71st ICoMST
GIRONA - CATALONIA - SPAIN
3rd-8th August - 2025

BIOGENIC AMINES IN FERMENTED MEAT PRODUCTS - CURRENT STATUS AND FUTURE PROSPECTS IN THE SADC REGION

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I. INTRODUCTION

Food becomes poisonous due to microbial contamination and the accumulation of toxic metabolites, such as biogenic amines (BAs), which are formed in the food materials. Food poisoning may occur at any stage of food preparation, such as harvesting raw materials, handling, processing, cooking, storage, and transport. BAs are categorized into endogenous, responsible for human physiological functions and exogenous ones resulting from ingesting contaminated foods. Sources of BAs range from the use of low-quality raw materials and improper processing and storage conditions. BAs have been found in meat products, particularly in fermented beef products [1]. During meat fermentation, the muscle proteins undergo proteolysis to be transformed into polypeptides by endogenous muscle enzymes. The polypeptides then release shorter peptides and amino acids under the action of peptidases and aminopeptidases from muscle. As a result, meat and meat products are particularly subjected to BAs production due to their high protein and amino acid content. Spices, starter culture and the diameter of sausages influence the BA formation in end products [2]. This paper reviews the current concentrations of BAs reported in fermented meat products based on scientific literature and international organizations' reports published during the last decade, with a special focus on the occurrence and legislation.

II. MATERIALS AND METHODS

Separate searches were conducted to firstly identify reviews and research studies on the occurrence of BAs in food consumed in Africa and secondly identify suggested guidelines for different BAs in the SADC region. Both scientific and gazette literature were searched to capture information relevant to the 16 countries members of the SADC. English-language articles published between 2015 and 2025 were included. Since fermented foods were the focus of this review, studies reporting BAs in wine and other fermented beverages were excluded. Studies were screened for inclusion based on the title and/or abstract. Inclusion criteria included relevance to the aim of the review, clearly defined results and outcomes and access to full text.

III. RESULTS AND DISCUSSION

This review highlights the presence and concentration of BAs in fermented meat products to provide information to policymakers and to set acceptable concentrations in other fermented foodstuffs, which will enable the region to standardize its policies. While internet research recovers more than 1200 publications since 2015, mentioning biogenic amines in South African wines, several reports highlight the approximatively risky level of total BAs in foods. Although several regulatory organizations have set legal maximum limits for histamine, there are these organizations have set no specific regulations for tryptamine, phenylethylamine, tyramine, cadaverine, spermidine, spermine, or putrescine. In Botswana, BAs were detected and quantified in fermented beverages [3]. As expected, only a few studies report on the impact of BAs in fermented meat products for the SADC countries, thereby limiting the implementation of coherent legislation within the region. In South Africa, histamine levels are set in the Regulations Governing Microbiological Standards for Foodstuffs and Related Matters (R692 of 1997). A histamine content of more than 10 mg per 100 grams of the foodstuffs (partly cooked or uncooked seawater and freshwater foods such as prawns, shrimps, crayfish, lobsters, crab meat, eels or fish) is indicative of spoilage of the concerned foodstuff, while a concentration of more than 20 mg per 100 grams renders the product unsafe

for human consumption. Although South Africa exports wine, there are no regulatory requirements or limits relating to BAs in South African fermented meats and wines. Thus, the level of BAs in South African wines only impacts the potential commercial values of wines to be exported.

IV. CONCLUSION

It is evident from the literature and reports that limited data is available with no clear legislation implemented in the region. This obviously demonstrates that there is a legislative gap as far as the control of BAs in fermented meat products is concerned.

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