



Pick your Pickle

What makes a pickle a pickle?

Pickling is a global culinary art. If you were to go on an international food-tasting tour, you'd find pickled foods just about everywhere. You might sample kosher cucumber pickles in New York City, chutneys in India, kimchi in Korea, etc etc.

On a most general level, pickles are foods soaked in solutions that help prevent spoilage. There are two basic categories of pickles. The first type includes pickles preserved in vinegar, a strong acid in which few bacteria can survive. The other category includes pickles soaked in brine to encourage fermentation—the growth of “good” bacteria that make a food less vulnerable to “bad” spoilage-causing bacteria. Common examples of fermented pickles include kimchi and many cucumber dill pickles.

Pickling is an ancient food preservation technique

It is an ancient technique – more than 4,000 years old. For thousands of years, our ancestors have explored ways to pickle foods, following an instinct to secure surplus food supplies for long winters, famine, and other times of need. Historians know, for instance, that over two thousand years ago, workers building the Great Wall of China ate sauerkraut, a kind of fermented cabbage.

Pickling foods does much more than simply preserve them

It can also change their taste and texture in several interesting ways. It's no surprise that cultures across the globe enjoy such an assortment of pickled foods, as you would discover on your international food expedition. In fact, food experts say, the evolution of diverse pickled foods in different cultures has contributed to unique cultural food preferences, such as spicy sour tastes in Southeast Asia and acidic flavors in Eastern Europe.

Today even though we have many techniques to preserve food; many cannot imagine food without pickles!! Pickles have become an integral part of our meal and we have a dedicated industry making a variety of pickles to suit every palate!! Although the process was invented to preserve foods, pickles are made and eaten because people enjoy the resulting flavors. Pickling also improves the nutritional value of food by introducing B vitamins produced by bacteria.

Large variety of pickles available in India

India has a large variety of pickles which are mainly made from mango, lime, Indian gooseberry (amla), chilli, vegetables such as egg plants, carrots, cauliflower, tomato, bitter gourd and

green tamarind, ginger, garlic, onion and citron. These fruits/vegetables are generally mixed with some other ingredients such as salt, spices, and vegetable oils and left to mature.

A special variety of mango pickle prepared in Andhra Pradesh State called Avakkai is very popular. This pickle, often described as king of all pickles, is a fine blend of cut mango pieces, red chilli powder, mustard seed powder, salt and sesame oil, each ingredient used in specified proportion all raw and allowed to mature for few weeks in porcelain containers in hot summer.

Tamil Nadu State has a typical mango pickle, *maavadu*, which is usually made early in the summer season with tender mangoes that are barely an inch long. The preservation process uses castor oil giving the pickle its unique taste.

Another pickle typical of Tamil Nadu is *narthangai* consisting of unripe citrons cut into spirals and stuffed with salt. Tamilians also consume sun-dried chillies stuffed with salted yogurt, making a dry preserve called *mor molagai* that is typically eaten with rice.

Tender whole mango pickle is a traditional pickle of Karnataka. This

is preserved entirely by dehydrating tender whole mango with salt and is very salty and sour. A special type of this pickle is *jeerige midi* prepared using special tender mango with a refreshing aroma.

South Indians living along the coast also pickle a variety of fish or *meen*.

The Pickling Process

In chemical pickling, the jar and lid are first boiled in order to sterilize them. The fruits or vegetables to be pickled are then added to the jar along with either brine or vinegar or both, as well as spices, and are then allowed to ferment until the desired taste is obtained. The food can be pre-soaked in brine before transferring to vinegar. This reduces the water content of the food which would otherwise dilute the vinegar. This method is particularly useful for fruit and vegetables with high natural water content.



PICKLES – PROS AND CONS

PROS	CONS
<ul style="list-style-type: none">❖ Can help in increasing appetite.❖ Preserves Vegetables or Fruits for longer periods of time❖ Versatile and Inexpensive.	<ul style="list-style-type: none">❖ Most pickles are high in sodium❖ Sweet pickles are high in sugar❖ In Large amounts, pickles-may increase the risk of cardio vascular diseases.❖ The high salt content in most pickles-may be harmful to people with high blood pressure.

Principles of Preservation

1. Salt

Fruits and Vegetables are preserved by the principle of increased Osmotic Pressure due to high content of salt. Salt preserves the food by the following principles:

- ❖ It dehydrates foods by drawing out and tying up moisture, as it dehydrates microbial cell.
- ❖ It breaks to yield the chlorine ion which is harmful to organisms.
- ❖ It reduces oxygen in the moisture.
- ❖ It sensitizes the cell against carbon dioxide.
- ❖ It interferes with the action of photolytic enzymes thus

prevents the growth of microorganism.

