

# Quality of Shaded and Unshaded Organic Coffee: Presence of Fungi, Ochratoxin A and Caffeine Content

O. FREITAS-SILVA<sup>1</sup>, T.Q. OLIVEIRA<sup>1</sup>, F.Q. CUNHA<sup>1</sup>, M.L.M. SOUZA<sup>1</sup>,  
R.L.O. GODOY<sup>1</sup>, M.S.F. RICCI<sup>2</sup>

<sup>1</sup>Embrapa Food Technology, Rio de Janeiro, BR

<sup>2</sup>Embrapa Agrobiology, Seropédica, BR

## SUMMARY

Coffee (*Coffea arabica* L.) is a tropical crop grown in 75 countries with a total production close to 108 million t of beans. The arabica coffee plant, as the principal economic species, contributes 70% of the world's commercial coffee. The environmental conditions of coffee organic production in shaded and unshaded coffee may alter the fungi flora associated with coffee grains, as well as their population dynamics and consequently coffee quality attributes. These changes may predispose the predominance of fungal species, particularly *Aspergillus* section *Circumdati* and stimulate the synthesis of mycotoxins, such ochratoxin A (OTA). To evaluate these two organic production systems, shaded and unshaded, were collected samples from six coffee cultivars (Icatu, Oeiras, Catuaí, Obatã, Catucaí and Tupi), coffee cultivated in the Experimental Station of Embrapa Beef Cattle, Juparanã, Rio de Janeiro, Brazil. In the laboratories of Mycotoxins and Mycology and Liquid Chromatography of Embrapa Food Technology, samples were evaluated on their water activity, the percentage of OTA potentially producers fungi, OTA contamination, total nitrogen and caffeine content. The results indicated values of water activity among 0.607 to 0.645. The coffee grains from shaded production showed higher percentage of fungal contamination by *Aspergillus* sections *Circumdati*, *Flavi* and *Nigri*, respectively. The analysis of OTA in green coffee was performed by the High Efficiency Liquid Chromatography (HPLC). The levels of OTA in shaded coffee ranged from not detected to 0.78 µg/Kg and in unshaded coffee to not detected to 1.95 µg/Kg. It was observed on shaded organic coffee fungi contamination and OTA production levels less than the unshaded ones. Samples from unshaded coffee presented values of total nitrogen (2.04 g/100 g) and caffeine (1,11 g/100 g) levels minors than shaded, 2,14g/100 g and 1,24 g/100 g, respectively. This fact shows that shaded coffee trees could help to better nutrients up take available for plant, as well nitrogen and transforming it into caffeine, and so unshaded production provides more decaffeinated coffee than shaded. Although the organic production is also subject to natural contamination, the levels of OTA found were within the limits allowed by the European Community, parameter used nowadays, considering there is no Brazilian Regulation for this toxic metabolite. The results showed that all varieties of organic coffee in both production systems were safety to the consumers.