Higher Eduction Commission Islamabad

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Project Outcomes

1. **Project/PI particulars**

Title of Project:	Identification of biochemical indicators for salt tolerance and their genetic basis in potential oilseed crops: canola and sunflower		
Name of PI:	DR. MUHAMMAD ASHRAF		
Project No:	403	**PI Email:**	ashrafbot@yahoo.com
Duration:	36 Months	**Total Cost:**	5760040
Start Date:	13-06-2005	**Completion Date:**	07/07/2008
University / DAI's:	UNIVERSITY OF AGRICULTURE, FAISALABAD		

2. **Sector of Institution:** **Public**
3. **Is this project:** **Basic**
4. **Is output of the project commercialize able:** **No**
5. **Objectives of Project**

1. Appraisal of various biochemical attributes in canola and sunflower under salt stress 2. Identification of the potential biochemical indicators which be used for improvement of salt tolerance in the two crops using molecular biology 3. To determine whether or not the same set of indicators identified for one crop are useful for the other crop

6. **Summary of Project**

Despite a wealth of published research on salinity tolerance of plants, neither the metabolic sites at which salt stress damages plants nor the adaptive mechanisms utilized by plants to survive under saline conditions are well understood. As a result, there are no well-defined indicators for salinity tolerance available to assist plant breeders for improving salinity tolerance of important agricultural crops. Although plant breeders have successfully improved salinity tolerance of some crops in recent decades, using plant vigor or seed yield as the main selection criteria, selection may be more convenient and practicable if the crop possesses distinctive indicators for salt tolerance at the whole plant, tissue or cellular level. Thus, there is a need to determine the underlying biochemical mechanisms of salinity tolerance so as to provide plant breeders with appropriate indicators. Although there are a number of promising selection criteria, the complex physiology of slat tolerance and the variation among species make it difficult to identify a single criterion. Progress is more likely if biochemical indictors for individual species rather than generic indicators are determined. The present project proposal will address this important issue. Two of the economically important oilseed crops viz canola and sunflower will be investigated for biochemical indictors for salt tolerance. Molecular biology approach will be used to study the genetic basis for these indictors.

7. **Out comes**

i. **No of Publications:**

Research papers (National)		Research papers (International)		Total
In impact factor journals	In non-impact factor journals	In impact factor journals	In non-impact factor journals	
1	0	1	0	2

Please mention publication:

1. Ulfat, M., Athar, H. U. R., Ashraf, M. Akram, N. A. and Jamil A. 2007. Appraisal of physiological and biochemical selection criteria for evaluation of salt tolerance in canola (Brassica napus L.). Pakistan Journal of Botany, 39(5): 1593-1608. 2. Shahbaz, M., Ashraf, M., Nudrat, A.A., Hanif, A., Hameed, S., Joham, S., and Rehman, R. 2010. Salt-induced modulation in growth, photosynthetic capacity, proline content and ion accumulation in sunflower (Helianthus annuus L.) Acta Physiol. Plant. (online published).

ii. **Research Supervised** (Number of students who have completed research degrees under said project)

	Name of student	PhD/MS	Registration no	Thesis title	Year of degree notification	University	Department	Name of Supervisor
No student								

iii. **Patents (Numbers)**

Local			Foreign			Total
Submitted	Granted	Income/royalties	Submitted	Granted	Income/royalties	
0	0	0	0	0	0	0

iv. **Major Equipment** (Please give detail of equipment purchased under said project along with verified copy of entry page of university stock register)

S. NO	Name of equipment	Cost of equipment	Entry Page in University Stock Register
1	Fluorescence detector for HPLC	1200000	55
2	PCR machine	500000	54
3	Two dimensional gel electrophoresis system	900000	52
4	Filter assembly for mobile phase with vacuum pump	40000	55

v. **Linkages with R&D organizations, universities and industries**

S. NO	Counterpart organization	Type of linkage
No Linkage		

8. **Other out puts**

No of products		No of process/methods		No of Crop varieties		Any other out put please specify	
Developed	Marketed	Developed	Marketed	Developed	Marketed	Developed	Marketed

0	0	0	0	0	0	0	0

9. **Have you considered communicating any interest in transferring research outcomes/products to (Please fill at least one):**
    a. Private Companies:
    b. Government organization:
    c. None-government organization:
    d. ORICs organization:
    e. others (please specify):
    f. None of the above:

    None

10. **Paper presented under the said NRPU project:**

S.NO	Title of conference	Level	
		International	National
No paper presented			

11. **Benefit of the project to the Community (Please mention the target group of the community, if any):**

The identified potential biochemical indicators in the two commercially most important crops could be efficiently used for breeding programs aimed at improving salt tolerance of the crops. This seems possible in view of long experience of the PI of conducting and supervising such kind of research on other crops such as wheat, cotton, pulse crops and grass species. This study is novel in a way that there are very few published reports in which biochemical indicators for these crops have been identified and recommended for use by the breeders. This study will certainly provide a baseline and, in fact, a model for all those who intend to improve salt tolerance of the two oilseed crops.

12. **Major problems hindering in the execution of the project, if any:**

Nil