2. Spices and condiments

Spices and condiments used in the pickles have inhibitory effect in the growth of micro organisms.

3. Vegetable Oil

Aerobic bacteria and mould growth are prevented by covering the top with oil.

Ingredients in Pickles

As per The Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011, "pickles" may contain onion, garlic, ginger, sugar, salt, jaggery, edible vegetable oil, green or red chillies, spices, spice extracts or oil, limejuice, vinegar, citric acid, dry fruits, and nuts. **Vegetables used in Pickles**

Mango, Lime, Green Chilli, Tomato, Garlic, Onion, Mushroom, Cucumber, Carrot, Cabbage, Turnip, Karonda, and Indian Gooseberry are some of the vegetables used in pickles.

Preservatives Used in Pickles

Preservatives are added to pickles so as to prevent or slow down the growth of micro-organisms, such as moulds, yeasts and bacteria in food. Preservatives can inhibit, retard or arrest the process of fermentation, acidification or other deterioration of pickles.

Class – I Preservatives: - There is no limit specified

Good manufacturing practices (GMP) should be followed by any manufacturing unit for the production. Thus the Class I Preservatives should be added in required, safe and acceptable quantities for all users,

as there is no specified limit for the addition of these acids specified.

- i. Salt
- ii. Sugar
- iii. Vinegar or Acetic Acid
- iv. Spices
- v. Edible Vegetable Oils

Class – II Preservatives:

- i. **Benzoic Acid – 250 ppm (Maximum) or**
- ii. **Sulphur dioxide – 100 ppm (Maximum)**

Other Food Additives Permitted in Pickles

Acidifying Agents

- **Acetic Acid – GMP**
- **Citric Acid – GMP**
- **Malic Acid – GMP**

Pickle a Carcinogen as per WHO

The World Health Organization has listed pickled vegetables as a possible carcinogen and the British Journal of Cancer released an online 2009 review of research on pickles as increasing the risks of oesophageal cancer. The report cites increases of cancer by about 100% in Chinese areas relying on pickled vegetables for nutrition. Results from the research is not conclusive it shows a significant association between consuming pickled vegetables and Oesophageal Cancer.

Firming Agent

**Calcium Chloride – 350 ppm
(Maximum)**

Different Types of Pickles

- ✓ Pickles in Lime Juice or Brine
- ✓ Pickles in Oil
- ✓ Pickles in Vinegar
- ✓ Pickles without medium-means the pickles other than those enumerated above. Such pickles shall be labeled as “Name of Vegetable or Fruit.....” Pickle.

COMPARATIVE TESTING

Comparative Testing is a formal process by which products & services of different vendors are tested for Quality; the services are tested for compliance to the regulations laid out by the regulatory authorities for services. CONCERT is undertaking to do this Comparative Testing for South India under a grant from Department of Consumer Affairs, Government of India. Concert is testing 7 products and 3 services. One of the products chosen for testing is Pickles.

PICKLES CHOSEN FOR TEST

Pickles were procured from all the five Southern states for testing and are grouped as under:

(1) Mango

1. 777 Cut Mango Pickle without garlic (Tamil Nadu)
2. Swastiks Cut Mango pickle (Karnataka)
3. Melam Kadu Mango Pickle (Kerala)
4. Ruchi Cut Mango Pickle (Karnataka)
5. Chinni’s Cut Mango Pickle (Karnataka)
6. Mother’s Recipe – Cut Mango Pickle (Andhra Pradesh)
7. Vee.R.G Cut Mango Pickle (Khadi Chennai)
8. Ravi’s Cut Mango (Tamil Nadu)
9. Sakthi Cut Mango (Tamil Nadu)

(2) Lemon

1. Aachi Lime Pickle (Tamil Nadu)
2. Mother’s Recipe Lime Pickle (Andhra Pradesh)
3. Happy Lime Pickle (Kerala)
4. MTR Lime Pickle (Karnataka)
5. Tasty Treat Lemon Pickle (Andhra Pradesh)
6. Priya Lime Pickle in lime juice with garlic (Andhra Pradesh)
7. Selvam Lemon Pickle (Puduchery)

(3) Mixed Vegetable

1. More Choice Pickle Mixed (Karnataka)
2. Spencer's Mixed Vegetable Pickle (Andhra Pradesh)
3. Nilon's Classic Mixed Pickle (Tamil Nadu)
4. Unbranded (Andhra Pradesh)

(4) Fish

1. Keya Mangalore Fish Pickle (Karnataka)
2. Melam Fish Pickle (Kerala)
3. Double Horse Fish Pickle (Karnataka)
4. Sea-Dot Fish Pickle (Tamil Nadu)
5. Twin Birds Fish Pickle (Andhra Pradesh)

Criteria and Parameters to be considered for test, scoring, and rating

The major criteria considered for scoring and rating for each type of Pickles tested were:

(1) Packaging and Labelling,

(2) Safety and Health, and

(3) Quality.

