

CHANGES IN PROTEIN CONTENT AND ELECTROPHORETIC PATTERNS DURING GERMINATION OF *AMARANTHUS HYBRIDUS* SEEDS

B. O. OBOH* and R. A. AFOLABI

Department of Cell Biology and Genetics, University of Lagos, Akoka, Lagos, Nigeria.

ABSTRACT

Amaranthus hybridus seeds were germinated in dark and light conditions over a 72-hour period. At specific intervals, the protein concentration and SDS – PAGE analysis of the seed protein extracts were determined. The results showed that there was a gradual decrease in the protein concentration from dry seeds to seeds germinated for 72 hours, with seeds germinating in the dark decreasing faster than such seeds germinated in the light. SDS – PAGE analysis further revealed that there were 3 major storage proteins in the dry seeds and these appeared in varying intensities over the 72-hour period. In some cases, the major protein totally disappeared as was the case of the protein with a molecular mass of 96.6 kDa which was actively utilized during germination especially up to the 48-hour period at which time the lowest possible number of protein bands occurred in both light and dark conditions.

Keywords: *Amaranthus hybridus*, Protein content, Germination, Electrophoretic patterns.

INTRODUCTION

Dry seeds are characterized by low metabolic rates, which may be due to their low moisture content of about 5 – 10%. However, the potential for metabolism still exists in dry seeds such that a lot of physiological and biochemical changes begin to occur when the apparent metabolic dormancy of dry seeds is disrupted by imbibition in the process of germination (Usha and Singh, 1996). The breakdown of stored proteins, lipids and carbohydrates occurs in the endosperm as soon as germination progresses in order for energy and other nutritional requirements to be provided for the embryo. Seed storage proteins are mobilized during germination and they function in supplying nitrogen and carbon to the growing embryo. This breakdown and mobilization of stored proteins affects the protein concentration in seeds during germination and may be reflected in the electrophoresis patterns in germinating seeds.

Amaranthus hybridus is a broad-leafed plant belonging to the family Amaranthaceae. It is usually cultivated as a pot-herb for medicinal purposes (Norman, 1992). It forms a large intake of leafy vegetable especially in West Africa (Ruskin, 1984). It grows vigorously, resists drought and pest and easily adapts to new environments. The seed has a protein content of about 16%, which compares favourably with conventional cereals such as wheat (12 – 14%), rice (7 – 10%) and maize (9 – 10%) (Harris *et al.*, 1980). Thus, it is one of the few non-grasses to produce significant amount of edible cereal grain. The seed head may be as long as 50cm resembling those of sorghum. Seeds are usually a little bigger than a mustard seed of about 0.9 – 1.7mm in diameter and varies in colour from golden, cream, pink, black or brown (Daloz, 1980). It is, therefore, a potentially important crop as it is used both as a leafy vegetable and cereal crop in the tropics. In Nigeria, it is being incorporated into the breeding programme for grain amaranth because it has the potential to impact early maturity from vegetable to grain types.

The aim of this research is to understand the phenomena that occurs in germinating *A. hybridus* seeds through an evaluation of the total protein content and study possible variations in the electrophoretic patterns during germination in light and dark conditions.

*65 Author for correspondence ; E-mail: bolaoboh@yahoo.co.uk

Fig. 1: Protein Content in Seeds germinated in Light and Dark

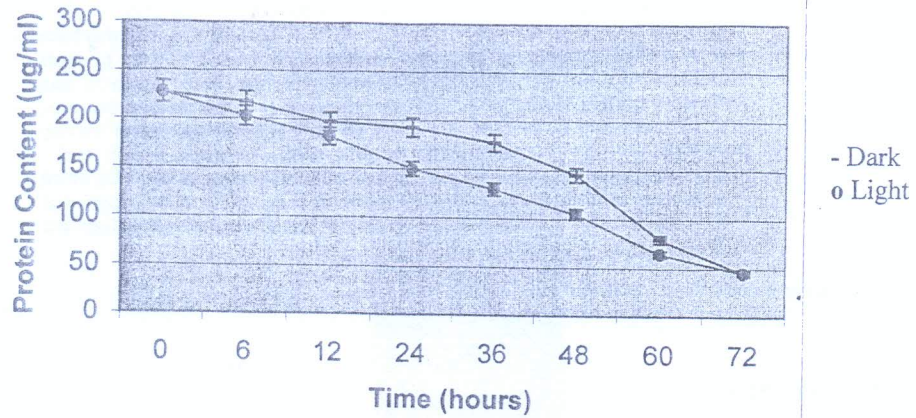


Fig. 2: Number of Protein Bands in Seeds germinated in Light and Dark

