

The Effect of Black Bean, Black-Green Bean and Immature Bean Defects in *Espresso* Coffee: One Single Bean Can Spoil One Cup

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SUMMARY

A cup of *espresso* coffee is the result of the percolation of hot water under pressure through a bed of approximately fifty roasted and ground coffee beans. Due to the extremely high yield, the beverage is richer in flavour, when compared to other brewing methods, but it is also so sensitive to possible defects that it is said that "one single defective bean can spoil one cup". We investigated this statement by means of sensory analysis. Therefore we took into considerations some of the worst visual defects - black beans, black-green beans, immature beans and brown (sour) beans - and evaluated cups with different concentrations of each defect by means of sensory analysis. A lot of care was paid selecting both the defective and non defective beans, in order to start the experiment in controlled conditions. A trained panel evaluated *espresso* cups according to a complete block experimental design with replicates. Statistical analysis showed that, in case of black bean and black-green bean defects, 2% are enough to be clearly perceived and therefore modify the flavour of the *espresso*. This percentage corresponds to one bean per cup. Furthermore, the qualitative description of the cup changes according not only to the type of defect (being black bean and black-green bean very different in their sensory profile), but also to the concentration at which the defect is present in the cup. This means that single compounds chemical analyses are not exhaustive in *espresso* flavor description, unless a pattern recognition approach is used instead of a peak to flavour one to one matching

Key words: *espresso*, cup quality, sensory analysis, black bean, immature bean, black-green bean