Price per 100 gm is indicated in the table for reference and it has not been considered for scoring and rating.

PACKAGING AND LABELLING

Suitable packing materials for pickles are wide-mouthed glass jars and porcelain jars. All general label requirements of FS & S (Packing and Labelling) Regulations, 2011 are applicable to pickles. Pickles are exempted from furnishing **Nutritional Information on Label.**

The label on the pickle should contain the following information

- Name of the product to be mentioned on the label. Examples: (1) Mango Pickle in Brine, (2) Mango Pickle in Oil, (3) Mango Pickle in Vinegar, (4) Mango Pickle etc.
- List of ingredients (These shall be declared on the label in descending order of composition by weight)
- Names/INS No. of additives (For example if the pickle is preserved in Benzoic Acid the following shall be disclosed on the label in capital letters: "CONTAINS PERMITTED CLASS II PRESERVATIVE INS 210.")
- Batch No (Lot No/Code No/Batch No has to be mentioned. This is for traceability, ie. to identify the product from the market and is required to trace the root cause of the problem in case of any customer complaint.)

- Date of manufacture
- Best before Date or Use by Date
- Instructions for storage and preparation
- Address of Manufacturer, Telephone No in case of consumer complaints, if any
- Vegetarian Logo (green filled circle enclosed in green square for vegetarian pickles) or Non-vegetarian Logo (brown filled circle enclosed in brown square for

non-vegetarian pickles).

- FSSAI Licence Number is to be indicated on the label (This replaces the FPO Logo)
- MRP - Maximum Retail Price

Nutritional Information on Labels:

Though it is not mandatory to provide the Nutritional Information on the labels of Pickles, some brands have given this information and we have presented them in the table below for consumer information.

Nutritional Information		
Lime	Aachi	Not Present
	Mothers Recipe	Present
	Tasty Treat	Present
	Happy	Present
	MTR	Present
	Priya	Present
	Selvam	Not Present
Mango	Sri Ganeshram's 777	Present
	Mother's Recipe	Present
	VEE.R.G	Present
	Ravi's	Present
	Sakthi	Not Present
	Chinni's	Present
	Ruchi	Present
	Swastik's	Not Present
Melam	Present	
Mixed	Nilon's classic	Present
	More Choice	Present
	Spencer's (Smart choice)	Not Present
	Unbranded (Andhra Pradesh)	Not Present

HEALTH AND SAFETY

Pickles may become unsafe or contaminated during preparation (from vessels), storage, or poor quality packing materials etc.

In general, pickles shall be free from insect damage or fungal infection and shall be free from copper, mineral acid, alum, synthetic colour, and shall show no sign of fermentation. Pickles shall be free from mould growth.

As per Appendix 'B' of the Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011, mould count shall be absent in 25g or 25 ml of the pickle.

i. Toxic Metals (Copper [Cu], Lead [Pb] and Mercury [Hg])

- Copper – shall be free from copper

Copper (chemical symbol Cu) is a heavy metal. Copper is essential for good health. However, exposure to

higher doses can be harmful. If we consume food that contains higher than normal levels of copper, you may experience nausea, vomiting, stomach cramps, or diarrhea. High intake of Copper can cause liver and kidney damage. Maximum permissible

Limits for Copper are prescribed in the FSS Act for various foods.

Copper is drawn from the copper vessels or containers WITHOUT PROPER TANNING – where pickle is stored or prepared. It is injurious to health hence copper should not be present above the permissible limit.

Lead – Not > 2.5 ppm

Lead (chemical symbol Pb) is another heavy metal. Increased level of

lead in the body causes lead poisoning also known as “plumbism.” Lead is toxic to many organs and tissues including heart, bones, intestines, kidney, and reproductive system. Symptoms include abdominal pain, confusion, head ache, and anemia.



