

QUALITY DETERMINATION ON HONEYBEES AT BRAZILIAN REGION: PROPOSAL FOR RESIDUES MONITORING AS CONTRIBUTION FOR ORGANIC HONEY PRODUCTION

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Introduction

Honey is an important bee product often used for nutritional, therapeutic and medical purposes. Main producer countries are China, Argentina, Mexico and Brazil, but they have got problems to guarantee that honey is not contaminated by residues of antimicrobial drugs, pesticides and metals so these contaminants must be controlled on honey. Sulfonamides have been worldwide used to treat honeybee diseases and residues of these compounds need to be controlled in honeybee products. Besides sulfonamides, organochlorines and other pesticides are problem that beekeeping has to face. Regarding they are pollinating insects, bees can be easily contaminated by the contaminants which can be achieve their products [1,2]. In Brazil, the Ministério da Agricultura, Pecuária e Abastecimento (MAPA) established control on following sulfonamides: sulfathiazole (STZ), sulfamethazine (SMZ), sulfadiazine (SDZ), sulfaquinoxaline (SQX) and sulfachloropyridazine (SCPD). Organochlorine Pesticides residues that should be also controlled are: Aldrin, endosulfan, 4,4-DDE, 4,4-DDT, Dodecachlor and others. Maximum residue limits (MRL) were defined as 100 $\mu\text{g kg}^{-1}$ for sulfonamides and 10 $\mu\text{g kg}^{-1}$ for organochlorine pesticides [3]. This work aims to apply analytical methodologies to control referred contaminants on honey samples from Alto Turi – Maranhão, considered an important honeybee production region.

Methodology

Preliminary results have been made on our research. SILVA (2008) developed and validated a method for determination of sulfadiazine (SDZ), sulfathiazole (STZ), sulfamethazine (SMZ) and sulfadimethoxine (SDM) using high performance liquid chromatography-diode array detector (HPLC-DAD) that had been proved as precise and sensitive enough [4]. Sample pretreatment included acidic hydrolysis followed by solid-phase extraction (SPE). It was used polymeric Absolut Nexus cartridge (60 mg, 6mL) followed by chromatographic separation on a Phenomenex C-18 analytical column (150 x 4,6 mm, 4 μm). Gradient elution with acetonitrile/water was used and wavelength detection was made at 270 nm. Another liquid chromatographic methodology was used to analyze pesticides that included solid-phase preconcentration with Stract-X (500 mg, 6 mL) adsorbent followed by Florisil clean-up. Separation and posterior analysis were made with gradient elution (acetonitrile/water at pH 3,0 with acetic acid) on the same C18 analytical column followed by UV detection (wavelength at 220 nm).

Results

Average recoveries for spiked honeybee samples ranged from 72 to 90% and detection limits for sulfonamide varied from 20 to 40 ng g^{-1} . For pesticides, recoveries were lower but it was possible to detect 100 ng g^{-1} . New test are being made to improve detection levels.

References

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