



Volatile Flavour Compounds of New Rice for Africa (NERICA) Varieties and the Effect of Nitrogen Fertilizer Rates in their Production in Lake Victoria Basin, Western Kenya

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Rice (*Oryza sativa* L.) is a staple food worldwide. Due to high food insecurity, New Rice for Africa (NERICA), an inter-specific high yielding upland rice variety, was developed in part address food insecurity in Africa. Consumers prefer aromatic rice cultivars. The aroma characteristics are due to composition of the volatile flavour compounds (VFC). Although some NERICA varieties are preferred and some claimed to be aromatic, their VFC compositions have not been characterised. Nitrogenous fertilizers use and location of production cause variations in quality of paddy and low land rice varieties. Influence of nitrogen fertilizers and geographical location of production on the VFC composition of NERICA varieties have not determined. The composition of VFCs of cooked NERICA 1, 4 and 10 varieties and influence of nitrogen fertilization and location of on VFC composition were investigated in western Kenya. A total of 110, 100, and 100 VFCs were detected in NERICA 1, 4 and 10, respectively. These included green leaf volatiles, terpenes and aromatic compounds. 2-Acetyl-1-pyrroline, responsible for desirable aroma in lowland and paddy rice varieties was detected in NERICA 1. Green leaf volatiles that reduce rice aroma quality increased while terpenoid compounds generally declined with nitrogen fertilizer rates increase. Africa has lagged behind in rice production with most of the rice consumed imported from Asia and other

continents. Serious concerns have been raised on the quality of rice imports since Africa has been claimed to be a dumping ground for substandard rice. Due to the 2008-2009 global food-price crises, major incentives to increase domestic rice productions in Africa were put in place. Consequently, rice production in Sub-Saharan Africa rose by 16-18% in 2008 and a further 4.5% in 2009. The increase in rice production was partly due to entry into production of New Rice for Africa (NERICA). NERICA is an inter-specific hybrid of *Oryza sativa* and *O. glaberrima* developed by West African Rice Development Association (WARDA) in Cotonou, Benin. The individual VFC concentrations varied with location of production. Results explain the preferred aroma in NERICA 1 and confirm that application of high nitrogen rates impair quality of NERICA varieties. A total of 112 volatile compounds were identified in NERICA 1, 4 and 10 varieties. The compounds were classified as green leaf volatiles, aromatic and terpenoid compounds. NERICA 1 is aromatic due to the presence the highest number of volatile flavour compounds and in particular, the presence of the key aroma compound 2AP. This contrasted to NERICAs 4 and 10 which had fewer flavour compounds and lacked 2AP. Maximum accumulation of volatile compounds occurred at N-rates between 60 to 100 Kg N/ha, and is suitable for production of aromatic NERICA varieties.

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