

## **KING AND QUEEN.**

*ELZBIETA & HANS BRAND  
ELZBIETA COSMETICS BV, THE NETHERLANDS*

ALL HAIL GREAT DURIAN, IN WHOSE SPINY BREAST  
A THOUSAND WONDEROUS FLAVOURS HAVE THEIR BIRTH  
ALL HAIL TO THEE! WE WANDERERS FROM THE WEST  
HERE CROWN THEE KING OF ALL FRUITS OF EARTH!

H.S.Whiteside, from "Gula Melaka", 1914

Hundred years ago it took a journey of a few weeks to go to Southeast Asia. Anno Domini 2004 it takes a 13 hours flight from Amsterdam to ground Bangkok International Airport. Beautiful Thailand, the only country being able to maintain its independence during the centuries of colonisation, is the home of thurian (*Durio zibethinus*), also named durian (Malaysia) or duren (Indonesia). Durian is named the King of Fruits, with a characteristic odour, sometimes characterised as a hybrid of garlic and old camembert, but with an irresistible, creamy taste. It is extremely nutritious, and it is said that it is easy to survive properly when eating only durian. High quality fruit shall be eaten fresh, just when it drops out of the tree. Take care that you don't stand under that tree when the fruit falls down: the fruit weighs up to a few kilo's and is covered with hard, thorn-like spines. Durian is exported from Thailand to Europe. Only the "Mon Thong" variety, which isn't very smelly, can be exported as it will also ripen when picked early. Tasteless stuff according to our Thai friends.



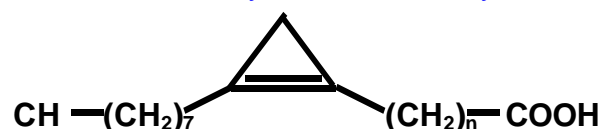
Many different durian subspecies exist, some of them have not even been described botanically, particularly Indonesian species from Kalimantan and Sulawesi. Although durian is so much appreciated (some say that you may get addicted to them), there is not much information available on its chemistry. Eating durian is said to “heat the body” (i.e. significantly raise blood pressure). In combination with alcohol eating durian may even result in a stroke. Durian and alcohol do not go together well. Recent research revealed that **MonoAmine Oxidase Inhibitors** (MAOI's) are responsible for this phenomenon.

Harmane alkaloids (see also our column on “Passion Flower”; SPC, April 2004) are well-known (naturally occurring) MAOI's, harmaline being the most active one. When neurotransmitters (mostly monoamines such as serotonin, noradrenalin and dopamine are released they may either be re-used or converted to the corresponding N-oxides by monoamine oxidases (MAO's). In the body the neurotransmitter concentration is elegantly controlled, mostly to control blood pressure.

Tyramine, produced by fermentative decarboxylation of the amino acid tyrosine, belongs to the group of monoamines and occurs in aged cheese, wine, pickled products, chocolate, banana and avocado. Inhibition of MAO's by MAOI's such as the harmane alkaloids will result in increased levels of e.g. noradrenalin or tyramine in the blood, causing significantly increased blood pressure. Thus, harmane alkaloids may be used for the treatment of low blood pressure.

The presence of harmaline in durian kernels as well as in the fruit pulp has been confirmed. It will, in conjunction with alcohol, induce hypertensive periods, whereby the blood pressure is raised to absurd high levels, sometimes even reaching life-threatening values of 300. Durian is also a source for tyramine. In absence of alcohol tyramine is converted in the gastro-intestinal tract swiftly to the corresponding N-oxide, but this conversion is greatly inhibited by harmaline in the presence of alcohol. Thus, the tyramine level in the blood reaches unacceptable high levels, eventually leading to a stroke. The same happens when eating banana's or avocado's while drinking alcohol, particularly when the fruits are overripe.

