

FLAVOUR RESEARCH

1. TOBACCO FLAVOUR

1.1. NATURAL

1.2. SYNTHETIC

2. NON-TOBACCO FLAVOUR

2.1. NATURAL

2.2. SYNTHETIC

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1. Tobacco Flavour

1.1. Natural

1.1.1. Project Concluded

A - Terpenic Extracts

- Main Results:

Extracts from Amarelinho, Comum, Burley and Flue-cured tobaccos have been prepared at Suvalan using tobacco dust as raw material. The extracts impart tobacco notes and enhance the smoke flavour. They have already been tested and have shown potential to improve taste/aroma of low quality tobacco grades. The levels of application to feel a tobacco flavour enhancing effect ranges from 0.03 to 0.13%.

1.1.2. Project in progress

A - Production of Flavours from Tobacco using Simultaneous Distillation and Extraction (SDE) Technique

- Current Status:

Early results on Va and By grades indicated that important volatile flavours can be generated in acid conditions by using the SDE technique.

Scale - up of this project is in progress. We are testing these extracts in projects that aim to obtain cigarettes with low tar, but high aroma amplitude.

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1.1.3. New Project

A - Production of Casings from Tobacco Dust

To produce casings capable of imparting tobacco aromas through the treatment of tobacco dust at high pressures and temperatures in acid conditions.

1. Tobacco Flavour

1.2 Synthetic

1.2.1. Projects in Progress

A - Production of Nor-Labdaneoids

- Current Status:

Two routes have been tested so far. One considers the degradative oxidation of sclareol and abienol from natural sources. The other includes synthetic routes starting from common monoterpenes. Several compounds have been obtained in either route. Some of them have been previously described as very powerful flavours. Increasing yields and testing will consist next steps.

B - Synthesis of Megastigmatrienone-related Nor-Carotenoids

- Current Status:

Starting from common feedstocks, megastigmatrienones have been synthesized although in low yield. Several related compounds have also been obtained starting from either alpha or beta-ionones with reasonable yields. Improving yields of reactions and organoleptic evaluation will be the next steps.

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C - Sugar Esters as Flavour Precursors

- Current Status

Industrial production of glucose and galactose isovalerates is running regularly at Suvalan. We have been using this product in some commercial brands. Development of a bouquet with the other esters made in laboratory scale is forecast to mimic as naturally as possible Oriental tobacco aroma.

D - Reaction Flavour

- Current Status:

Reactions between several aminoacids and sugars have been investigated. Several flavour compounds were identified in the reaction mixtures. These reaction mixtures are going to be evaluated next.

For the next step we are planning to concentrate our efforts in the reaction with amino acids and sugars natural to tobacco

1.2.2. New Projects

A - Synthesis of Nornicotine Amadori Compounds

Preliminary studies conducted with Deoxy fructosyl nornicotine have shown this compound as a source of sweetness to the smoke and also a nicotine generator. Evaluation of this product in our blends is planned. Once approved, its commercial production will be evaluated.

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B - Lactones for the Production of Tobacco Smoke Flavours

A number of lactones have been formed after pyrolysis of sugars, some carboxylic acids and glycosides. These lactones impart aromatic and/or sweet notes to the smoke. It is our plan to synthesize and to modify structurally known and available lactones. Panel assessment will be performed.

2. Non-Tobacco Flavour

2.1. Natural

2.1.1. Project Concluded

A - Tropical Fruit Extracts

- Main Results

- Good potential to reduce tobacco smoke impact and irritation (pineapple and tamarind extracts);
- Some extracts can be used to improve tobacco smoke aroma and taste characteristics (cashew, guava, and mangaba extracts);
- Good combination of fruity/tobacco aroma and taste; reduction of unpleasant butt odor in ashtrays; good fruity notes in mainstream and sidestream smoke notes (passion fruit, banana, and a tutti frutti mixture of fruit extracts).

Industrial production of these extracts is running regularly at Suvalan. We have been using these products in commercial brands.

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2.2. Synthetic

2.2.1. Project in Progress

A - Production of Sulphur Compounds

- Current Status

We have started the production of synthesized sulphur compounds by using alpha, beta unsaturated substances as raw materials by 1,4 - addition of phenyl, butyl and furfuryl mercaptans and obtained a variety of very active compounds. Future work will consist of testing new reaction conditions to improve yields as well as to obtain pure materials suitable for organoleptic evaluation.

