

Alicyclobacillus Detection Agar

Cat. 2002

For the detection of Alicyclobacillus spp. in fruit juices.

Practical information

Applications	Categories
Detection	Alicyclobacillus

Industry: Juices

Principles and uses

Alicyclobacillus Detection Agar is a medium for the detection of Alicyclobacillus spp. in fruit juices.

Alicyclobacillus is a genus of Gram-positive, rod-shaped, spore-forming, bacteria. The bacteria are able to grow in acidic conditions, while the spores are able to survive typical pasteurization procedures. Alicyclobacillus are strictly aerobic, acidophilic, thermophilic, soil-dwelling organisms, with an optimum growth at temperatures between 42–60 °C at a pH of 3.5 – 4.5 (growth range pH 2.2 – 5.8). Their spores survive for long periods in fruit concentrates and similar environments.

Spoilage of shelf-stable fruit juice products by Alicyclobacillus bacteria can be very costly. It is therefore important that concentrates and other raw materials are screened for spores of these taint producers to reduce the risk of spoilage of processed products.

Its presence in packaged products can cause flavor alterations. They do not produce gas or cause any change in the appearance of the beverage container, and therefore the spoilage is discovered only when the consumer opens and begins to consume the product. Fortunately, Alicyclobacillus are not pathogenic bacteria.

D(+) Glucose is the fermentable carbohydrate providing carbon and energy. Yeast extract is source of vitamins, particularly the B-group. Monopotassium phosphate acts as a buffer system. The medium is especially characterized by the presence of many trace elements which supply all of the specific requirements for these bacteria. pH value and the high incubation temperature inhibit the contaminating flora. Bacteriological agar is the solidifying agent.

A.acidoterrestris can be differentiated from A.acidocaldarius by incubating cultures at 30, 45 and 65 °C. A.acidoterrestris does not grow at 65 °C and A.acidocaldarius does not grow at 30 °C.

Formula in g/L

Ammonium sulfate	0,2	Bacteriological agar	18
Boric acid	0,0001	Calcium chloride	0,25
Copper sulfate	0,0006	D(+) Glucose	5
Magnesium sulfate	0,5	Manganase sulfate	0,00015
Potassium dihydrogenphosphate	3	Sodium molybdate	0,0003
Yeast extract	2	Zinc sulfate	0,00018

Preparation

Suspend 29 grams of the medium in one liter of distilled water. Mix well and dissolve by heating with frequent agitation. Boil for one minute until complete dissolution. Dispense into appropriate containers and sterilize in autoclave at 121°C for 15 minutes.

Note. - The medium is manufactured with a pH of $5,3 \pm 0,2$ in order to maintain the gel strength during sterilization. Adjust the pH at $4,0 \pm 0,2$ after autoclaving, adding 1.7 ml per liter of medium of 1 N H₂SO₄. Homogenize gently and pour into petri plates.

Instructions for use

- Incubate the medium for 3-5 days at 45 ± 1 °C.
- Confirm the suspicious colonies by further testing.

Quality control

Solubility	Appearance	Color of the dehydrated medium	Color of the prepared medium	Final pH (25°C)
w/o rests	Fine powder	Beige	Amber	5,3± 0,2

Microbiological test

Incubation conditions: (45±1 °C / 3-5 days).

Microrganisms	Specification
Escherichia coli ATCC 25922	Inhibition
Alicyclobacillus acidocaldarius ATCC 27009	Good growth
Alicyclobacillus acidoterrestris ATCC 49025	Good growth

Storage

Temp. Min.:2 °C
Temp. Max.:25 °C

Bibliography

- BAUMGART, J. and MENJE, S.: The Impact of Alicyclobacillus acidoterrestris on the Quality of Juices and Soft Drinks. Fruit Processing 7; 251- 254 (2000).
- IFU Working Group Microbiology: First Standard IFU-Method on the Detection of Alicyclobacillus in Fruit Juices. (April 2003).
- Jensen Nancy, Evaluation of detection methods for alicyclobacilli in fruit juice concentrates in Australia. Food Science, Australia.
- Akira Yokota, Tateo Fujii, Keiichi Goto, Alicyclobacillus: Thermophilic Acidophilic Bacilli. Springer (2008).
- Chang SS, Kang DH. Alicyclobacillus spp. in the fruit juice industry: history, characteristics, and current isolation/detection procedures. Department of Food Science and Human Nutrition, Washington State University, Pullman, Washington 99164-6376, USA.