J Food Process Technol 2016, 7:9(Suppl)
http://dx.doi.org/10.4172/2157-7110.C1.048

Aerobic rice technology: Farmers' strategy to fight impacts of climate change in Cagayan Valley, Philippines

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Philippines is experiencing the impacts of climate change that greatly affected the agriculture sector. Aerobic rice technology, a technology using water saving rice varieties was introduced and adopted by rice farmers in Cagayan Valley, Philippines way back in 2009 to increase their production. This study determined the extent of technology application of farmer-adopters in the region. The study utilized survey interviews and farm documentations to 120 rice farmers. The data was analyzed using descriptive statistics generated through SPSS. Majority (73%) of the farmers were males and their average age was 48 years old. More than half (59%) had incomes of US$900 to $1,300. All respondents reached secondary and tertiary school and 80% attended farming-related trainings. Respondents' type of rice farm is flat (with scarce irrigation and rainfed) and their average farm size is 2.2 hectare (ha). Some (44%) of them sourced their water from the ground and from national irrigation systems while 48% sourced their farm inputs from own funds. Sources of information about ART were through researchers (41%) and Department of Agriculture extensionists (39%). Majority (34%) were new adopters and more than half (52%) affirmed to continue planting aerobic rice varieties. Most farmers grew aerobic rice varieties using organic fertilizer and natural farming, saving water by 75%. Their average yield ranged from 3.5 to 5 tons per ha. The yield is comparable to high yielding rice varieties that require huge amount of water and other farm inputs. The technology is feasible for water scarce and rainfed areas.

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Portable electronic nose applied for determination of contaminants in milk

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Milk is one of the most consumed foods in the world and one of the most likely to suffer adulteration by adding water or even chemical substances, which represents a serious risk to consumer health. Due to this, the development of more effective tools for the analysis of milk has been the subject of constant studies. Among the characteristics of milk, the aroma is one of the most important and can say much about the quality of the product. The electronic nose has demonstrated to be a promising tool for the analysis of flavorings and similar to human olfaction. It uses an array of chemical sensors with partial selectivity associated with pattern recognition powerful techniques. Among them the artificial neural networks have shown satisfactory performance and efficiency, being the most used for discrimination of aromatic profiles. This paper presents the performance of a portable electronic nose designed for the quality evaluation of milk when it is subjected to adulteration by chemicals such as formaldehyde, sodium hydroxide and urea. The differential of this device compared to hallowed techniques of physicochemical analysis is the possibility of obtaining real-time response and adds portability, low cost and simple interface. For two months, we analysed five commercial brands of milk and from these, samples were separated containing different proportions of the contaminants cited and altogether 40 samples were analyzed. For the recognition and classification of each contaminant we used a neural network multilayer perceptron. In addition, other techniques facilitated the development of neural network such as the bootstrap resample used to create a network training data set from the original samples. Network parameters were adjusted using sequential simplex optimization and the reliability of the results was analyzed through statistic tools. The neural network showed satisfactory performance recognizing all contaminants from the set of test samples constituted only by the original samples, samples used for training obtained from the bootstrap. 95% were correctly classified as 97% of validation samples. This demonstrates that the network is able to learn to identify the aromatic profile of each contaminant. The advantage observed by the incorporation of artificial neural networks to the electronic nose is the possibility to circumvent the effects of noisy signals and interferences which the electrical measurements are subject to. This is the first time that the electronic nose is applied to discriminate milk when subjected to adulteration by various types of contaminants which makes it an innovative tool for the dairy industry.

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