

Innovations in the use of cocoa products and by-products

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Innovation derived from Latin word *innovate*, is the noun form of *innovare* "to renew or change," It can be the development of new customers' value through solutions that meet new needs, inarticulate needs, or old customer and market needs in new ways.

This is accomplished through different or more effective products, processes, services, technologies or ideas that are readily available to markets, governments and society.

Innovation differs from invention in that innovation refers to the use of a better, novel idea or method, whereas invention refers more directly to the creation of the idea or method itself.

Innovation differs from improvement in that innovation refers to the notion of doing something different (*innovare*: "to change") rather than doing the same thing better.

Diffusion of innovation research, Started in 1903 by seminal researcher Gabriel Tarde, who first plotted the S-shaped diffusion curve.

He defined the innovation-decision process as a series of steps that include:^[1]

- 1.First knowledge**
- 2.Forming an attitude**
- 3.A decision to adopt or reject**
- 4.Implementation and use**
- 5.Confirmation of the decision**



Sources of innovation

The general sources of innovations are different changes in industry structure, in market structure, in local and global demographics, in human perception, mood and meaning, in the amount of already available scientific knowledge (Drucker,). Internet research, developing of people skills, language development, cultural background, skype and Facebook are also sources of innovation.

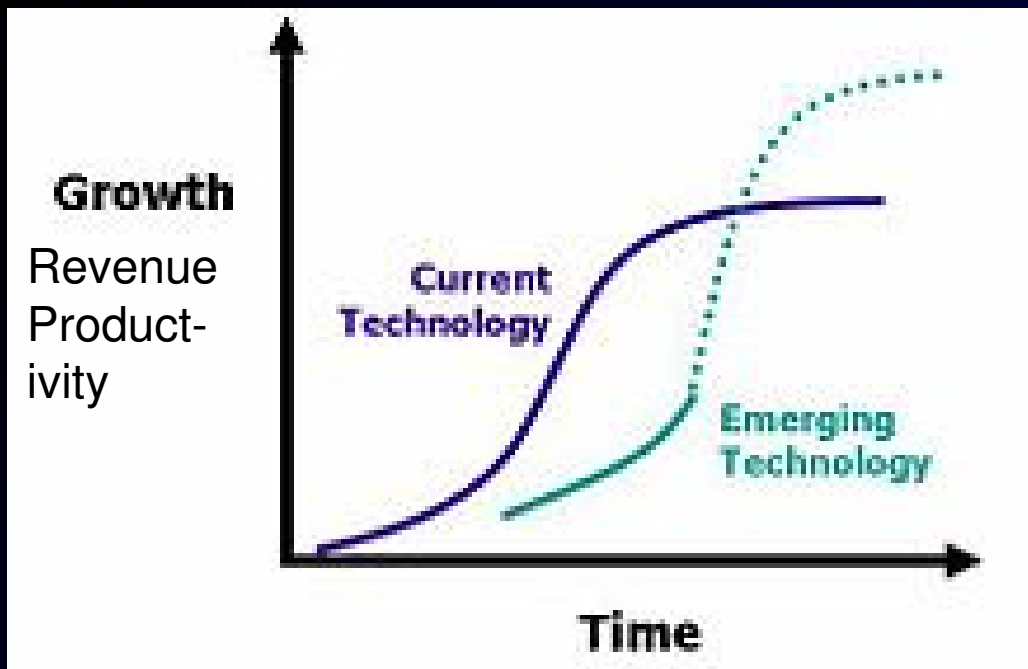
The simplest linear model of innovation, *i.e.* the traditionally recognized source is *manufacturer innovation*. Here an agent (person or business) innovates in order to sell the innovation. Another source of innovation, now becoming widely recognized, is *end-user innovation*. Here an agent develops an innovation for their own (personal or in-house) use because existing products do not meet their needs. End-user innovation has been identified as the most important and critical in *Sources of Innovation* (Hippel, 1988). Engelberger (1982) asserts that innovations require only three things: 1. A recognized need, 2. Competent people with relevant technology, and 3. Financial support. The Kline Chain-linked model of innovation (1985) places emphasis on potential market needs as drivers of the innovation process, and describes the complex and often iterative feedback loops between marketing, design, manufacturing, and R&D.

