In Vitro and in Situ Activities of Lipolytic Enzymes and Hydrolysis of Lipids in Flour of Pearl Millet Designated B-lines

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Abstract—*Flour of 30 pearl millet designated B-lines was stored at 37^{O}C and relative humidity (RH) of 40-50 % for 10 days. These lines differed considerably in respect of fat acidity (FA) of fresh flour and development of FA in stored flour. High variability in in vitro and in situ activities of lipolytic enzymes in fresh flour of the genotypes was present. Activities of lipolytic enzymes did not vary with period of storage. Fat acidity (FA) in fresh flour of these lines varied from 9 to 46 mg KOH/100g with an average of 21 mg KOH/100g. Average FA on 5th and 10th day of storage of flour was 90 and 181 mg KOH/100g. Thus an equal increase in FA was recorded during the first five days and the next five days of storage. However, the genotypes differed in total buildup of FA by 10th day of storage ranging from 116 to 219 mg KOH/100g. In vitro activity of esterase was highly correlated with its in situ activity (by correlation coefficient of 0.915**) as well as with in situ activity of lipase (by correlation coefficient of 0.959**). In situ activity of esterase was also more strongly correlated with in situ activity of lipase by a correlation coefficient of 0.976**. A strong positive correlation was found between FA developed by 10th day of storage of flour and in vitro esterase, in situ lipase and in situ esterase with correlation coefficients of 0.715**, 0.583** and 0.512**, respectively. No correlation was found between lipids content and either total FA or rate of development of FA or activities of esterase and lipase. This indicated development of FA is controlled by action of lipolytic enzymes and not by lipid contents. Implications of changes in lipolytic activities on storability of flour are discussed.*

Keywords*: Pearl millet, designated B-lines, in situ lipase, in situ esterase, storage, fat acidity.*