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Scientific note

A scientific note on the Phadebas method for honeys with low enzyme content[1]

Livia Persano Oddo*, Patrizio Pulcini

Istituto Sperimentale per la Zoologia Agraria, Sezione di Apicoltura,
Via Leonida Rech, 36 000156 Rome, Italy

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The Phadebas method for measuring the diastase content in honeys was proven to be simple and effective [1], and it is currently used in many laboratories. The correlation between the absorbance at 620 nm of the Phadebas solution and the correspondent value of diastase number (DN) according to the Schade method [5, 6], was confirmed through a European ring trial [2, 3] and is given by the formula:

$$DN = 28.2 \times \Delta A_{620} + 2.64 \quad (1)$$

This linear regression was validated on honey samples ranging from 11 to 39 DN. However, a problem arises when honeys with a very low enzyme content are analysed, as is the case for old or heated honeys, or for a few unifloral honeys, or for *Melipona* honeys [7]. In fact, applying the formula, the DN value cannot go under the intercept value of 2.64.

In order to verify the relation between absorbance of the Phadebas solution and DN values at low diastase levels, 54 honey samples (most of them very low in diastase) were analysed using both the Schade and the Phadebas methods.

In the range of DN from 0 to 6 (34 samples), the following linear regression was found (*figure 1*):

$$DN = 35.17 \times \Delta A_{620} - 0.46 \quad (2)$$

Plotting all the data (54 samples, from 0 to 44 DN), a very good correlation ($R^2 = 0.993$) was found with the following polynomial regression (*figure 2*):

$$DN = -4.37 \times \Delta A_{620}^2 + 31.38 \times \Delta A_{620} + 0.03 \quad (3)$$

The relationship DN/absorbance seems therefore to be better explained by this kind of formula.

However, in the range of DN from 6 to 44 (21 samples), where most natural honeys lie, we can see virtually no difference between the linear and the polynomial regression (*figure 2*), and the linear formula found for our 21 samples fitted very well with the one given by Bogdanov et al. [3]. This formula (1) is therefore more suitable for routine use (honeys with DN in the range 6–40).

Maybe, a greater difference between linear and polynomial formula could occur at higher diastase values, but honeys with DN values over 40 are quite rare. In contrast, honeys with low diastase content (be it naturally or because of ageing or overheating) are much more frequent and it is important to be able to evaluate them correctly, in order to verify their correspondence with the international quality standards [4]. For these honeys, either the above formula (2) or the Schade method should be used.

* Correspondence and reprints
E-mail: isza.apicoltura@flashnet.it
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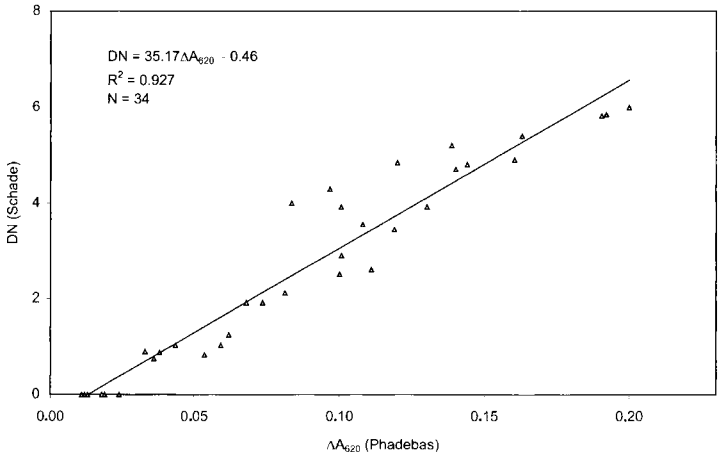

Figure 1. Linear regression between the absorbance at 620 nm of the Phadebas solution and the correspondent value of diastase number (DN) according to the Schade method, found on 34 samples in the range of DN from 0 to 6.

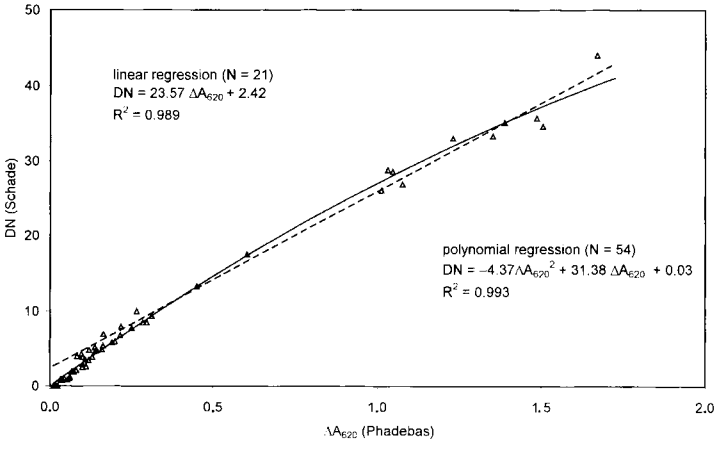

Figure 2. Polynomial regression between the absorbance at 620 nm of the Phadebas solution and the correspondent value of diastase number (DN) according to the Schade method, found on 54 samples in the range of DN from 0 to 44. Comparison with the linear regression found on the 21 samples in the range of DN from 6 to 44.

Note scientifique sur la méthode de Phadebas pour les miels ayant une faible teneur en enzymes

Eine wissenschaftliche Notiz über die Phadebas-Methodik für Honige mit niedrigem Enzymgehalt

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