Innovation by businesses is achieved in many ways, with much attention now given to formal research and development (R&D) for "breakthrough innovations." R&D help spur on patents and other scientific innovations that leads to productive growth in such areas as industry, medicine, engineering, and government. Yet, innovations can be developed by less formal on-the-job modifications of practice, through exchange and combination of professional experience and by many other routes. The more radical and revolutionary innovations tend to emerge from R&D, while more incremental innovations may emerge from practice – but there are many exceptions to each of these trends.



An important innovation factor includes customers buying products or using services. As a result, firms may incorporate users in focus groups (user centred approach), work closely with so called lead user (lead user approach) or users might adapt their products themselves. The lead user method focuses on idea generation based on leading users to develop breakthrough innovations. In most of the times user innovators have some personal record motivating them. Sometimes user-innovators may become entrepreneurs, selling their product; they may choose to trade their innovation in exchange for other innovations, or they may be adopted by their suppliers. Nowadays, they may also choose to freely reveal their innovations, using methods like open source. In such networks of innovation the users or communities of users can further develop technologies and reinvent their social meaning.





Once innovation occurs, innovations may be spread from the innovator to other individuals and groups. This process has been proposed that the life cycle of innovations can be described using the 's-curve' or diffusion curve.

Given the noticeable effects on efficiency, quality of life, and productive growth, innovation is a key factor in society and economy. Consequently, policymakers are working to develop environments that will foster innovation and its resulting positive benefits

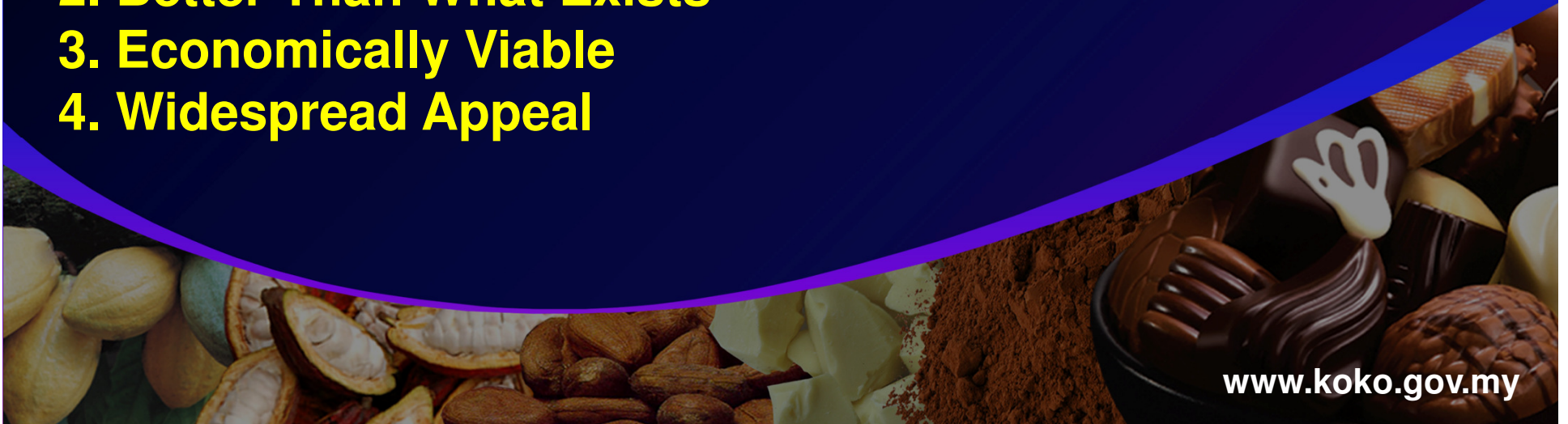
Innovation in business can be achieved in many ways, now much attention is given to formal research and development for "breakthrough innovations." Innovations may also be developed by less formal on-the-job modifications of practice, through exchange and combination of professional experience and by many other routes. The more radical and revolutionary innovations tend to stem from R&D, while more incremental innovations may emerge from practice.



