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HIGH-PROTEIN CORN: A STAPLE OF A BALANCE DIET IN HAITI

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Abstract: The malnutrition remains a major public health problem in Haiti, especially among children under five years of age and pregnant women, due to limited access to diversified and balanced diets. The Haitian diet is largely based on cereals, especially maize, which is widely grown and consumed as a staple food. However, conventional maize has a low protein content and an unbalanced amino acid composition, especially lysine and tryptophan, which contributes to the risk of protein malnutrition. This paper aims to examine the potential of high-protein maize as a nutritional alternative for improving food security and feed quality in Haiti. The study builds on existing research on malnutrition, maize consumption and crop improvement, in particular the work of the International Maize and Wheat Improvement Centre (CIMMYT), which has developed selection-improved maize varieties. A documentary and bibliographic approach is adopted to analyze the nutritional limits of conventional corn and the potential benefits of high-protein corn in the Haitian context. The originality of this work lies in highlighting the importance of integrating nutrient-enriched maize into the Haitian food system, given the agricultural and dietary importance of this crop. This can help to improve protein intake, diversify nutritional resources and reduce the risk of protein deficiency in vulnerable populations. Its adoption could also support local agricultural development and enhance food security. However, its effectiveness depends on factors such as seed availability, agricultural productivity, consumer acceptance and integration into farming practices.

Keywords: Malnutrition, Public health, Food security, Amino acid, Maize, Food system, Food security, Seed

• Introduction

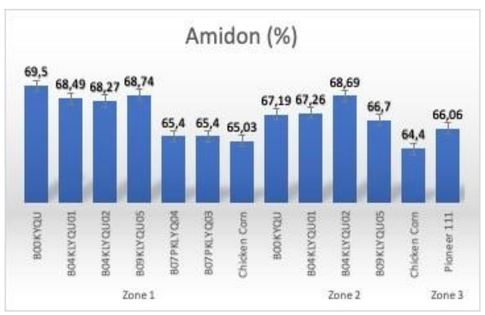
- An individual’s diet largely determines his or her state of health (Amadou, 2011). Since ancient civilizations, the importance of a balanced diet was already in vogue. Indeed, the Greek doctor Hippocrates (5th century BC) asserted, “Make your diet your first medicine” (Anne, 2015). Because a diet unbalanced can cause harmful effects on the body. ındeed, nearly 70% of Haitians are unable to eat properly, and their the diet relies almost exclusively on cereals, notably rice, maize and sorghum (UNAG, 2012). Among these, maize plays a central role: it is the most important crop widespread (CNSA, 2012) and constitutes, for many Haitians in particular the peasants main, even unique, source of daily nutrients (Jean Baptiste, 2006).Yet, despite its massive consumption, maize remains low in protein and presents an unbalanced amino acid profile, with significant deficiencies in lysine and tryptophan (Drogoul et al., 2004). Such dependence on this cereal therefore exposes the population, especially rural, at an increased risk of protein malnutrition. Faced with this observation, the improvement of the nutrition in Haiti has become a top priority. To contribute to it, the International Centre for the improvement of corn and wheat (CIMMYT), based in Mexico, has developed by selection. We intentionally introduced a variety from the southern area of Muntenia, Wallachia, Romania, with a view to achieving a broader and more diversified scope. In these trials, the QPM varieties were compared with the local variety that was obtained from the Levy farm. Given what has just been highlighted, the present study is part of a perspective to assess the chemical composition of the grains of new varieties in order to help assess the potential of QPM maize in the fight against malnutrition in Haiti.