Mercury – (for Fish pickles only)/ 0.5 ppm maximum

Mercury (chemical symbol Hg) is a heavy metal occurring in several forms. A highly toxic organic compound of mercury is methyl mercury. Fish and fish products have been shown to contain varying amounts of mercury, from water pollution. Mercury poisoning also known as “mercurialism” is a disease caused by exposure to mercury. Toxic effects include damage to brain, kidney, and lungs.

Aflatoxin – Not >30 ppb (parts per billion)

Aflatoxin is a group of toxic compounds, viz. B₁, B₂, G₁, and G₂ derived by the fungus *aspergillus flavus* in favourable conditions of storage such as high moisture and humidity. This should be absent in the sample tested.

Synthetic Colours – Should be absent

Amount of Salt Present – Presented in a separate Table

QUALITY

Acidity Test

Acidity in Citric Acid – This is tested for Pickles in citrus juice or brine

Acidity in Acetic Acid – This is tested for Pickles in vinegar

Test for Mineral Acid – As the pickles may contain organic acids such as Acetic Acid, Citric Acid and Malic Acids – their purity may be ascertained by testing the presence of Mineral Acids in the pickles.

Test for Alum – should be absent

Amount of Class II preservatives:

- **Benzoic Acid (250 ppm max)**

Benzoic acid and its salts are used as food preservatives, represented by the E-numbers E₂₁₀, E₂₁₁, E₂₁₂, and E₂₁₃. Benzoic acid inhibits the growth of mould, yeast and some bacteria.

Acidic food and beverages like fruit juice, sparkling drinks, soft drinks, pickles or other acidified foods are preserved with benzoic acid and benzoates.

- **Sulphur dioxide (100 ppm max)**

Sulphur dioxide is widely used in the food and drinks industries for its properties as a preservative and antioxidant. If sulphur dioxide is added to the pickle as a preservative, it has to be labelled in the ingredient list as either

- Preservative (sulphur dioxide) or
- Preservative (220) or

- Preservative (E220) or
- Preservative (E220)
- Preservative (INS 220)
International Numbering System

Mould Count – should be absent in 25 gm

Acid Value of Oil – Only for pickles in Oil

(Acid value was tested to assess the quality of the pickles. Very high acid value of Oil in pickle indicates that the product is rancid. There are no specified ranges for Acid value in Oil in the Standards.)

Weight – Drained weight of the pickle in grams is measured.

PRICE

MRP on label to be read and Price per 100 gm is indicated in the table but not considered for scoring and rating.

Scoring and Rating

Every test parameter is evaluated / tested, and scored. These are added to give the scoring to the major criterion. Each criterion and parameter is rated individually on a 5-point scale.

The rating given is **1 (Poor), 2 (Fair), 3 (Good), 4 (Very Good), and 5 (Excellent)**. For any parameter, when the test result fails to meet the

defined standards, it will be given a scoring of **Poor** or **Fair** based on the extent of deviation, it will be given the scoring of **Good**, if the brand meets the standard requirement. When it exceeds the minimum standards substantially, it will be rated **Very Good**. When it exceeds the standards significantly and shows appreciable innovation, it will be rated **Excellent**.

Weightage considered for the three criteria are as given below:

Packaging and labeling = 30%, Safety and Health = 40%, and Quality = 30%

We present the results against these major criteria that in our opinion is fair and without any subjective element. The user is encouraged to study these results and make his/her buying decisions based on their requirements and judgment.



The results are as tabulated below.

(1) Lime Pickle

Lime Pickle	Packaging & Labeling	Safety & Health	Quality	Total Score by Different Weightages (%)	MRP in Rs (Per 100 grams)
Aachi	Good	Good	Good	79.30	18.75
Mother's Receipte	V.Good	Good	Good	84.71	20
Tasty Treat	Good	Good	Good	77.54	14.15
Happy	V.Good	Good	Poor	72.30	15
MTR	Good	Good	V.Good	84.60	17
Priya	Good	Poor	Good	69.30	19.5
Selvam	Poor	Good	Good	65.67	Rs 1 Per leaflet

(2) Mango Pickle

Mango Pickle	Packaging & Labeling	Safety & Health	Quality	Total Score by Different Weightages (%)	MRP in Rs (Per 100 grams)
Sri Ganeshram's 777	Good	Fair	Good	75.21	18.65
Mother's Receipte	V.Good	Good	V.Good	82.89	17
VEE.R.G	Fair	Good	Fair	74.87	14.65
Ravis	Fair	Good	V.Good	80.16	17.35
Sakthi	Good	Good	V.Good	81.98	16
Chinni's	Good	Good	V.Good	81.07	14

