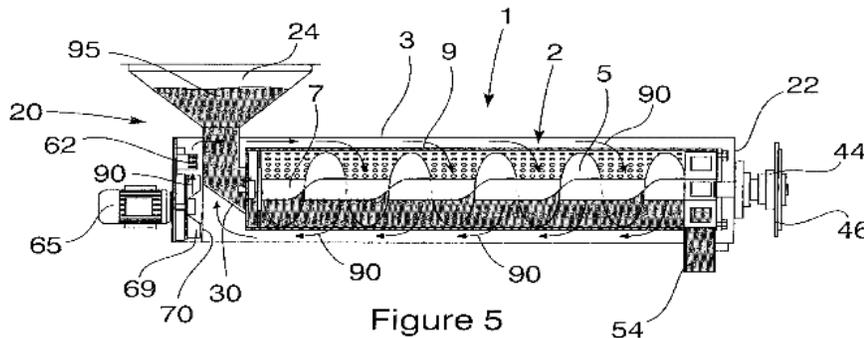




## Forced Convection Roasting

### Working principle of our Roastech Roasters:



FCCTR means: *Forced Convection Continuous Tumble Roaster*

Forced convection roasting is new in the sense that hot air is forced right through the product, while the product is continuously mixed and moved through the machine.

Diesel burner is used to heat the air.

The heated air is continuously re-circulated, resulting in efficient energy usage.

The temperature of the heated air is controlled precisely with an adjustable electronic thermostat.

A perforated rotor with a screw conveyor inside gently conveys the product in the machine while it is exposed to the hot air treatment.

The rotor speed is adjustable to enable the operator to find the exact optimal roasting conditions for his product.

The operator can easily find the optimal temperature and time settings for the required roasting result.

When the optimal speed and temperature is set, the roasting conditions are stable, resulting in continuous precise roasting of each of the particles of the product stream.

The total surface area of each of the particles in process is utilized to transfer heat, resulting in a very evenly roasted product.

The temperature of the hot air is accurately controlled, so particles will not be exposed to extreme hot surfaces. (In fact, the maximum temperature inside the machine will not exceed the set-point of the temperature controller.

### **Super heated steam**

Moisture from the product replace the hot air inside the machine within 15 minutes from start-up. This super heated steam (at atmospheric pressure) results in faster and very even heat transfer to the product. The machine is thermally insulated, resulting in low heat loss and effective usage of energy for processing of the product. The typical running cost is less than 20% of conventional gas fired drum-type roasters at the same capacity.

### **Incubation**

Most of the machines are equipped with an incubation unit where the product is kept at the outlet temperature to incubate. This is an effective way to cook the products further at the downstream side of the machine and to develop *Maillard browning* if necessary.

### **Management**

Electrical interruptions do not cause any serious problems. The machine shuts off when a power dip occurs. When the power supply has been corrected, the operator puts the machine on; evaluate the residual temperature; wait for the machine to reach the desired temperature level, and start the rotor, and production carries on.

The machine does not have to be monitored continuously.

It runs in a “steady state” where all parameters are fixed and every particle receives the same treatment.

The machine is safe in handling impurities in the product like stones and even dangerous particles like bolts and nuts.

As soon as the set-point temperature is reached, and the rotor speed is set, the machine can run on its own.

The product must have a low dust content, for too much small particles will result in smoke and more frequent cleaning.

## **Proven Technology**

We have installed 85 machines in the first four years of production with a combined capacity of more than 750 000 tons per year.

Our clients range from Dairy Farmers, Veterinarians, Industrial Processors, Business People, Suppliers to big chain groups, like Central Markets USA, Woolworths and Checkers in SA, and Universities in Arizona USA, South Africa and Namibia.

We are continually improving the performance of the machines and we do intense research on more applications and new products.

This precision roasting technology has already replaced micronizing equipment and extruders. It is successfully used commercially for roasting of soy, corn, coriander, groundnuts (blanch, roast in the shell and normal roast), macadamia nuts, rolled oats, caramelizing of dehydrated onions without oil etc. We are doing trials on coffee beans where it seems that taste is drastically enhanced, due to the new efficient method of heat transfer. (No thermal pinching of the coffee beans occurs)

No oil is needed for nut roasting and a very even roasted product is produced with many health benefits.

No particles are burnt, because the operator has full control of the temperature set-point and thus the maximum temperature inside the machine.

We have initially developed this technology for whole soy beans. Tests have been done at the University of Free State in South Africa, Eskom and private entities on several grains. They are very excited about the capabilities.

Roasting of Soy is very successful, without losing any proteins and vital fiber. The trypsin inhibitor has been destroyed to almost 2mg/g. It deactivates urease activity to negligible levels.