**INSTITUTION NAME:**

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**TOPIC: DISCUSS THE ADVERSE HEALTH EFFECTS ASSOCIATED WITH AFLATOXIN HAZARD.**

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**1.0 Introduction.**

Aflatoxins are basically poisonous carcinogens and mutagens that are produced by certain molds of Aspergillus species. According to Gong et al, 2016 aflatoxins are the secondary metabolites of the Aspergillus flavus and A. Parasiticus fungi.

Aflatoxins are fungal toxins that possess acute life threatening toxicity, carcinogenic properties and other potential chronic adverse effects (Gong et al 2016). Dietary exposure to aflatoxins is one of the major public health concern among subsistence farming communities in tropical regions where dietary staple food crops such maize and ground nuts are contaminated with aflatoxin due to hot and humid climates and poor storage.

The main types of aflatoxins are aflatoxin B1, aflatoxin B2, aflatoxin G1 and aflatoxin G2 which are found in food. They contaminate major cereal food crops such as maize, tree nuts and ground nuts. Aflatoxins substances are absorbed through consumption of contaminated food substances such as peanuts,corn maize and rice.

Large amounts of aflatoxins can lead to acute poisoning which is life threatening mainly through liver damage and death in both livestock and humans. Exposure to aflatoxins can occur at any stage of life and is a huge risk factor for hepatocellular carcinoma especially when hepatitis B is evident.

**2.0 Health effects**.

The main route of exposure to aflatoxin is through direct consumption of contaminated food substances. It is can occur throughout the life course starting in utero through transplacental exposure. Brest milk is the pathway of exposure for young children during breastfeeding. Gong et al (2016) states that high level exposure of aflatoxin that occurs over a relatively short period of time is recognized as causing acute aflatoxicosis. Exposure to low dose aflatoxin for a long time leads to chronic aflatoxicosis. Below are some adverse health effects of aflatoxins exposure in humans and animal life.

**2.1Food poisoning due to fungal action.**

Fungal action leads to food spoilage. Qazi,J.I., & Fayyaz, Z.(2006), argued that favourable conditions for natural aflatoxin contamination of food occur at latitudes between 40°N and 40°S of the equator. Fungi are major plant and insect pathogens and fast growth of fungi on animals hosts produces the diseases called mycoses.

 Dietary and respiratory exposures to toxic fungal metabolites cause mycotoxices. Mycotoxins are fungal metabolites that are present in a large part of the world food supply and have potential threat to food safety (Qazi, J.I.,& Fayyaz,Z. 2006). Molds are found in dry stored foods and grains in dormant structures for instance fragments and spores.

 Fungal spoilage of food substances includes post harvest diseases and losses of fruits and vegetables, contamination and also foods stored under low temperatures.

**2.2 Aflatoxin and Risk of Cancer.**

Aflatoxin has been associated with carcinogenicity and toxicity in animals and human life. Diseases caused by aflatoxin consumption are called aflatoxicoses. Acute aflatoxicoses causes death while chronic aflatoxicoses causes cancer and immune suppression.

Aflatoxin is perceived as a major agent enhancing liver cancer in humans because liver is the basic target organ of any toxic substance. Liver damage is common in fish,rodents, poultry and humans. Immune suppressive effects of aflatoxins includes reduced antibody production,increased susceptibility to infectious diseases and reduced cell mediated immunity.

**2.3 Nutrition and Underweight Complications.**

Aflatoxin has led to underweight conditions among children in various countries for instance, Benin and kwashiorkor and other malnutrition diseases. Deaths of children in the Philippines caused by respiratory tract infections was linked to aflatoxin exposure.

**2.4 Reproductive Health.**

Aflatoxin has also affected the reproductive health in humans.Shuaib,F.M., et al (2010) conducted a study that showed that a significant proportion of people living in low income countries are exposed to environmental and food borne toxins which may compromise reproductive health. Animal studies shown that aflatoxins are spermatotoxic, that is, affected by aflatoxins in humans.

The toxic effects of aflatoxins on the liver may inhibit enzyme synthesis , fatty acid metabolism and production of sex hormones precursor molecules. Aflatoxins also cause DNA damage and mutations. This toxicity is thought to involve epoxide intermediates which bind DNA and RNA thus inhibiting RNA and protein synthesis. This could lead to interference with spermatogenesis, maturation of spermatozoa and lead to abnormal sperm cells.

**2.5 Growth impairment.**

Childhood growth performance is usually determined through one or more indicators such as height for age, weight for age and weight for height. Khlangwiset,P. et al (2011) argued that most children are stunted, underweight and wasted due to acute and chronic malnutrition. Stunting leads to increased susceptibility to infectious diseases and cognitive impairment. Deaths and disability among children below five years are attributed to stunting and severe wasting.

Child stunting is prominent in regions where foodborne aflatoxin exposure is high for instance sub Saharan Africa. Underweight childrenc have risk of death from diseases including diarrhoea, pneumonia, malaria and measles.

Aflatoxin exposure leads to growth impairment in animals and human children. Children are exposed to aflatoxin through transplacental exposure in the utero, through breastfeeding, through weaning and post weaning foods, particularly where maize and ground nuts are dietary staples ( Gong et al, 2016)

**2.6 Aflatoxin effect on Male Reproductive System.**

The occurrence of aflatoxins in foods consumed by humans is more frequent in regions with tropical and sub tropical climate. Thus it is more possible for the population of these regions to consume aflatoxin contaminated food and become more susceptible to the danger of aflatoxin. In most developing countries, there is high risk of chronic exposure to aflatoxins from contaminated food crops.

According to Kourousekos, G.D., & Theodosiadou, E.K.(2015), men's infertility is linked to aflatoxin consumption. Infertile men with high concentrations of aflatoxins in their semen have decreased spermatozoa concentration and increased spermatozoa abnormalities.

**3.0 Conclusion**.

In general, aflatoxin exposure as a result of contamination of staple cereal crops, is a major food safety issue in developing countries. Very high exposure leads to acute toxicity and chronic toxicity. It is a risk factor for liver cancer, child growth impairment and immune suppression. However, to prevent future aflatoxicosis incidences, it is necessary to explore public health interventions that promote effective production, storage and processing of grains.

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