

Comparative evaluation of different packaging materials for chickpea dhal quality over storage

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ABSTRACT

Chickpea (*Cicer arietinum* L.) is the premier leguminous crop cultivated in India, but it experiences lower yields due to biotic and abiotic stresses, particularly insect pest infestations during storage. The major post-harvest loss is due to inappropriate choice of packaging material. So, the present study aims to investigate suitable packaging material for storing Kabuli chickpea splits (cv. JG11). Processed chickpea splits were stored for 8 months in five different packaging materials viz., High Density Polyethylene (HDPE), Jute bags (JB), Low Density Polyethylene (LDPE), Biaxially Oriented Polypropylene (BoPP), and Polyethylene Terephthalate (PET) containers at ambient temperatures of 19-37 °C and relative humidity of 23-92%. During 8 months of storage, chickpea seed health quality parameters such as moisture content (%), protein content (%), mass loss (%), insect species, uric acid (mg/100g) and microbial load (CFU/g) were assessed for every two months. The moisture content (%w.b) of stored chickpea in different packaging materials ranged from 8.73 to 9.95%. The moisture content increased up to 4 months of storage period, then followed a decreasing trend in all the packaging materials. The protein content decreased in all packaging materials over the storage period. Mass loss by insects was not detected in chickpea samples stored in PET and BoPP material throughout the storage period. Insects namely *Callosobruchus chinensis*, *Tribolium castaneum*, *Rhyzopertha dominica* were observed in chickpea stored in JB and LDPE after 2 months of storage. But infestation was observed after 6 months of storage in HDPE. Due to more infestation, chickpea uric acid levels ranged from 7.84 to 1661.15 mg/100g during the storage period. Cooking time recorded was less than 24 min for all the chickpea samples stored in different packaging materials. Chickpea stored in JB significantly recorded highest bacterial count (4.88×10^6 CFU/g) and fungal count (3.99×10^3 CFU/g) followed by LDPE and HDPE. Whereas, in HDPE bacterial and fungal only was found after 6 months of storage (1.55×10^6 CFU/g) and (1.51×10^3 CFU/g). It was observed that PET storage container performed better in retaining the quality parameters during the storage amongst all the packaging materials for stored chickpea grain storage upto 240 days of storage due to the creation of hermetic conditions inside.

Keywords: BoPP, LDPE, Chickpea, HDPE, Jute, Microbial load, PET, Protein content and Uric acid