Durian seeds contain high levels of cyclopropenoid fatty acids, mainly malvalic and sterculic acid; these fatty acids contain 18 and 19 carbon atoms respectively. They cause sterility and other physiological disturbances involving fatty acid metabolism, including liver and gall bladder enlargement. It has been suggested that the toxicity is due to the addition of the cyclopropene ring to the sulfhydryl group of proteins; the cyclopropene ring is highly strained and adds easily to a wide variety of substrates.



**n=6: MALVALIC ACID**

**n=7: STERCULIC**

Recent fundamental research revealed that cyclopropenoid fatty acids, in particular sterculic acid, inhibit Palmitoyl and Stearoyl CoA Desaturase (PCD, SCD). These enzymes convert palmitic and stearic acids into palmitoleic and oleic acids respectively. As the consequence of PCD or SCD inhibition palmitic and stearic acids levels are in-

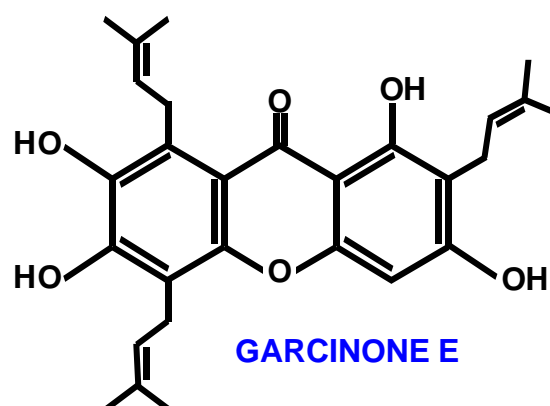
creased, at the expense of palmitoleic and oleic acids. Due to the inhibition of PCD & SCD the fluidity of the lecithin membranes is greatly reduced, which enables small molecules or ions to escape via the membrane to the outside world. A nice example of this phenomenon are chicken fed on cottonseed producing eggs with yellowish egg white due to iron ions that escaped from the egg yolk.

Cyclopropenoid fatty acid are not exclusive to durian seed (which contains 60-65% cyclopropenoid fatty acids). They also occur in e.g. cottonseed oil, kapok seed oil (Ceiba pentandra) and baobab oil (Adansonia digitata). Cows fed on cottonseed produce hard butter because of the inhibition of PCD & SCD; their butter contains significant higher levels of palmitic and stearic acid than normal butter.

Where there is a king there should also be a queen: mangosteen (Garcinia mangostana), belonging to the family of Guttiferae. Mangosteen is indigenous to Southeast Asian countries. The fruit is used in traditional medicine to treat inflammatory diseases and for the treatment of skin infections caused by bacteria and fungi.



The pericarb of mangosteen is 0,5-1,0 cm thick. It is green unripe and dark purple when ripe. The fleshy fruit pulp is responsible for its reputation as the best tasting fruit in the world. Within the pulp one or two seeds are present. Mangosteen is currently conquering the health product market (XANGO™) due to the presence of xanthenes. They are extremely powerful antioxidants, totally outperforming all existing anti-oxidants ; the highest concentrations of xanthenes are found in the pericarb.



The major xanthone isolated from the pericarb of mangosteen is garcinone E, carrying four hydroxyl groups and three isoprene side chains. Recently Dr. Chi-Kuan Ho (2002) from the Taipei Veterans General Hospital reported that garcinone E has extremely potent cytotoxic effects against a panel of different cancer cell lines. In actual fact, only taxol has shown more potency for cancer treatment, having said that laboratory synthesis of taxol has not yet been successful (the molecule is extremely complex), and given the limited availability of taxol from natural origin (*Taxus Brevifolia*) an alternative for taxol would be highly welcome. Garcinone E showed to be significantly more effective than methotrexate, vincristine and *cis*-platina, which also show highly undesirable side effects; the side effects are largely absent with garcinone E.

**This beautiful gift comes to us from the Queen of Fruits.  
Another miracle that Mother Nature offers.**