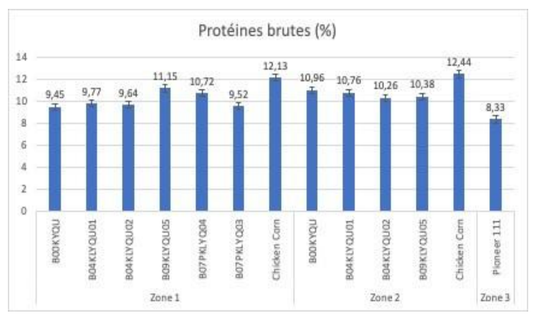
• Material and method

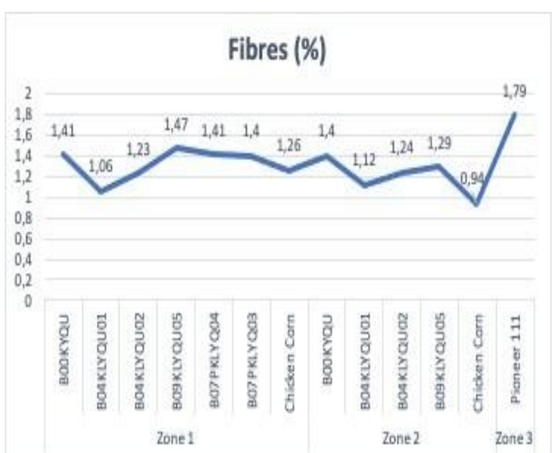
- The basic experimental material considered in this study consists of seven (6) high-protein corn varieties, of a European variety, more precisely from the Romania of the Corteva Agriscience seed plant and a local variety (Chicken Corn) grown in two different experimental sites (Lalouère and the Arcahaie plain). The seeds of Seven (7) varieties of high-protein maize have been produced by the Centro Internacional de Máys y Trigo (CIMMYT) in several different experimental centers and the seeds of the local variety came from the LEVY farm (Port-auPrince-Haïti). The plant material used in this study was produced in two different areas in Haiti. • Lalouère, fourth section, commune of Saint-Marc, the adaptation essay conducted at Lalouère is part of a final year project carried out by student Jackson JEUDI under the supervision of Cindy ULYSSE ING.Agr. MSC and supported by the AKOSAA project. This communal section is located at 19° 07′ 00″ north latitude and 72° 42″ west longitude. It has a rainy season extending from June to November place from April to November (1,300 mm of rain/year) and a dry season that varies between November and May (220 mm of rain/year). The average temperature in the area is 27.9 °C (BAC de Saint Marc, 2013; 34 MARNDR, 2000). Soils come from the degradation of basaltic rocks, limestones and alluvium. Irrigable areas cover an area of 850 ha (MARDR, 2000). The plain of Arcahaie, the experiment conducted in the plain of Arcahaie was also part of a final year project carried out by student Nikson PIERRE under the direction of Aloys NIZIGIYIMANA ING.Agr. MSC and Professor Tescar ROBERS-PIERRE ING.Agr. MSC of the FAMV. This zone is located at 18° 46′ 08″ north latitude and 72° 30′ 46″ west longitude. The average annual rainfall varies between 900 and 1000 mm with a rainy period extending from May to October and a dry period from November to March.

• Results and discussions

- Data from the chemical analysis of maize, carried out according to the methods mentioned earlier, are presented in the form of tables and graphs for each sample. The results of varieties grown only in the first trial will be included in the tables, but will not be taken into account in the comparisons of averages between the three areas studied. In accordance with the bibliographic references concerning the methods of dosing proteins in corn, we chose to retain the results from Dumas' method. The analyses obtained in this work were analyzed by the Dumas method described in the Materials and Methods part. The results for protein content in corn samples are shown. The analysis revealed significant differences between the varieties. The protein content ranged from 8.33%, 9.45%, to 12.44%. The Chicken Corn variety recorded the highest content, with 12.13% in the first trial and 12.44% in the second. Conversely, the varieties B00KYZQU (9.45%) and B04KLYZQUP02 (9.64%), and Pioneer 111 (8.33%) had the lowest levels. The results indicate that the protein content was slightly lower for the varieties grown in the first zone compared to those grown in the second and third zones.









• Conclusions

- The objective of this study was to analyze the chemical composition of grains of six maize varieties QPM (Corn Protein Quality), from a hybrid variety grown in Europe mainly in the southern area of Romania and of a local variety, grown in two distinct agricultural environments in Haiti. Faced with the variability observed in QPM corn and to the specificities of the Haitian environment, and the particularity of the European context we have formulated the hypothesis that varietal testing would provide a better understanding the expression of the protein character of new varieties. study highlighted the potential of QPM maize varieties, in particular B00KLYZQUP, B00KLYZQUP05 and B00KLYZQUP02, whose high lysine content confirms their nutritional superiority in the two environments tested. These results validate our initial hypothesis and highlight the importance of varietal testing to assess protein character expression, especially in agricultural contexts as contrasted as those of Haiti and Romania. The local variety Chicken Corn, with its high protein content, also deserves special attention, as it could represent a local alternative adapted to the nutritional needs and conditions of haitian culture.

- Indeed, as recommendations for the future, it is necessary to continue varietal testing by integrating more sites representative of Haitian conditions, to confirm the stability of the protein character of QPM varieties. Then make a complete evaluation of the nutritional value of promising varieties, in collaboration with specialized laboratories, to guide farmers' choices and agricultural policies. Then, to promote the adoption of QPM maize in Haiti, by supporting training and seed distribution programs, to make it an effective lever against malnutrition. Ultimately, this study opens up promising prospects for improving food security in Haiti, while highlighting the need for an integrated approach, combining varietal innovation, local adaptation and nutritional assessment.

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