



Thirumalai
Chemicals Ltd.

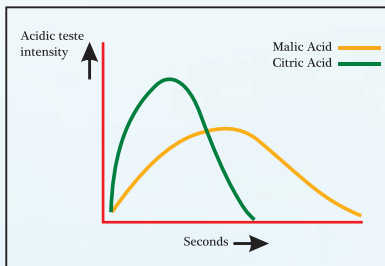
Malic Acid

Malic Acid is a major, natural organic acid occurring in Fruits and Berries. Contrary to popular belief, Malic Acid and not Citric Acid is the prominent constituent of many fruits.

The pleasant and refreshing experience of biting into a juicy apple or cherry is mostly due to Malic Acid. In fact, Malic Acid derives its name from the Latin word 'Malum' for apple.



Malic acid blends extremely well with an extensive range of essences and flavours. It has a smooth build up and a longer retention of flavour when compared to citric acid.



Malic Acid's natural anhydrousness, non – hygroscopicity, nonvolatility and excellent solubility make it 'the preferred acidulant' in more and more applications.

Applications	Benefits
Beverages – <ul style="list-style-type: none"> Carbonated beverages Non carbonated beverages Concentrates Powdered mixes Dry beverages Ciders and Wines 	<ol style="list-style-type: none"> Smooth lingering taste Flavour enhancement Easy solubility Masks aftertaste Compatible with a wide range of flavours Longer shelf life pH stability Economy in acidulant consumption
Confectionery <ul style="list-style-type: none"> Hard and Soft candy Sugar-less confectionery Chewing gum 	<ol style="list-style-type: none"> Flavour enhancement Easy incorporation Improved clarity and brightness of the end product Longer shelf- life
Fruit preparations and preserves <ul style="list-style-type: none"> Canned fruits and vegetables Jams, jellies and fruit chews Desserts Bakery products 	<ol style="list-style-type: none"> pH stability Intensified flavour Better compatibility with natural flavours. 'Anti-browning' synergistic effect Economy in acidulant consumption Improved texture and compatibility
Dietary Products	<ol style="list-style-type: none"> Economy due to synergy with sugar substitutes Masks aftertaste Improved overall taste
Edible Oils	<ol style="list-style-type: none"> Controlling oxidative rancidity Renewing and controlling trace metal impurities, as a sequestering agent
Other non – food Applications	<ul style="list-style-type: none"> Animal feed Medical and personal care products Oil field chemicals Detergents Lubricants

SPECIFICATIONS: (Conform to FCC 9)

Characteristics	Unit	Guaranteed		Typical
Appearance		White Crystalline Granular / Fine Granular / Powder		
Odour		Little or no odour	No odour	
Assay on dry basis (Titrimetry)	wt. %	Min	99.5	99.8
Maleic acid	Wt. %	Max	0.05	0.03
Fumaric acid	Wt. %	Max	1.0	0.6
Residue on Ignition (sulfated Ash)	Wt. %	Max	0.05	0.02
Moisture	Wt. %	Max	0.3	0.2
Optical (Specific) Rotation	$[\alpha]_D^{25}$	Between	-0.10 and +0.10	-0.10 and +0.10
Heavy metals (pb)	PPM	Max	5	<5
Lead (as pb)	PPM	Max	2	<2
Arsenic (as As)	PPM	Max	1	<1
Water Insoluble Matter	Wt. %	Max	0.1	0.02

Malic Acid from Thirumalai Chemicals

Thirumalai Chemicals Limited, TCL, is one of the world's leading manufacturers of industrial chemicals, food additives and specialty chemicals; and the only manufacturer of Malic Acid in India. The manufacturing process has been developed by TCL, entirely through in-house R&D, from scratch to 8000 MT per year. The feedstock used is Butane based Maleic Anhydride; hence it is edible and can safely be used in food products. TCL supplies Malic Acid to all major players in the flavour manufacturing, beverage, food and confectionery industries.

TCL offers:

- Consistently high quality
- On-time delivery
- Pre and post sales support / services
- Technical assistance

Our processes are certified by the following systems.

- ISO 9001:2008 - Quality Management System
- ISO 14001:2004 -Environment Management System
- HACCP (Hazard Analysis & Critical Control Point) -Food Safety Management System
- HALAL Assurance system - Jamiat Ulama E Maharashtra. (JUM)
- KOSHER Certificate - Kosher Inspection Service India
- FSSAI License No. 10012042000166
- FSSC 22000 - Food Safety System Certification 22000
- US FDA Certificate of Registration
- * FAMI-QS - European Feed Additives & Pre-Mixtures Quality System

* Certification awaited

Thirumalai Chemicals Ltd.

Factory:

25-A Sipcot Industrial Complex
 Ranipet - 632 403, Tamil Nadu, India
 Phone : + 91 4172 244441 / 2 / 6 / 8
 Fax : + 91 4172 244308
 E-Mail : mail@thirumalaichemicals.com

Marketing office:

SPIC HOUSE, 5th Floor,
 No: 88, Mount Road, Guindy, Chennai – 600 032. India
 Phone : + 91 44 2230 1242
 E-Mail : info@thirumalaichemicals.com