Preliminary study of hydroxymethylfurfural (HMF) presence in syrup to feed bees in Belgium

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In 2009-2010 in Belgium, abnormal losses of colonies of bees were observed. Later analyses showed that some of these colonies had been fed during winter with syrup of inverted beet sugar which presented a high concentration of hydroxymethylfurfural (HMF). Several studies confirmed a toxic effect of the HMF on the health of the bee. At the moment, the absence of toxicological data of reference does not allow to establish a limit of definitive action susceptible to stop the problem. Preliminary study on HMF in syrups (for wintering or stimulation) to feed bees has been realised in order to point out HMF formation. We have compared several home-made syrups and commercial syrup often used by beekeepers in Belgium. Several measurements have been performed on all syrups stored at three different temperatures: pH, sugars composition, and HMF content. The results showed that most of the analyzed syrups contained mainly saccharose, had pH around 7 and a very little HMF content (< 5ppm). More interesting, commercial syrup and home-made syrup of water and saccharose mixed with pollen mainly contained fructose and glucose, and had acid pH around 3.5. Thus they contained the highest HMF content as well. These results highlighted the importance to standardize the production of syrup for beekeepers and especially for commercial producers that use directly fructose and glucose in their mixture.