Ruchi	V.Good	Good	Good	81.12	19.65
Swastik's	Fair	Good	Good	78.40	7.5
Melam (Kadu Mango)	Good	Poor	Poor	57.25	20

(3) Mixed Pickle

Mixed Pickle	Packaging & Labeling	Safety & Health	Quality	Total Score by Different Weightages (%)	MRP in Rs (Per 100 grams)
Nilon's classic	V.Good	Good	Fair	78.45	4.10
More Choice	Fair	Good	V.Good	81.93	15
Spencer's (Smart choice)	Good	Good	Good	79.30	16.65
Unbranded (Andhra Pradesh)	Poor	Good	Good	53.85	8

(4) Fish Pickle

Fish Pickle	Packaging & Labeling	Safety & Health	Quality	Total Score by Different Weightages (%)	MRP in Rs (Per 100 grams)
Sea-Dot	Poor	Good	Fair	71.71	35
Keya	V.Good	V.Good	Fair	82.57	55.55
Twin bird	V.Good	Good	V.Good	81.14	41.65
Double Horse	Good	Good	V.Good	79.43	34.75
Melam	Good	Fair	Good	74.00	41.65

Comments and Observations:

- The recommended shelf life (i.e. BEST BEFORE DATE) given by different manufacturers varies from pickle to pickle from **1** month to **18** months.
- Only the brand Melam Mango pickles has incorporated FSS Licence Number on the label as per the Label Regulations under General requirements.
- The brands Swastik's, Sakti Mango Pickle, and Mother's Recipe Mango and Lime Pickles labels contain advertisements of some other food products made by them.
- Some brands specify on labels that this product contains "No Garlic."
- Statutory Warning for "Allergic Information" is given on the label of Nilon's Classic Mixed vegetable Pickles.



The following brands do not conform to the standards prescribed in FSS (Food Products Standards and Food Additives) Regulations 2011 in respect of addition of **Class II** Preservatives namely Benzoic Acid since they contain more than the prescribed limits of 250 ppm.

Brand Name	Amount of Benzoic Acid Present
Melam Kadu Mango Pickles	508 ppm*
VEE.R.G Mango Pickles	439 ppm*

* ppm means parts per million, that is mg/Kg

Edible common salt:

Its chemical name is sodium chloride. WHO recommendation for intake of salt per head per day is 5gm. However, the level of Indian intake is higher than this limit. The average intake of salt by an Indian is about 10 gm per day.

The amount of salt present in pickle samples tested varies from 9% to 19% as can be seen from the table below:

Amount of salt present (per 100 gm)		
Lime	Selvam	19.03 gm
	Mothers Recipe	18.63 gm
	Priya	17.63 gm
	Aachi	14.44 gm
	Tasty Treat	13.57 gm
	Happy	11.05 gm
	MTR	10.72 gm
Mango	Mother's Recipe	14.73 gm
	Swastik's	12.63 gm
	Sri Ganeshram's 777	12.23 gm
	Chinni's	11.56 gm
	Ruchi	11.30 gm
	Ravi's	11.19 gm
	Sakthi	10.87 gm
	VEE.R.G	9.57 gm
Melam	8.93 gm	
Mixed	More Choice	15.47 gm
	Spencer's (Smart choice)	14.36 gm
	Nilon's classic	13.77 gm
	Unbranded (Andhra Pradesh)	12.56 gm

It is advisable to reduce the intake of pickles with higher salt content as the link between high salt intake and high blood pressure is well established, and it has been suggested that a reduction in dietary salt intake has the potential to substantially reduce the levels of cardiovascular disease.

Recommendation to BIS

The salt being a class I preservative there is no restriction on the quantity used.

The World Health Organization recommended level of salt consumption is 5 g (about one teaspoon) per day at the population level, yet dietary salt intake in most countries is close to 10g per day. The label should declare the salt content as high or low to enable the consumer to make the right choice

- High - If it contains more than 1.5g salt per 100g (or 0.6g sodium)
- Low - If it contains 0.3g salt or less per 100g (or 0.1g sodium)

Some Safety Tips for Pickle Users:

- Use only dry wooden spoon
- Retain oil layer on top till the contents are fully utilized
- Transfer the pickles from pet jars to glass jars
- Discard the entire quantity of pickles, if fungus growth is seen on the top layer
- Always keep and preserve pickles in glass or porcelain jars
- Avoid reheating the pickles, particularly pickle in oil.

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