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SUVALAN CASINGS AND FLAVOURS PLANT

TONS OF RAW MATERIAL PROCESSED PER YEAR

1986	1987	1988	Total Capacity
1,202	1,899	2,125	6,080

TONS OF CASINGS PRODUCED PER YEAR

1986	1987	1988	Total Capacity
374	579	644	1,860

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SUVALAN PRODUCTS

AVERAGE CONSUMPTION BY SOUZA CRUZ

AUGUST 1988/JULY 1989

CPD.RJ No.	NAME	CONSUMPTION, Tons
500	Natural Prune Extract	156,4
501	Natural Dry Fig Extract	96,9
502	Natural Banana Extract	21,4
503	Natural Pineapple Extract	82,7
504	Natural Cashew Extract	77,1
506	Natural Tamarind Extract	86,6
508	Natural Guava Extract	5,6
511	Natural Mangaba Extract	0,2
527	Natural Raisin Extract	47,1
528/1	Pyrazine Precursor	17,1

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SUVALAN PRODUCTS

AVERAGE CONSUMPTION BY SOUZA CRUZ

AUGUST 1988/JULY 1989

CPD.RJ No.	NAME	CONSUMPTION, Tons
529	Anti-Harshness for Flue-Cured Tob.	0,3
534/1	Anti-Harshness for Flue-Cured Tob.	0,1
535/1	Anti-Harshness for Air-Cured Tob.	14,3
536/1	Virginia Enhancer	11,6
541	Air-Cured Casing	22,2
549	Flue-Cured Casing	30,6
013	Oriental Tobacco Flavour	0,2
046	Coumarin Substitute	1,2
048	Coumarin Substitute	3,1
050	Coumarin Substitute	0,7
052	Coumarin Substitute	6,7
053	Coumarin Substitute	0,7
	TOTAL:	682,8

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COMMERCIAL PRODUCTS FOR PROMPT DELIVERY

CASINGS AND FLAVOURS INGREDIENTS

CASINGS

<u>PYRAZINE PRECURSOR</u>	<u>ANTI-HARSHNESS</u>	<u>VIRGINIA ENHANCER</u>	<u>FRUIT EXTRACT</u>	<u>TOBACCO COLOURANT</u>
528/2	529	511	500 and 500/2	543
555/2	534/1	536/1	501 and 501/2	
*556/2	530		502 and 502/2	
557/2	535/1		504 and 504/2	
*558/2			527 and 527/2	
			503	
			506	
			508	
			559	
			560	

FLAVOURS

<u>TONKA BEAN</u>	<u>ORIENTAL TOBACCO</u>	<u>COUMARIN SUBSTITUTE</u>	<u>NATURAL TOBACCO FLAVOUR</u>
017	018	* 045/1	054
		* 047/1	*055
		* 051/1	*056
		* 048/1	*057
		* 050/1	
		* 052/1	

* PRODUCTS NOT APPROVED BY AMGP YET

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LOW NICOTINE

- COMPETITIVE PRODUCTS IN TEST MARKET
- EXPERT SMOKING INDICATES SMOKE QUALITY RATED "POOR TO FAIR"
- ANALYTICAL MEASURES INDICATE
 - FLUE CURED SKEWED
 - ALL COMPONENTS LOW IN NICOTINE
 - AMMONIA TECHNOLOGY w/o RECON
 - NO HEAVY CASINGS
- OPPORTUNITY
 - MATCH NICOTINE DELIVERY
 - IMPROVE SMOKE QUALITY

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LOW NICOTINE
PRODUCT DEVELOPMENT

- RICHLAND STRIP BLEND BASIS
- SUPERCRITICAL CO₂ EXTRACTION BY BATCF
- TOBACCO ANALYSES:

	<u>% ALKALOIDS</u>	
	<u>BEFORE</u>	<u>AFTER</u>
BURLEY	4.4	0.4
FLUE CURED	3.6	0.5
ORIENTAL	1.2	0.2

- CIGARETTE MANUFACTURE IN PROGRESS
 - EXTRACTED TOBACCOS
 - NO ET
 - LOW LEVEL OF CPCL
 - LIGHT SUGAR CASING
 - AMELIA FLAVOR
- DUPONT CONSUMER RESULTS IN OCT.-NOV.

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LOW NICOTINE
NEXT STEPS/ISSUES

- BLEND VS COMPONENT EXTRACTION
 - WHAT DOES PM DO?
 - PROCESS IMPACTS

- PRODUCT DEVELOPMENT
 - CASINGS
 - INCREASES IN IMPACT
 - AMMONIA TECHNOLOGY
 - TOBACCO SELECTION

- PROCESS CAPABILITY
 - DEVELOP BETTER UNDERSTANDING OF BATCF PROCESS
 - INTERNAL CAPABILITY
 - DOMESTIC CAPABILITY

- PM PATENT POSITION

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