OXALIC ACID (UV Test)

Intended use
UV Test for the determination of oxalic acid in food such as beer, wine, honey, chocolate, cocoa, rhubarb, spinach, sweet potatoes, tea, most nuts as well as in biological samples.

General
Oxalic acid occurs naturally in quite a large number of plants. Since oxalic acid binds to important nutrients, making them inaccessible to the body, regular consumption of a large amount of foods with high oxalic acid content over a period of weeks may result in nutrient deficiencies, most notably of calcium. High levels of oxalic acid may also contribute to the formation of kidney stones (the most common form of kidney stone is composed of calcium oxalate). Honeybee colonies are treated for parasitic mites with either spraying or trickling of oxalic acid.

Test Principle:
Oxalic acid (oxalate) is cleaved to formic acid (formate) and CO2 at pH 5.0 in the presence of oxalate decarboxylase (1).

(1) Oxalate $\xrightarrow{\text{oxalate-decarboxylase}}$ formate $+ \text{CO}_2$

The formate formed is quantitatively oxidized to bicarbonate by nicotinamide-adenine dinucleotide (NAD) at pH 7.5 in the presence of the enzyme formate dehydrogenase (FDH) (2).

(2) Formate $+ \text{NAD}^+ + \text{H}_2\text{O} \xrightarrow{\text{FDH}}$ bicarbonate $+ \text{NADH} + \text{H}^+$

The amount of NADH formed during reaction (2) is stoichiometric to the amount of oxalic acid. NADH is determined by means of its light absorbance at 334, 340 or 365 nm.

Materials provided:
- 1 x Potassium phosphate/citrate buffer solution (3 ml); pH approx. 5.0.
- 1 x Oxalate decarboxylase suspension (approx. 8 U); 0.5 ml.
- 1 x Potassium phosphate buffer (0.1 M); 45 ml solution; pH approx. 9.5.
- 1 x Lyophilized NAD, Li-salt 420 mg.
- 1 x Formate dehydrogenase lyophilizate (80 U).
- 1 x Oxalic acid assay control solution for assay control purposes (measurement of the assay control solution is not necessary for calculating the results.) Use the assay control solution undiluted.

Kit Specifications:
Detection Limit: - 1.6 mg/l.
Specificity: - The method is specific for oxalic acid.
Linearity: - Linearity of the determination exists from 0.8 µg oxalic acid/assay (1.6 mg oxalic acid/l sample solution; $v = 0.500$ ml) to 40 µg oxalic acid/assay (0.4 g oxalic acid/l sample solution; $v = 0.100$ ml).
Precision: - In a double determination using one sample solution, a difference of 0.005 to 0.010 absorbance units may occur.
Samples Per Kit: - 10 tests.
Product ID #: - E0755699.