

SECRET

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MEMORANDUM OF THE HON. MINISTER OF HEALTH TO CARRY OUT COORDINATED, EXTENSIVE AND SUSTAINED PUBLIC ENLIGHTENMENT CAMPAIGNS AGAINST THE USE OF CALCIUM CARBIDE FOR FRUIT RIPENING AND THE DEVELOPMENT OF A NATIONAL CODE OF PRACTICE ON ARTIFICIAL RIPENING OF FRUITS

1. PURPOSE:

The purpose of this Memorandum is to seek approval of the Council for coordinated, extensive and sustained public enlightenment campaigns to be carried out by all relevant MDAs at Federal, State and Local Government levels against the use of calcium carbide for fruit ripening and the development of a National Code of Practice (NCP) on Artificial Ripening of fruits.

2. BACKGROUND:

Fruits are consumed as essential component of food to provide micronutrients that improve immunity and prevent diseases. Fruit ripening is a unique aspect of plant development which makes the fruit edible, softer, sweeter, more palatable, nutritious and attractive. During ripening, there is enzymatic breakdown of insoluble polysaccharides (starch) to water soluble saccharides such as fructose, sucrose and glucose. Ripening also changes the skin colour of fruit from green to yellow, red, etc due to the degradation of the chlorophyll and softer due to conversion of pectin into soluble form.

Ripening has been categorized as either 'climacteric' or 'non-climacteric'. Climacteric fruits continue to ripen after being harvested e.g mangoes, bananas, guavas, pears, papaya, apple, melon, etc while non-climacteric have shorter shelf life and do not ripen after being harvested, e.g grapes, pineapple, strawberry, citrus fruits, etc.

The demand for fruits as component of daily diet is growing in Nigeria due to increased nutrition consciousness. As a result, fruits merchants device various ways of fast tracking fruit ripening including the use of calcium carbide.

Natural Ripening agents:

Ethylene is the main natural ripening agent. Ethylene is a naturally occurring hormone that is emitted from fresh fruit, vegetables, and floral items. Ethylene gas is necessary in initiating the ripening process. There is increased production of ethylene during ripening of fruits. Artificial ripening agents are sometimes used to produce ethylene.

Artificial ripening agents:

Modern farms as well as fruit industry use ethylene gas to ripen fruits for the following reasons:

- Ripening agents speed up the ripening process.
- To meet high demand and overcome transportation damage thereby attracting high profit.
- Allow many matured fruits to be picked prior to full ripening and then ripened at the final destination.

The following are the most common artificial ripening agents in use:

- Smoke from hay which contains ethylene gas.

- Artificial sources of ethylene gas which can be generated from many sources. This is an acceptable practice worldwide.
- Calcium Carbide is the most common and widely used artificial ripening agent, especially in Africa and South Asia, mainly as a result of ignorance of its harmful effects. Acetylene gas produced by Calcium Carbide when it comes in contact with water behaves like ethylene and is used for fruit ripening.
- Ethephon, although mainly used as an insecticide, is another commonly used artificial agent and is assumed as better than calcium carbide.
- Others include ethanol, methanol and ethylene glycol.

Effect of artificial ripening on fruit quality

- Organoleptic properties are lost considerably.
- It does not give the natural aroma and flavour to the fruits.
- Artificially ripened fruits are less juicy.
- These fruits have uniform colour than when ripened naturally.
- Artificially ripened fruits are not very tasty and are difficult to cut.
- They have recorded weight loss and have comparatively short shelf life.

3. CONTENT:

- i. Calcium Carbide when sprayed with water reacts chemically to produce acetylene which acts like ethylene and ripens fruits by a similar process. Calcium carbide generally contains impurities of arsenic, lead particles and phosphorus that pose a number of health problems.
 - These impurities may cause serious health hazards when workers come in direct contact with these chemicals while applying the ripening agents.
 - Acetylene produced by Calcium Carbide affects the neurological system and reduces oxygen supply to the brain and further induces prolonged hypoxia.
 - Consuming such artificially ripened fruits could result in sleeping disorders, mouth ulcers, skin rashes, kidney problems and possibly even cancer.
 - It is hazardous to pregnant women and children and may lead to headache, dizziness, mood disturbances, mental confusion, memory loss, cerebral oedema (swelling in the brain caused by excessive fluids), sleepiness, seizure etc.
 - Higher exposure may cause undesired fluid build-up in lungs (pulmonary oedema).
 - They may cause frequent thirst, irritation in mouth and nose, weakness, permanent skin damage, difficulty in swallowing, vomiting, skin ulcer etc.
 - Calcium Carbide is alkaline in nature and erodes the mucosal tissue in the abdominal region and disrupts intestinal functions. Cases of stomach upset after eating carbide ripened mangoes have been reported recently.
 - Apart from these, symptoms of poisoning include diarrhoea (with or without blood), burning or tingling sensation in abdomen and chest, difficulty in swallowing, irritation in eyes/skin, sore throat, cough, shortness of breathing, numbness etc
- ii. In November 2014, the Agency conducted a nationwide survey on calcium carbide to ascertain its use for fruit ripening. The result of the survey showed that Calcium Carbide is widely used in Nigeria as a fruit ripening agent.
 - Realizing the danger posed by the use of this chemical on fruits, the Agency placed it under restriction. Any importer of Calcium carbide is required to obtain from the Agency Permits to Import and to Clear a certain justifiable quantity in a year. He is also, if not an end user, expected to obtain a Local Purchase Order (LPO)

from a verified end user. The Office of the National Security Adviser also issues End User Certificates to importers of calcium carbide.

