NIGERIAN STORED PRODUCTS RESEARCH INSTITUTE (NSPRI) REACTS TO INDISCRIMINATE USE OF CHEMICALS FOR STORAGE OF BEANS

The Nigerian Stored Products Research Institutes (NSPRI) is aware like many other institutions and Nigerians, the recent video involving storage of beans in bags by two men using a synthetic chemical — SNIPER®. The Institute is also aware of the many outbursts by many organisations and Nigerians including, no less a personality than, the Honourable Minister for Agriculture and Rural Development, Chief Audu Ogbe on whose shoulders the overall burden lies.

The problem of high susceptibility of beans to insect infestation resulting to huge losses, lower food security and food safety which in order to mitigate these losses, majority of farmers and grain merchants employ various insect control measures including the use of chemicals not minding the consequences of their actions. This indiscriminate use of synthetic chemicals e.g. organophosphates (such as DDVP), pyrethroids (such as Permethrin, Deltamethrin) and some already banned class of chemicals (organochlorides such as gammalin etc.) for the storage of beans, had led to sicknesses, diseases and even death of consumers. Therefore the general public is at risk due to their effects.

To address the problem of mis-use of chemicals in beans storage, the public is encourage to know that beans of safe moisture content can be stored with or without the use of chemicals.

Harvested and threshed beans can be stored for short and long term periods **without chemicals** using the following procedures:

(a) Hermetic Storage: This technology works on the principle of exclusion of oxygen gas from the storage environment. Hermetic storage facilities are air-tight storage structures which can be flexible or rigid and require no synthetic chemical application. For example, using **polythene lined jute bags** developed by our Institute, the bag should be filled to the brim with beans and properly tied or sealed to ensure air tightness. Other flexible hermetic storage structures such as **PICS** (Purdue Improved Crop Storage) bags developed by Purdue University, USA and **ZeroFly®** Hermetic bags by Vestergaard Frandsen SA are also very effective. If we do not have access to the flexible hermetics, the rigid hermetic storage made from plastic or galvanised/stainless metals can also be used. Both of these structures can be used as domestic, retail and commercial storage for beans and grains in general and can protect the grains for over 12 months for as long as the air tightness is maintained.

(b) Even if the beans have been infested as do occur along the value chain, the infested beans can be placed in air-tight containers and placed under freezing conditions (such as home freezers) as cold shock treatment. This method kills all life stages of the insect within four (4) days. Thereafter, the beans can be removed, sieved, aired and kept in air-tight containers under ambient condition as described above.

(c) **Diatomaceous Earth (DE):** Another approach is to use a diatomaceous earth formulation otherwise called inert dust. DE branded products are safe, non-toxic products marketed in dust formulation whose effectiveness to kill insects is through its physical contact presence. To use, the DE dust is admixed with the beans of safe moisture content before and then bagged in a polypropylene woven bag and sealed. DEs protect grains for up to 12 months; are safe; can be eaten at any time; easy to handle; and can be **safely** applied by all levels of stakeholders. There are commercially available DE products in the market and **NSPRIDUST®** developed by our Institute is one of them.

(d) **Inert Atmosphere System:** Another approach to grains storage and in particular beans without use of chemical is through the inert atmosphere system (IAS). The principle of this technology is to deprive the insect pest access to oxygen by replacing the air in the storage environment with nitrogen gas. Clean beans is loaded into metal silo and purged with nitrogen gas. The system is maintained with nitrogen gas to keep the environment inactive. Beans kept in this structure up to 36 months retained their food and seed qualities. Such a technology has been developed by **our institute** and are available at few locations in the country as Inert Atmosphere Metal Silo (IAMS).

For a highly and industrial storage of grains and in particular beans, our institute, **NSPRI**, advocates the use of **Integrated Pest Management** (IPM) strategies which involve combination of several other reduced-risk control measures, including sanitation and the use of chemicals as last resort.

Harvested and threshed beans can be stored for short and long term periods with fumigants and chemicals using the following procedures:

(i) Fumigation for Storage: Beans can be stored for short term periods (not more than 3 months) by application of aluminium phosphide tablets or pellets for warehouse and conventional silo storage. This operation although involves use of a chemical, is very safe and is usually the first line of treatment procedures for industrial storage of beans, **BUT** the operation must be conducted by experts under safety precaution following the manufacturers' manual. Because fumigation leaves no chemical residues on the grains, fumigated grains can be used for immediate consumption after being aired for 3 days.

(ii) Chemical Application: For long term storage of beans, synthetic chemicals (organophosphates, pyrethroids) **can** be applied as well as for empty space storage structure fumigation. The use of appropriate chemicals for grain storage is not harmful rather it's the improper use by untrained operators. The situation in the country has been that these chemicals are applied indiscriminately without due regards usually by ill-informed grain merchants. The proper actions are that the procedure for use of appropriate chemicals be performed by experts under safety precautions.

Beans treated directly with chemicals could be consumed after 6 months of storage, during which their active ingredients would have degraded.

For the consumers, the following precautions should be observed:

1. If you see that the grain is dusty and choky or has offensive odour or strange smell that is not peculiar to the grains, it may suggest that some kind of synthetic chemical might have been used. Be careful.
2. Grains should be par-boiled, decanted and washed before final cooking. This will significantly reduce high levels of the chemical used to a safe limit for consumption.
3. Grains bought for consumption should be kept at home for about a two weeks before consumption, thereafter follow step 2 above for the recommended cooking procedure.
4. Any neat beans in the market without living insects and holes is likely to be having an active insecticide. To ascertain this, place a few insects (e.g. ants) on the grains and leave for 2-4 days. If they die, it confirms presence of a chemical.
5. NSPRI warns that if you are in doubt about the safety of any food, please avoid it. It is better to be hungry than to be late.

Hands-on practical demonstrations are available online for public consumption.

For avoidance of doubt, NSPRI could be contacted on www.nspri-ng.org and +234 (0) 811 776 7204, email nspriheadquaters@yahoo.com

Signed

Prof Olufemi Peters, *CSN, MIPAN*
Executive Director/CEO