

Expression of Isocitrate Lyase and the Abundance of β -tubulin: Feasible Markers for the Estimation of Germination Processes in Differently Processed Green Coffees

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SUMMARY

In order to monitor germination processes in coffee beans during post harvest treatments, two approaches have been pursued: 1) expression studies with germination-specific enzymes i.e. that of isocitrate lyase (ICL) and 2) analyses of cell cycle activity and cell division. ICL was quantified by RT-PCR, using specific primers deduced from a homologous probe. As reliable marker for cell division, the occurrence of β -tubulin was determined. This protein assembles the microtubules and thus is an indispensable constituent of cell division. The abundance of β -tubulin was visualized in Western blots using specific antibodies.

Whereas in fresh coffee seeds neither ICL transcripts nor β -tubulin molecules were abundant, both components are found in significant amounts in processed ones. In the case of wet process coffees the highest rate of ICL expression and the highest amount of β -tubulin were detectable already at the first day after the onset of processing. In contrast, in dry process seeds, peak levels were found after about four to six days after the start of post harvest treatment.

These results unequivocally prove that germination plays a role in coffee processing and that the extent of this metabolism differs between wet and dry processed coffees. These new insights establish a basis to explain the quality differences of differently processed green coffees and underline the so far underestimated relevance of coffee seed physiology for questions of coffee quality.