- NAFDAC inspects warehouses for storage of chemicals and monitors the distribution and sale of chemicals. The extent of the monitoring is from the importer down to the chemical marketers. Some quantities of Calcium Carbide are sold to artisans such as welders and panel beaters by chemical marketers. Preliminary investigation reveals that it is likely this chemical leak from this low level of use to those misusing it for agricultural purposes.
- iii. The Agency has on several occasions organised Workshops/Seminars for Chemical Marketers, Importers and End Users on the proper use and disposal of Chemicals including calcium carbide.
- iv. The Agency also uses text messages to educate the populace on the dangers of using calcium carbide to ripen fruits.
- v. Arising from the incessant use of calcium carbide for fruit ripening, the Office of the National Security Adviser, in a memo ref: NSA/INT/333 of 13th September, 2017 called the attention of the Honourable Minister of Health to the problems posed by this practice. Consequent upon this, the Hon. Minister in a memo ref: NCD/5537/11 of 14/12/2017 requested NAFDAC to put in place measures to protect consumers from the effect of consuming fruits ripened with calcium carbide.
- vi. Thus, there is urgent need to put in place measures to protect consumers from the effect of consuming fruits ripened with Calcium Carbide.

PRAYERS:

The Council is invited to note that:

- i. Fruit ripening is a unique aspect of plant development which makes the fruit edible, softer, sweeter, more palatable, nutritious and attractive.
- ii. The demand for fruits as component of daily diet is growing in Nigeria due to increased nutrition consciousness. As a result, fruits merchants device various ways of fast tracking fruit ripening using artificial fruit ripening agents.
- iii. That organoleptic properties of artificially ripened fruits are lost considerably; hence they are less juicy, do not give the natural aroma and flavour, not very tasty, difficult to cut and have comparatively short shelf life.
- iv. The artificial ripening agents in use include Calcium Carbide ethylene gas, Ethephon, ethanol, methanol and ethylene glycol.
- v. That Calcium Carbide is the most widely used artificial ripening agent in Nigeria, Africa and South Asia.
- vi. Calcium Carbide is not an acceptable ripening agent due to its health hazards.
- vii. Ethylene Gas, Ethephon, Ethanol, Methanol and Ethylene Glycol are less harmful as ripening agents.
- viii. Calcium Carbide generally contains impurities of arsenic, lead particles and phosphorus that pose a number of health problems e.g. frequent thirst, irritation in mouth and nose, weakness, permanent skin damage, difficulty in swallowing, vomiting, skin ulcer, kidney problems and possibly cancer.
- ix. The Agency on realising the danger posed by the use of this Chemical on fruits, placed Calcium Carbide under restriction; hence any importer of Calcium Carbide is required to obtain from the Agency Permits to Import and to Clear a certain justifiable quantity in a year. Also End User certificate must be obtained from Office of National Security Adviser by importers.

- x. Preliminary investigation has identified smuggling, ignorance on the part of the bulk fruit merchants and retailers as well as Artisans who use Calcium Carbide for welding purposes as the major hindrance to the control of the chemical.
- xi. Arising from the incessant use of Calcium Carbide for fruit ripening, the Office of the National Security Adviser (ONSA) called the attention of the Honourable Minister of Health to the problem posed by this practice and requested that measures be put in place to protect consumers from the effect of consuming fruits ripened with Calcium Carbide. Consequent upon this, the Hon. Minister in a memo ref: NCD/5537/11 of 14/12/2017 requested NAFDAC to put in place measures to protect consumers from the effect of consuming fruits ripened with calcium carbide. In addition, the Federal Ministry of Health wrote to all the State Commissioners to take necessary action in a letter titled '**Looming health hazard over indiscriminate use of carbide by fruit and vegetable vendors**' in January 2018 and copies of the letter from ONSA were attached to all.

Council is further invited to:

1. Approve coordinated, extensive and sustained public enlightenment campaigns against the use of Calcium Carbide for ripening of fruits.
2. Approve that the campaign against the use of Calcium Carbide for ripening of fruits be driven by the Federal Ministry of Agriculture and Rural Development (FMA&RD), Federal Ministry of Health (FMoH), State Ministries of Health and Agriculture, Local Government Departments of Health and Agriculture, Agencies and Parastatals including NAFDAC, Standard Organisation of Nigeria (SON), Nigeria Agricultural Quarantine Service (NAQS), Consumer Protection Council (CPC) as well as NGOs, Faith Based Organisations and Traditional Rulers.
3. Encourage the Federal Ministry of Agriculture and Rural Development to develop a National Code of Practice for Artificial Ripening of Fruits in line with global best practices.
4. Encourage the Standards Organization of Nigeria (SON) in conjunction with relevant MDAs to develop Nigerian Industrial Standards on Fresh Fruits and Vegetables where maximum levels of contaminants will be specified.

Honourable Minister of Health
June 2018