

PA-ABK-204
ISA 75160

**OUTPUTS/BENEFITS OF THE
HBCU RESEARCH GRANTS
PROGRAM**

**Agency for International Development
Office of Research and University Relations
May 1990**

Outputs/Benefits of HBCU Research Grant

Proposal #145

GENERAL INFORMATION

TITLE: CHEMICAL STUDIES OF GRAIN AMARANTH & CELOSIA SPEC
PI: Robert L. Shepard, Ph.D.
SCHOOL: Howard Univ
STATUS: This project has been completed.
A final report has been submitted to RUR.

DIRECT BENEFITS

COUNTRIES WHERE RESEARCH WAS CARRIED OUT:

Nigeria
USA

PERSONNEL SUPPORTED:

Faculty: 6.0 person-months
Research Assistants: 18.0 person-months

GRADUATE STUDENTS TRAINED: 4

EQUIPMENT PURCHASED:

None

OUTPUTS OF RESEARCH:

Refereed Papers:

Aknyemiju, Y., G. Adegroye, F. Ayorinde, et al.
"Correlation between day length, days to flower, days to mature and plant height at maturity on yield in nineteen amaranth cultivars grown under West African agronomical conditions." Field Crops Res., paper submitted for publication, 1990.

Ologunde, M., B. Headley-Ayotund, B. Harland and R. Shepard. "Amaranth grain as an alternative protein source: phytate, total dietary fiber and protein content." J. Food Comp. Anal., paper submitted for publication, 1990.

Shepard, R. and M. Ologunde. "Variation of Mineral and Amino Acid Contents of Defatted Vernonia galamensis Meal During Oil Extraction." J. Am. Oil Chem. Soc., paper submitted for publication, 1990.

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Refereed Papers (continued)

Shepard, R., M. Ologunde, O. Afolabi, et al. "Novel Cleaning Method for Amaranth Seeds." J. Food Tech., paper submitted for publication, 1990.

Ologunde, M., F. Ayorinde and R. Shepard. "Chemical Evaluation of Defatted Meal of Vernonia galamensis." J. Am. Oil Chem. Soc., 67:92-93, 1990.

Ologunde, M., O. Afolabi, O. Oke and R. Shepard. "Sterol and Fatty Acid Composition of Seed Oil from Exotic Varieties of Grain Amaranth Grown in West Africa." J. of Food Chem., in press, 1990.

Shepard, R., M. Ologunde, B. Taylor, O. Afolabi, et al. "Chemical Evaluation of Grain Amaranth Growing in Nigeria." J. Food Agric. 2:2 46-51, Nigeria, 1988.

Ayorinde, F., J. Clifton, O. Afolabi and R. Shepard. "Rapid Tranesterification and Mass Spectrometric Approach to Seed Oil Analysis." J. Am. Oil Chem. Soc. 65:6 942-947, 1988.

Ayorinde, F., G. Osman, R. Shepard and F. Powers. "Synthesis of Azelaic Acid and Suberic Acid from Vernonia galamensis." J. Am. Oil Chem. Soc. 65:11 1774-1777, 1988.

Shepard, R.L. "Amaranth Grain As A Food Source." New Directions Magazine 16:1, 22-27, 1989.

Ologunde, M. O. and R. L. Shepard. "Investigating the Chemistry of Seeds From V. Galamesis." Proc. of 16th NOBCCHE Meeting, 1989.

Afolabi, O.A., R.L. Shepard, R. Oke, et al. "Amino Acid Composition of Grain Amaranthus cruentus (West African Genus): A Potential Substitute in Cereal-Based Foods." Chemical Society of Nigeria, Lagos, Nigeria, 1986.

Ayorinde, F.O., M.O. Ologunde, E.Y. Nana, et al. "Determination of Fatty Acid Composition of Amaranthus Species." Journal American Oil Chem. Soc., 66:(12), 1812-1814, 1989.

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Proposal #145**Unrefereed Papers:**

Shepard, R.L., F.O. Ayorinde, et al. "Agronomical and Chemical Studies of High Yielding Lines of Grain Amaranth: A Potential Food Source for West Africa." Contractor Report AID/CR-8801, 1988.

Shepard, R.L., F.O. Ayorinde, et al. "Agronomical and Chemical Studies of High Yielding Lines of Grain Amaranth: A Potential Food Source for West Africa." Interim Report HUDC87-01, USAID, 1987.

Abstracts:

"Grain Amaranth: A Potential Weaning Food Source." Kraft, Inc., Glenville, Illinois, 1989.

"Mineral, Amino Acid and Phytate Composition of Grain Amaranth Growing in Nigeria." National Organization of Black Chemists and Chem. Engineers, Chicago, Illinois, 1989.

"The Potential of Grain Amaranth as a Food Crop in West Africa." USAID, Washington, DC, 20523, 1988.

"Using Food Chemistry to Investigate the Food/Feed Potential of Lesser Known Plants Growing in West Africa." Awolowo University Seminar Series, Ile-Ife, Nigeria, 1987.

"Correlating the Chemistry and Agronomy of Grain Amaranth." National Research Council Review Committee, Washington, D.C., 1987.

"Some Recent Investigations of Grain Amaranth." United States Department of Agriculture/ARS, N. Region Research Center, Peoria, 1987.

Theses:

"Some Aspects of the Chemistry and Potentials of Grain Amaranth as Food." Ologunde, M.B. Ph.D. Thesis. Obefemi Awolowo University, 1989.

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INDIRECT BENEFITS

GRANTS/CONTRACTS RESULTING FROM HBCU RESEARCH GRANT:

\$653,000 NSF - Pre-College Students Pilot Project:
From Seeds to Nylon

\$108,963 USAID - Development of grain amaranth as a
crop in West Africa

\$50,000 Private - Kraft, Inc., Food Science and
Technology Lecture Series

\$1,035,000 Private - Kraft Foundation, Howard
University Food Technology Laboratory

\$50,000 Government - USDA-OICD Potential Source of
Raw Materials for Plastics

LINKAGES ESTABLISHED:

With LDC Institutions:

Obafemi Awolowo University, Nigeria

With Other Universities:

Eastern Michigan University

With International or Scientific Organizations:

Rodale Research Center, PA

USDA Agricultural Research Service, MD

OBJECTIVES AND FINDINGS

BRIEF STATEMENT OF RESEARCH OBJECTIVES:

Document agronomical conditions favorable for optimum cultivation of light-seeded amaranth in West Africa and to perform chemical analyses on African-cultivated grain to identify the amaranth species showing greatest potential as a food supplement.

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BRIEF STATEMENT OF RESEARCH FINDINGS:

Light colored amaranth seed can be grown successfully in West Africa. Without use of fertilizers, yields are comparable to conventional cereals, with substantial yields even under adverse weather conditions and without irrigation. Cleaning and drying of the seeds is within the reach of low-income farmers.