THE INTRODUCTION OF ASPARTAME

A) INTRODUCTION :

1. Aspartame was an accidental discovery by Mr. James Schlatter, a chemist from the company, M/s. G.D. Searle & Company in the year 1965.

2. G.D. Searle & Company first patented Aspartame in 1970.

3. In March 1973, M/s. G.D. Searle submitted its first petition to the FDA for Aspartame use in Foods.

4. In 1974, FDA approved Aspartame use in Carbonated Beverages and in Dry Food Products, in United States .

5. Marketing Authorisation was granted for Solid Food in 1981 and , for Soft Drinks in 1983.

   Aspartame was finally authorized as General Sweeteners in 1996.

6. Today, it is an everyday component of most Diet Beverages, Sugar-Free Desserts, and Chewing Gums in countries worldwide

7. Aspartame has been renamed and is now being marketed as a Natural Sweetener (M/s. Ajinomoto, the Maker of Aspartame) (AminoSweet".)

   It is also Marketed as **Canderel** and **NutraSweet.**

8. Aspartame is used by more than 100 million people around the world and is found in more than 6,000 products.

   This low-calorie sweetener has been extensively researched and more than 200 studies have been conducted. Aspartame is approved for use in more than 100 countries.

9. It is 180 to 200 times sweeter than Sucrose. (Normal Sugar) .

10. It is digested as a protein. The components are metabolized normally.

11. Aspartame is classified as a **"General Purpose Sweetener"** by FDA and is approved for use in all Foods and Beverages.

B) THE PROPERTIES :

1. Aspartame is a nutritive sweetener made by joining two Amino Acids (Protein components) , L- Phenyl Alanine and L- Aspartic Acid, with a third component called a Methyl Ester group.

   Very little is needed for a sweet taste, making Aspartame virtually Non-Caloric.

2. Aspartame is an odorless, low-calorie intensive sweetener.
   It is chemically pure and contains no additives, preservatives, or colors.

3. Aspartame has a sugar-like taste.

   It enhances some flavors and is appropriate for many applications.

   When Aspartame is combined with other low-calorie sweeteners, they enhance each other so that the combinations are sweeter than the sum of the individual sweeteners.

C) THE SOLUBILITY AND STABILITY

SOLUBILITY :

- The solubility of Aspartame in Water is dependent on

pH ; and **Temperature.**

pH 2.2 : At this pH, it is maximum Soluble : 20 mg./ml. at 25°C

pH 5.2 : At this pH , it is minimum soluble : 13.5 mg/ml at 25°C.

STABILITY :

- The stability of Aspartame is dependent on
  Time; Temperature; pH and Water activity.
- Aspartame is very stable in the Dry state.
- At 105°C, a loss of approximately 5% (formation of diketopiperazine) is observed after 100 hours of treatment.
- At 120°C, a 50% loss is obtained after 80 hours of treatment.
- In solution, when stored at temperatures ranging from 30°C to 80°C, Aspartame is progressively degraded into Diketopiperazine .

- It is therefore not usable in Foods heated at higher temperature (cooking, sterilisation, etc.).
- At Room Temperature, its stability is good at pH values of between 3.4 and 5.0 and it is maximum at pH 4.3.
- At pH below 3.4 , the Dipeptide is hydrolysed and at a pH greater than 5.0, cyclisation occurs with the formation of Diketopiperazine.
- In both cases, this transformation results in the loss of sweetness.
- In foods with a low or moderate water content (water activities between 0.34 and 0.66), the maximum stability is observed at pH 5.0.
- Aspartame has good stability in deep frozen products.
- Its main impurity (approximately 2%) is Diketopiperazine, a degradation product of aspartame which has no sweetening properties

D) THE ADVANTAGES

Aspartame is a Low-Calorie sweetener which is approximately 200 times Sweeter than Sucrose (Normal Sugar) .

The rapid rise in Aspartame's popularity can be attributed to the many Benefits (Advantages) that Aspartame provides to Calorie-Conscious consumers, including:

- Aspartame Tastes Like Sugar
- Aspartame Enhances and Extends Flavors
- Aspartame Does Not Promote Tooth Decay
- Aspartame is Helpful for Individuals with Diabetes
- Scientific Studies Show Aspartame is Beneficial in Weight Control
- Aspartame Can Be Part of a Healthful Diet.
- More benefits :

Low-calorie sweeteners provide consumers with many benefits, both psychological and physiological.

Health professionals and consumers believe low-calorie sweeteners are effective for the following purposes: Weight maintenance, Weight reduction, Management of diabetes, Reduction of dental caries, and Reduction in the risks associated with obesity.

E) THE APPLICATIONS :

1. Aspartame has established itself as an important component in many Low-calorie, Sugar-free Foods and Beverages and is primarily responsible for the growth over the last two decades in the Sugar-Free Market

2. Currently, aspartame is consumed by over 200 million people around the world and is found in more than 6,000 products including carbonated soft drinks, powdered soft drinks, chewing gum, confections, gelatins, dessert mixes, puddings and fillings, frozen desserts, yogurt, tabletop sweeteners, and some pharmaceuticals such as vitamins and sugar-free cough drops.

3. The safety of aspartame has been affirmed by the U.S. FDA, 26 times in the past 23 years.

4. Aspartame is used in the manufacture of many Sugar-free, low calorie and dietary products, such as:

   - **Beverages:** Carbonated and still Soft Drinks, Fruit-Juices and Fruit Syrups.
   - **Table-top:** Compressed Sweeteners, Powdered Sweeteners (spoon-for-spoon), Sweetener Sachets and Liquid table-top Sweeteners.
   - **Dry mixes:** Hot and Cold Chocolate and Beverage Mixes and Instant Desserts.
   - **Dairy:** Yoghurt, Frozen Novelties and Desserts.
   - **Confectionery:** Chewing Gum, Boiled Sweets, Pastilles, Mints, Chocolate, Gums and Jellies.
   - **Pharmaceutical:** Tablets, Sugar-Free Syrups, Powdered Mixes and Effervescent Tablets.

5. The Following Reduced Calorie Products Have Aspartame-Sweetened Choices

   - Breath Mints
   - Carbonated Soft Drinks
   - Cereals
   - Chewing Gum
   - Flavored Syrups for Coffee
   - Flavored Water Products
   - Frozen Ice
   - Frozen Ice Cream Novelties
   - Fruit Spreads
   - Gelatin, Sugar Free
   - Hard Candies
   - Ice cream Toppings
   - Ice Creams, No Sugar Added or Sugar Free
   - Iced Tea, Powder
   - Iced Tea, Ready to Drink
   - Instant Cocoa Mix

- Jams & Jellies
- Juice Blends
- Juice Drinks
- Maple Syrups
- Meal Replacements
- Mousse
- No Sugar Added Pies
- Non-Carbonated Diet Soft drinks
- Nutritional Bars
- Powdered Soft Drinks
- Protein Nutritional Drinks
- Pudding
- Soft Candy Chews
- Sugar Free Chocolate Syrup
- Sugar Free Cookies
- Sugar Free Ketchup
- Table Top Sweeteners
- Vegetable Drinks
- Yogurt, Drinkable
- Yogurt, Fat Free
- Yogurt, Sugar Free

6. Recently, researchers have found possible Medical uses for Aspartame.

   In 1998, researchers at the Oklahoma Medical Research Foundation found that Aspartame could be used as a Pain- Reliever, Anticoagulant, and Fever-Reducer much like a Non-Steroidal Anti-Inflammatory drug such as Aspirin.