The Japanese interpret "Innovation is a novel solution to a new problem." The principle is new problems always attract new funding and a new culture is permitted to develop. One is not trying to correct an old mistake. "Innovation contains elements of change and elements of creativity but in very few cases are either change or creativity innovative. Innovation involves learning, often expressed as a new way of seeing, or developing a different understanding that makes a new idea sensible and practical as a way to improve some aspect of human endeavour. Innovation is an active process, often preceded by long hours of exposure to a difficult or confusing situation. The innovation one is seeking has the purpose of making the situation less difficult, more efficient or more understandable. "Innovation creates commercially successful products, processes, or services that contribute to sustainable growth and with a smaller 'env. footprint' than existing technology." New products and services are talked into existence.

Today, Innovation is probably the lifeblood of any organization. It encompasses new products, processes, methods or inventions; with four essential ingredients.

- 1. Something New**
- 2. Better Than What Exists**
- 3. Economically Viable**
- 4. Widespread Appeal**



Cocoa – Food products

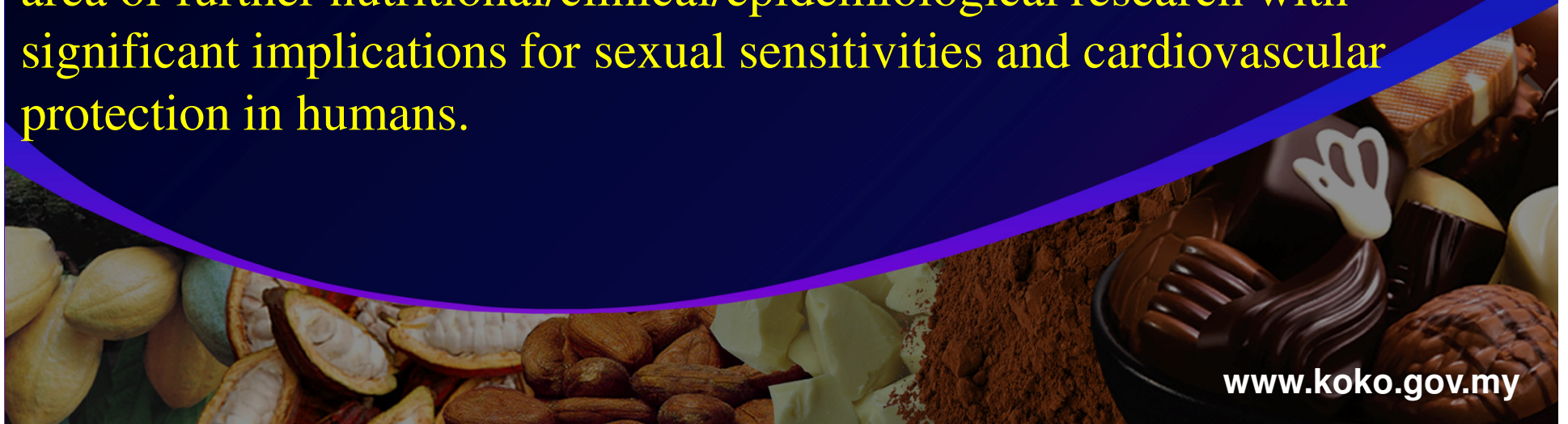
The cocoa and chocolate industry is constantly undergoing dynamic change depending on the nature of the demand for chocolate. The trends towards niche or premium chocolate products have engendered new challenges and opportunities for all participants in this sector. Until recently, the general perception was that consumption of chocolate in Europe and the United States would stagnate, as these major chocolate markets were on the verge of saturation. However, consumption behaviour across these mature markets has recently experience a major change, with the increasing appeal of premium chocolate, including organic, Fairtrade, single-origin, reduced sugar and dark and high cocoa content chocolate. The confectionery market has increasingly been characterised by consumer demand for taste, convenience and health; and products addressing ethical and environmental concerns.



New product developments and 'functional foods' with wholesome ingredients (foods that give health benefits beyond basic nutrition) have played an important role in the upward trend of the confectionery market. In recent times, many research activities have been conducted on the health and nutritional benefits of cocoa and chocolate. The findings supported that flavanoids in cocoa may decrease low-density lipoprotein ('bad' cholesterol) oxidation, helping to prevent cardiovascular diseases. In addition, cocoa's high content in anti-oxidants has been proved to reduce the risk of cancer. The demand for dark (high cocoa content) chocolate, in particular, has surged in response to these positive findings.

The chocolate industry has demonstrated a strong ability to meet these challenges and benefited from the new opportunities brought about thru' changing consumer demand.

