom**

Dr. Edo Chalutz, Executive Director, BARD, US-Israel Binational Agricultural Research and Development Fund, **Israel**

Professor Eli Fallik, Postharvest and Food Sciences Department, (ARO) **Volcani Center**, **Israel**

Dr. Kofi Essuman MLS-SCM Programme Manager, UN International Trade Center, **Switzerland**

Professor Joseph Arul, Université Laval, **Canada**

Dr. Shiping Tian, Chinese Academy of Sciences, Beijing, **China**

Professor Neeta Sharma, University of Lucknow, India

Professor Pervin Kinay Teksur, Ege University, Faculty of Agriculture, Department of Plant Protection, **Turkey**.

Dr. Rosa Maria Valdebenito- Sanhueza, Pesquisadora na Proterra Engenharia Agronômica, **Brazil**

Professor R. Renar Joao Bender, Federal University of Rio Grande do Sul, **Brazil**

Professor Umezuruike Linus Opara, Distinguished Professor & DST/NRF South African Research Chair in Postharvest Technologies, **South Africa**

Dr. Y. Martin Lo, President, BioIntelliPro, **USA**

Professor Robyn McConchie, University of Sydney, **Australia**

Dr. Luis Luchsinger L., Centro de Estudios Postcosecha (CEPOC) **Universidad de Chile**, **Chile**

2. Parties to the MoU

2.1. University of Allahabad located Allahabad, Uttar Pradesh 211002 India, through its authorized signatory Prof. B.P. Singh, Registrar, University of Allahabad.

2.2. World Food Preservation Center LLC, a limited liability company in Shepherdstown, WV 25443 and incorporated in the State of West Virginia, USA, through its authorized signatory Dr. Charles L. Wilson, Founder Chariman & CEO, WFPC™LLC, West Verginia, USA.

Both the parties have mutually agreed upon the following terms and conditions:

3. Aim of the MoU

3.1. The primary aim of this MoU is to promote and assist in research of the most advanced methodologies and technologies for the postharvest preservation of food and to formulate a framework for active cooperation on the research and academic activities of the two institutions.

3.2. This MoU aims to strengthen the mutual understanding, foster friendly cooperation, and provide a world- class education (M.S. and Ph.D.) to young students/scientists of UoA and conduct research on much needed new technologies to preserve food targeted to the needs of developing countries.

3.3. This MoU shall also involve the exchange of faculty/scientist researchers, and students of both the parties.

4. Scope of the MoU

In contemplation of achieving the aims as provided under this MOU, the parties agree as follows:

4.1. This agreement replaces all previous agreements between the parties, and subsequent discussions, agreements and understanding, whether verbal or in writing, is subsumed by this agreement.

4.2. This agreement is designed to lead to a further understanding and arrangements between the PARTIES to establish a World Food Preservation Center™ at the University of Allahabad.

4.3. It is agreed that the World Food Preservation Center LLC will provide the following services to UoA:

4.3. i Providing Complete technical, intellectual and other additional support of any nature whatsoever for the World Food Preservation Center™ at the University of Allahabad.

4.3. ii Consulting and utilizing its international "think tank" of postharvest scientists to assist UoA in the formulation of a M.S. and Ph.D. postharvest curriculum for UoA.

4.3. iii Utilizing COMPANY'S "think tank" of leading international postharvest scientists, to assist UoA in the formulation of a research agenda for the World Food Preservation Center™ at UoA.

4.3. iv Provide UoA the opportunity to license the trademarked name World Food Preservation Center ™.

4.3. v Help provide scholarships to students attending the World Food Preservation Center™ at the University of Allahabad.

4.3. vi Collaborate with UoA in the organization of conferences on postharvest preservation of food.

4.3. vii Help coordinate the activities of UoA with other universities of the World Food Preservation Center LLC.

4.4. It is agreed that the UoA will provide the following to the COMPANY:

4.4. i. Cooperation with COMPANY in the development of a curriculum for the World Food Preservation Center™ at the University of Allahabad.

4.4. ii. Cooperation with COMPANY in the development of a research agenda for the World Food Preservation Center™ at the University of Allahabad

4.4. iii. Cooperation with COMPANY in coordinating the research and curriculum activities of the World Food Preservation Center TM with other sister universities of the World Food Preservation Center LLC.

