

## Use and Efficiency Of Low Temperature Plasma In Foods: Promising Intervention On Aflatoxin Control In Maize In Kenya – A Review

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### ABSTRACT

Maize (*Zea mays* var. *indentata* L.) is the most important food security crop in Kenya and plays an important role in human nutrition. Mycotoxins (MTs) are fungal toxic metabolites which naturally contaminate food and feed. When ingested, inhaled or adsorbed through the skin, even in very small concentrations, are associated with various cancers, retarded growth, suppressed immunity and mutations among other complications. Aflatoxins especially aflatoxin B<sub>1</sub>, are considered the most lethal in the group of more than three hundred known mycotoxins. In Kenya, aflatoxin contamination in maize leads to huge losses in the country's breadbasket and also in the grain reserves. One of the possible methods for control of the aflatoxin menace in maize would be through the use of plasma technology. Plasma, an electrically energized matter in form of a gas that is generated at different atmospheric pressures, has several uses. At low temperature, it makes the process of decontamination practical, inexpensive and suitable for products whereby use of heat is not desired. Non thermal plasma, a new discipline in food processing has been shown to destroy microorganisms including spores to undetectable levels. Over the years, there has been increased concern over the rising cases of aflatoxin poisoning in Kenya due to contaminated maize. The presence of aflatoxins is promoted by various factors, among them poor storage conditions, soil type, insect activity and drought conditions before harvest. Several measures including use of hermetic storage types such as pics (Purdue Improved Cowpea Storage) bags to store maize and proper drying of maize to the right moisture content to discourage mould growth have been suggested and used to tackle the aflatoxin menace. In Mexico and Caribbean countries, nixtamalization is widely practised and has been used to reduce aflatoxin in tortilla. Nixtamalization involves cooking the maize in an alkaline solution resulting in detoxification. The traditional nixtamalization and extrusion cooking processes have been combined in making of the dough (masa) for corn tortillas and have shown better success in elimination of aflatoxin. The main challenge with the use of this method of detoxification is acidification of aflatoxin extracts, which occurs during digestion and can lead to a rebuilding of the aflatoxin molecule leading to poisoning. The application of low temperature plasma technology can bring much needed reprieve in tackling the aflatoxin menace in maize and other foods both in Kenya and even worldwide.

Key words: plasma, maize, aflatoxin, mycotoxins, food safety, food decontamination, aflatoxicosis, technology