Consumption of cocoa and chocolate flavonoids still presents an exciting area of further nutritional/clinical/epidemiological research with significant implications for sexual sensitivities and cardiovascular protection in humans.

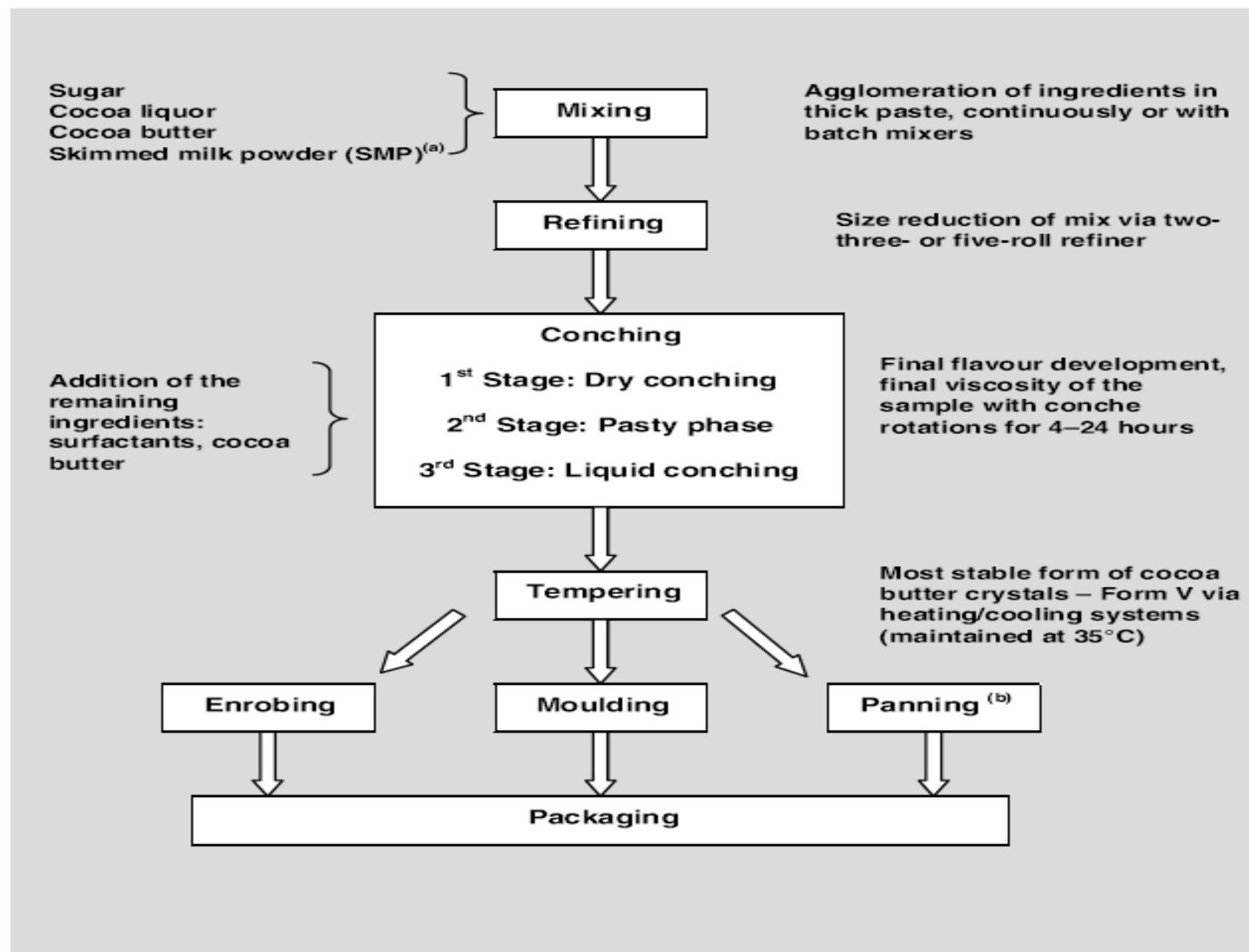


Process of chocolate making

Chocolate manufacturing is very complex; requires a combination of several ingredients and technological operations to achieve the desired rheological, textural and melting qualities. However, the extent to which the formulated ingredients and the applied processing operations, such as refining and conching, influence these quality characteristics remains unclear to processors and therefore requires in-depth investigations to elucidate their effects.

