# THE ADVENTURES OF CATECHIN

*(A Short Story for Planters)*

Godwin R. Roberts

*Head, Biochemistry Division*

*(Tea Research Institute of Sri Lanka, Talawakele, Sri Lanka)*

A large family called Catechins lived inside the young leaves of the tea plants. The members of the Catechin family are, father Catechin, E.G. Catechin, his wife E.G. Catechin Gallate and their son and daughter E. Catechin and E. Catechin Gallate. The ladies in the family had 'gallate' added to their names. They were known to be more 'active' and reacted to a change in their environment much faster than the men. The inside of the leaves in which they lived were divided into 'cells' or little housing units each with its subdivisions (activity zones). No one really understands why the Catechins family originally moved into tea leaves but they do live happily with numerous other families in the leaf cells.

The main enemy of the Catechin family was Mr Polyphenol Oxidase who belonged to an organisation called the 'Enzymes'. Members of the Enzyme organisation were important persons in the leaf cells. They made things happen fast. They would round up the proteins and break these up to amino acids so that the leaf could use them. They would also help in building up the sugars, carbohydrates and all the materials necessary for the plant to go on living. The catechins however stayed away from this particular Enzyme (Mr PPO) who, happily for them, lived in a separate compartment.

Life was however not a bed of roses for the Catechin family. The tea plant was grown in estates and, ever so often, the young shoots were picked off the trees and removed to a factory. What happened there truly terrified the Catechins.

The leaves were placed in large troughs and withered. Those living inside the leaves wished that the temperatures would not rise too much because the leaves

would then get 'cooked'. Fortunately, there was a man who controlled the temperature carefully. Further, there was total disaster if some of the leaves were damaged while being transported or even dried up; both these incidents meant that the walls separating the cells broke down and then Mr PPO could get at the Catechins easily. This was alright after rolling when they could not avoid him anyway, but certainly not now!

After withering, there was little hope for the Catechins, because the leaves were totally crushed and the 'cells' or housing units were broken up. This resulted in PPO having easy access to the Catechins. On meeting the Catechins, PPO immediately started off his work which came to be known as 'Fermentation'. Each Catechin, starting with the most active - Mrs E.G. Catechin gallate, had an oxygen atom firmly fixed onto them. The Catechins were then rendered very unstable and unhappy. They were sometimes referred to as 'Quinones' in this state.

They tried to get out of this unhappy state by either attacking other chemical families close by and transferring the oxygen to them or by joining with each other. When they joined with each other they became coloured. If two Catechins joined hands they sometimes formed an orange red compound who assumed the name Theaflavin. The Catechins could also join in other ways to form darker negroid families called Thearubigins. The quantities of Theaflavin and Thearubigins formed decided the colour of the brew when 'tea' was finally made. The Theaflavin family was more sophisticated and was formed very early in fermentation; but if the fermentation was too long then this family was again attacked by oxygen bearing compounds and destroyed.

The Thearubigins family were formed in large quantities. They loved high temperatures and got darker and darker as the temperature went up. The factory personnel always watched the temperature and time; because given too high a temperature or too long a fermentation these thearubigins built-up in sufficient numbers to render the tea brew muddy and dull. When the oxidised Catechin (with oxygen attached) attacked other families such as amino acids or carotenes then the

oxygen was discarded and the Catechins returned to their happy state, but converted the other families to oxidized entities which, fortunately for tea, contributed to the flavour of tea - the new families were called aldehydes and ketones.

The final act of the manufacture process was very uncomfortable to all occupants of the leaf cell. The leaf was dried to a very low moisture content. The only happy incident was that Mr PPO could no longer act - he was rendered inactive. Part of the newly oxidised families like the aldehydes were unhappily removed with the moisture from the leaf.

The members of the Catechin family who escaped Mr PPO during fermentation lived in the dry tea and so did the Theaflavin and Thearubigin families. All of these contributed to the lovely taste of the tea brew when taken into hot water. Now, they had a new enemy - this was outside invaders called moulds and bacteria; but, they were safe as long as the tea was dry. So, if you want a tea with 'Happy families' in the cells then manufacture your tea carefully and store it dry.

F.