4.4. iv. Cooperation with COMPANY in publicizing the activities of the World Food Preservation enter™ at the University of Allahabad.

5. Commencement and duration

5.1. This memorandum will come into effect from the date of signature by both the parties and will remain in force for an initial period of five years.

5.2. This memorandum may be amended / extended by the written agreement and mutual consent of both the parties.

5.3. This agreement may be renewed for a period by mutual consent of the UoA and COMPANY. Renewals shall be in writing and subject to the same terms and conditions set forth herein, and shall be contingent upon a satisfactory performance evaluation by the parties. The evaluation will be initiated by the respective International Programs Offices.

6. Confidentiality

Both parties acknowledge that any information disclosed by or on behalf of any of the parties which is not in the public domain is confidential and may not be used or disclosed to any other party (whether before or after the termination of this MoU) for any reason whatsoever save as may be strictly necessary for the due and effectual rendering of the services. Any scientific data exchanged/shared between the parties for joint research/supervision will not be transferred to third party without consent of the parties

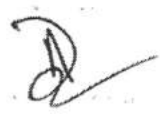
7. Intellectual property

It is the intention of the institutions that any and all research derived from the collaborative efforts of the two parties will be the joint property of both the parties, proportionate to the parties respective contributions.

8. General Terms & Understanding between Parties

8.1. This agreement provides the foundation and framework for, the particular projects developed by academic and administrative units from the two PARTIES and embodied in the implemented agreements.

8.2. Both PARTIES are committed to the policy that all persons shall have equal access to programs, facilities, admission and employment without regard to personal characteristics, performance, or qualifications as determined by the respective UoA and COMPANY policies.



8.3. Resources in form of equipments, machineries, apparatus, tools, experts and intellectuals required for the smooth and adequate implementation of the aims and scope of this MoU may come from either party, depending upon terms and conditions discussed and negotiated between the parties on a case to case basis. No implementation of any portion of this agreement or commencement of any specific projects may be initiated prior to the written assurance of adequate resources.

8.4. This agreement shall not be construed to create a relationship of brokers, employees, servants, joint ventures or agents as between the parties. The parties to this agreement are acting as independent participants.

8.5. This agreement shall be governed by and construed under the laws of India with respect to UoA, and the laws of West Virginia, USA with respect to COMPANY. The parties shall cooperate mutually to resolve any dispute or misunderstanding by collaboration and discussion.

8.6. Either party shall have the absolute right to terminate this agreement with or without cause upon sixty (60) days prior written notice to the other party. Such termination shall not become effective as to students already enrolled and participating in a program at the Host Institution.

8.7. This MoU does not constitute any legal or contractual obligation on the part of either party. It reflects an arrangement that is currently satisfactory to the parties involved. The parties agree to negotiate amendments to this memorandum as needed to meet the evolving requirements.

IN WITNESS WHEREOF, the authorized representative(s) of UoA and COMPANY have executed two (2) copies of this agreement.

Signed at Allahabad on 15th day of September 2015	Signed at Shepherdstown, West Verginia, USA on…. day of September 2015
UNIVERSITY OF ALLAHABAD	**WORLD FOOD PRESERVATION CENTER LLC**
By: Prof. B.P. Singh Registrar, University of Allahabad Allahabad-211002 REGISTRAR University of Allahabad Allahabad	By: Dr. Charles L. Wilson Founder Chariman & CEO, WORLD FOOD PRESERVATION CENTER ™LLC Shepherdstown, West Verginia, USA.
Witness: 1. Prof. A. Satyanarayana, Dean, Research and Development, University of Allahabad, Allahabad-211002 Dean Research and Development University of Allahabad	**Witness:** 1. Miriam J Wilson COO World Food Preservation Center LLC
2. Prof. Anupam Dikshit HoD, Botany Department, University of Allahabad, Allahabad-211002 Professor Anupam Dikshit FNASc. Head, Department of Botany University of Allahabad Allahabad - 211002	2. Sworn and subscribed before me this 1st day of September 2015 Ruth M. Knill Notary Public My commission expires Dec 11, 2016
Date: 01.9.2015	Date: Sept. 1, 2015

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
RUTH M. KNILL
JEFFERSON SECURITY BANK
P.O. BOX 35
SHEPHERDSTOWN, WV 25443
My Commission Expires Dec. 11, 2016