Chocolate is a dense suspension of solid particles, on average 60–70% sugar and non-fat cocoa solids and milk solids (depending on type) dispersed in a fat continuous phase, mostly of cocoa butter.





Note: (a) Skimmed milk powder is only used in milk chocolate manufacture;

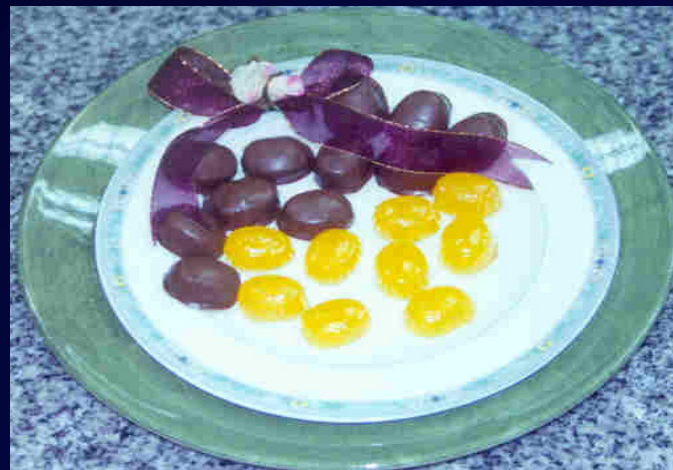
(b) Panning means that the chocolate is used as coating for hard centres such as nuts.

Processing steps for chocolate manufacture (Afoakwa *et al.*, 2007).

Cocoa base food products



Cempedak truffle chocolate



Cempedak jelly chocolate



Cempedak Truffle Chocolate



Mango jam chocolate

Cocoa base food products



Mango fondant chocolate



Nata from cocoa pulp juice



Cocoa pulp jelly



Energy bar

Cocoa base food products



Sugar Free Dark Chocolate



Sugar Free Milk Chocolate



Sugar Free White Chocolate



Tongkat Ali Chocolate

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Panning Chocolate

- Hazelnut
- Almond
- Raisin



Cocoa non-food products that have been innovated is depended upon the properties and specialty factors of each components of cocoa. From cocoa tannin gel toothpaste to charcoal from cocoa shells are some of the non-food products produced in relation to their uses.



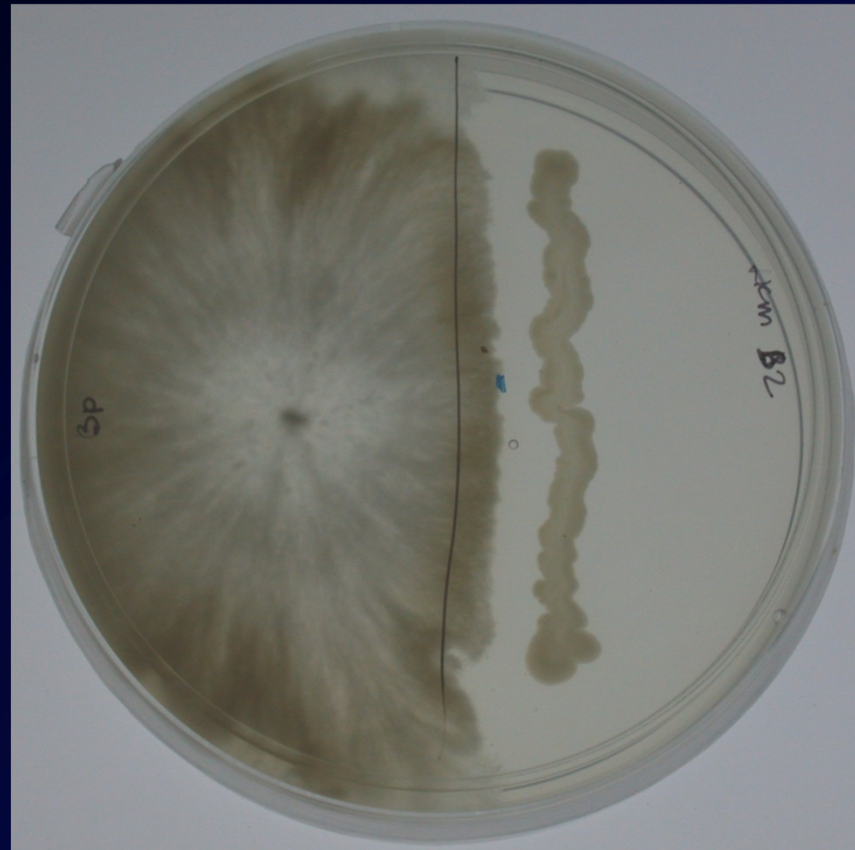
Product name	Source	Benefits	Uses
Cocoa Tannin Gel Toothpaste	Cocoa tannin extracted fr. cocoa powder as a.i.	Inhibit tooth plaque form Anti-mouth plaque bacteria	As personal care for brushing teeth
Cocoa Oral Rinse	Cocoa tannin extracted fr cocoa powder as a.i.	Inhibit tooth plaque form Anti mouth plaque bacteria	As personal care for gargle
Cocoa Body Scrub	Cocoa butter as cream base Ground cocoa pod husk e.a.	Body C& M. Natural exfoliating agent	For bathing and removal of dirt
Cocoa Shower Cream	Cocoa butter as base	Cleansing and at the same time moisturizing	For bathing & dirt removal
Cocoa Bath Gel	Cocoa tannin extracted from cocoa powder as a.i.	Cleansing with antibacterial	For bathing and antibacterial
Cocoa Cream for Crack Heel	Cocoa butter as base	Removal of cracked heel	Personal care for cracked heel
Cocoa Shaving Cream	Cocoa butter as base – replace animal fat	cream base for shaving, remove beard /face hair with m.e.	Men personal care product for shaving
Cocoa After-shave	Cocoa butter as base Tannin extracted from cocoa powder as a.i.	Moistening skin after shaving Antibacterial effect	Men personal care product for after shave



