Residue Monograph prepared by the meeting of the Joint FAO/WHO Expert Committee on Food Additives (JECFA), 82nd meeting 2016

**Phosphated Distarch Phosphate**

(Tentative)
PHOSPHATED DISTARCH PHOSPHATE
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Prepared at the 82nd JECFA (2016) and published in FAO JECFA Monograph 19 (2016), superseding specifications for Phosphated distarch phosphate included in the specifications for Modified starches prepared at the 79th JECFA (2014), published in FAO JECFA Monographs 16 (2014). An ADI "not specified" was established at the 26th JECFA (1982).

Information is required on:
- A suitable test for identification of the phosphate groups and of crosslinking.

SYNONYMS
INS No. 1413

DEFINITION
Starch is a carbohydrate polymer consisting of a large number of glucose units linked together primarily by alpha 1-4 glucosidic bonds. The starch polymers come in two forms: linear (amylose) and branched through alpha 1-6 glucosidic bonds (amylopectin), with each glucose unit possessing a maximum of three hydroxyls that can undergo chemical substitution.

Phosphated distarch phosphate is a modified starch. It is obtained by esterification/cross-linking of food starch with sodium trimetaphosphate or phosphorus oxychloride combined with esterification with ortho-phosphoric acid, or sodium or potassium ortho-phosphate, or sodium tripolyphosphate, in accordance with good manufacturing practice. The esterification results in partial substitution in the 2, 3-, or 6- position of the anhydroglucose unit unless the 6-position is occupied for branching. In the case of cross-linking, where a polyfunctional substituting agent, such as phosphorus oxychloride, connects two chains, the structure can be represented by: Starch-O-R-O-Starch, where R = cross-linking group and Starch refers to the linear and/or branched structure.

Phosphated distarch phosphate may additionally be subjected to acid, alkali, enzyme, or bleaching treatment in accordance with good manufacturing practice.

C.A.S number
11120-02-8
63055-37-8 (modified amylopectin)

DESCRIPTION
White or nearly white powder or granules or (if pregelatinized) flakes, or amorphous powder or coarse particles.

FUNCTIONAL USES
Thickener, stabilizer, binder, emulsifier
CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Insoluble in cold water (if not pre-gelatinized); forming typical colloidal solutions with viscous properties in hot water; insoluble in ethanol.

Microscopy Passes test
  See description under TESTS

Iodine stain Passes test
  See description under TESTS

Copper reduction Passes test
  See description under TESTS

Phosphate groups Information required

Crosslinking Information required

PURITY

Loss on drying (Vol. 4) Cereal starch: not more than 15.0%
  Potato starch: not more than 21.0%
  Other starches: not more than 18.0%
  (120°, 4 h, vacuum not exceeding 100 mm Hg)

Phosphate (calculated as phosphorus) (Vol. 4) Not more than 0.5% on the dried basis for potato and wheat starch
  Not more than 0.4% on the dried basis for other starches

Sulfur dioxide (Vol. 4) Not more than 50 mg/kg on the dried basis for modified cereal starches
  Not more than 10 mg/kg on the dried basis for other modified starches

Lead (Vol. 4) Not more than 2 mg/kg on the dried basis

Determine using a method appropriate to the specified level. The selection of sample size and method of sample preparation may be based on principles of methods described in Volume 4 (under “General Methods, Metallic Impurities”).

Manganese (Vol. 4) Not more than 50 mg/kg on the dried basis

Determine using a method appropriate to the specified level. The selection of sample size and method of sample preparation may be based on principles of methods described in Volume 4 (under “General Methods, Metallic Impurities”).

Carboxyl groups (Vol. 4) Not more than 0.1% on the dried basis

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TESTS

IDENTIFICATION TESTS

Microscopy  Modified starches which have not been pre-gelatinized retain their granular structure and can be identified as starches by microscopic observation. Shape, size and sometimes striations are characteristics of the botanical origin. In polarized light under cross nicol prisms the typical polarization cross will be observed.

Iodine stain  Add a few drops of 0.1 N potassium tri-iodide to an aqueous suspension of the sample. These starches stain with iodine in the same way as native starches. The colour can range from dark blue to red.

Copper reduction  Place about 2.5 g of the sample previously washed with water, in a boiling flask, add 10 ml of dilute hydrochloric acid (3%) and 70 ml of water, mix, reflux for about three hours and cool. Add 0.5 ml of the resulting solution to 5 ml of hot alkaline cupric tartrate TS. A copious red precipitate is produced.