# THE ENDOSPERM CAVITY OF WHEAT GRAINS CONTAINS A HIGHLY HYDRATED GEL OF ARABINOXYLAN

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In the developing wheat grain, as in other cereals, storage compounds accumulate in a specialized tissue: the endosperm, to insure the sustenance of the embryo and seedling during germination and post-germinative growth [1-2]. The transport of water and precursors of storage compounds from the maternal vascular tissue to the endosperm passes through the chalaza, the nucellar projection cells, towards the aleurone transfer cells and starchy endosperm transfer cells [3]. In wheat, as in barley, the nucellar projection cells and the endosperm transfer cells are separated by a cavity named endosperm cavity filled with a gel-like structure and where nutrients and water are released [3-4]. The aim of the study was to identify the compound responsible for the gel-like appearance and to explore its biological function.

Light microscopy showed that the gel-like structure is present in the developing grain and persists in dry mature grain and during subsequent imbibition. Fourier transform infrared spectroscopy and immunolabeling revealed the presence of weakly substituted arabinoxylans in the cavity. The immunolabelling results also strongly suggest that these arabinoxylans are synthesized in the nucellar epidermis during grain development, from where they are subsequently released in the cavity. In addition, ester-linked ferulic acid and ferulate dimers, markers of arabinoxylan chains cross-linkages, were detected by UV autofluorescence microscopy and biochemical analysis of the microdissected cavity. Feruloylated arabinoxylans are known to have gel-forming and water absorbing properties [5]. Thus, it is reasonable to assume that feruloylated arabinoxylans are responsible for the formation of the gel structure in the cavity. Microscopic magnetic resonance imaging showed that the hydration level in the cavity content is high and maintained at the same level from the filling stage to the desiccation stage although the grain water level drops at the desiccation stage. The highly hydrated arabinoxylan gel might contribute to regulate nutrient delivery to the endosperm and grain hydration [6].

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