Cocoa butter m.c.	Cocoa butter	Natural emollient and moisturizer	Moisturizer
Cocoa based lipstick & lipbalm	Cocoa butter Wax derived from cocoa butter/ butter deodorizer distillate	Protect chapped lips.	Lips care.
Methyl salicylate Ointment	Cocoa butter Wax derived from cocoa butter/ butter deodorizer distillate	Cocoa butter able to enhance drug percutaneous abs. rate through skin compared with normal paraffin base.	Pain relief.
Cream-to-powder foundation	Cocoa butter /powder Cocoa tannin extracted as a.i.	Cocoa butter as natural moisturizer. Cocoa powder as natural pigments & anti-oxidant	Color cosmetic
Compact powder (foundation, blusher & eye shadow)	Cocoa butter /Cocoa tannin extracted as active ingredients	Cocoa butter as natural moisturizer Cocoa powder as natural pigments & anti-oxidant	Color/ decorative cosmetic
Palmityl Theobromate	Cocoa butter/ cocoa butter deodorizer distillate	able to enhance spread ability of lipstick and lip-balm. Make greener product	wax for cosmetic, pharma. Prod. devt. Aromatherapy candle development.
Activated carbon	Cocoa shell	Green prod. value add	Useful in env. removal toxic metal cont. in water sources.
Fuel pellets	Cocoa shell	Fuel pellets low in alkali metals will reduce maintenance problems - hot corrosion and sintering.	Useful source of heating energy.
Charcoal	Cocoa shell	Green prod value add	Useful source of heating energy, added advantage odourless and smokeless.

Endophytic Microorganisms: Biological Pest and Diseases Control of Cocoa

Endophyte inhibit growth of *Phytophthora palmivora*



Antibiotic from Cocoa Tissues



Antibacterial hair gel



Antibacterial body cream



Antibacterial liquid hand soap



Antibacterial dishwashing liquid

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Cocoa base non-food products



Body Scrub



Soap From Cocoa



Cocoa Oral Rinse



Cocoa Tannin Gel Toothpaste



Cocoa butter moisturizing cream



Cocoa-Based Cream-to-Powder Foundation



Cocoa butter lip balm



Cocoa butter lipstick

Hand-made Chocolate Entrepreneurs Development Program

Entrepreneurs development by MCB.



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“Koko Malaysia – Khasiatnya Sejati,
Lazatnya Menyegarkan”

“Malaysia Cocoa – Naturally Nutritious,
Deliciously Healthy”

Terima Kasih
(Thank You)

