TECHNOLOGY FOR PRODUCING SOY BASED DAL ANALOGUE- SUBSTITUTE OF TUR DAL PULSE

Malik Engineers, Mumbai offer Equipment for producing Soy based Dal Analogue from 49.5% Soy + 49.5% wheat + turmeric & emulsifier mix. The Dal Analogue is protein rich, (30%) nutritious and scores over tur dal (22% protein). Not only can it meet the growing consumption requirement, it can save our money, being cheaper than tur dal.

Every year India exports huge quantity of defatted soy flour (we are ranked 5th in production of soy beans). Instead of exporting, we can utilise the same to produce Dal analogue and satisfy our national requirements. Being in great demand locally, units engaged in producing dal analogue and those willing to take up challenge are totally assured of bright and secured future and time is ripe to launch production for new units.

Currently, there are not much units engaged in production of dal analogue. Also, the production technology (Extrusion) was not available indigenously. Imported equipment is very costly and medium/small scale enterprises found difficult to invest the huge amount.

Now, we offer the Extrusion technology indigenously to the entrepreneurs willing to start production of dal analogue.

Soy Dal Analogue is made on Single screw or Twin screw Extruder. When using Single screw machine, a combo is used- 1st machine acts as gelatiniser or HTST while 2nd machine , a former, forms dense product which needs drying to remove excess moisture. These 2 functions of cooking/forming can be achieved in one Twin screw Extruder which has special profiled screw segments that provide necessary mechanical shear and heat for cooking the ingredients and form a dense product after exit from die.

Small size dal

Regular size

Manufacturing Process for producing Dal Analogue:

The Soy based Dal Analogue is produced in following steps:

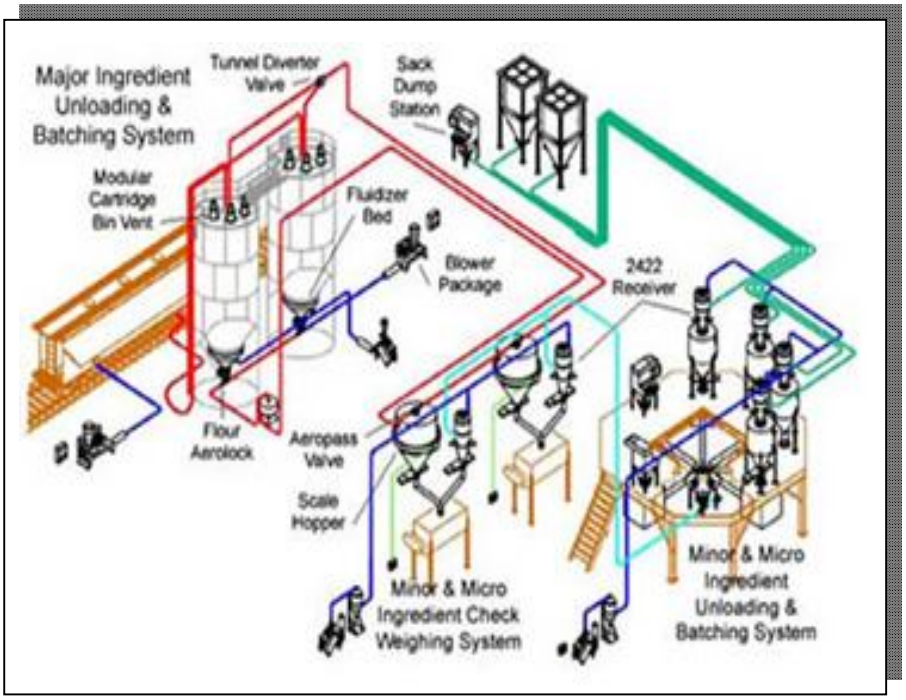
1) Premixing which involves mixing all the Dry Ingredients in a Paddle type Batch mixer to mix all these thoroughly.
2) Preconditioning step involves injecting water and steam for hydrating the materials and steam is injected for precooking the raw materials at temperature of 100 C. Generally Moisture content should be from 28-30 % in this step on wet basis.
3) Extruding step- Here the premixed and hydrated and precooked materials are homogenised at high temperature and shear inside a Twin screw Extruder which consists of a set of co-rotating screws inside cylinder. The high temperature (80-175 C) and high shear cooks the ingredients.
4) Inside the Extruder, Steam and water may be injected for homogenous cooking of the ingredients. Further, the Vent zone of the Extruder is important to remove Gaseous material from the material so that the form of material is suitable for extrusion through the die where it forms the Dal Analogue product by continuous cutting.
5) As the Dal Analogue product emerges out through the die orifices mounted at the former, a rotary cutter chops down the product into small lengths. Thus Dal

Analogue is formed, but is still hot and has excess moisture. Size of product depends on dia. Of holes in the die plate.

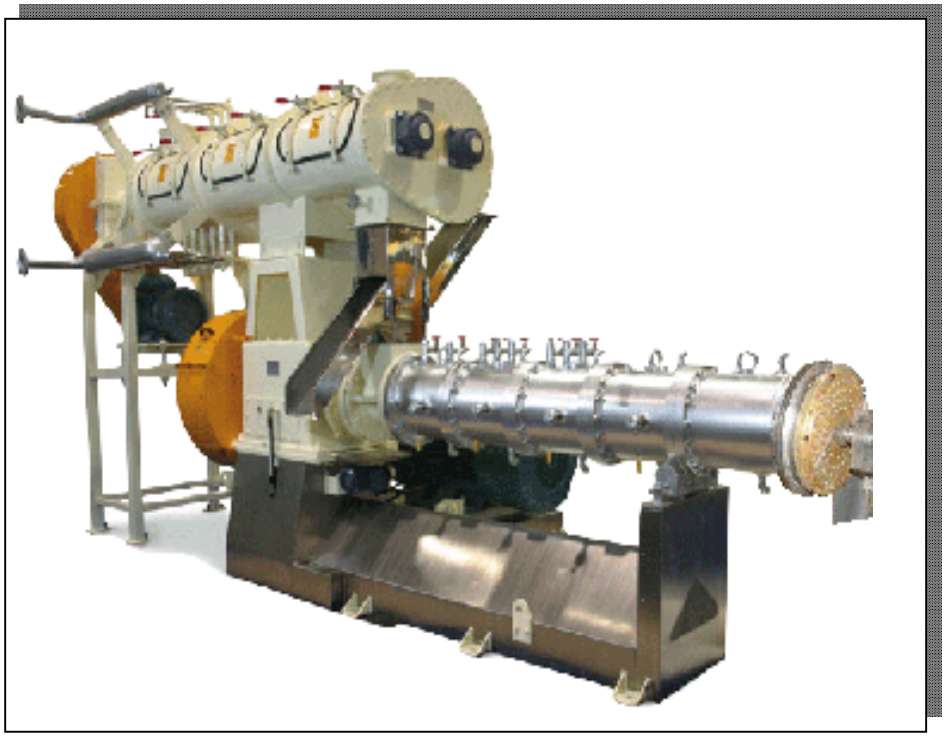
6) Conveyors transport the wet Dal to the Dryers to remove excess moisture- target moisture is generally not more than 10%. The Final Dryer has an extended length of Cooling section to cool down the product near room temperature for safe packing.

List of Equipment Required for producing Soy based Dal Analogue:

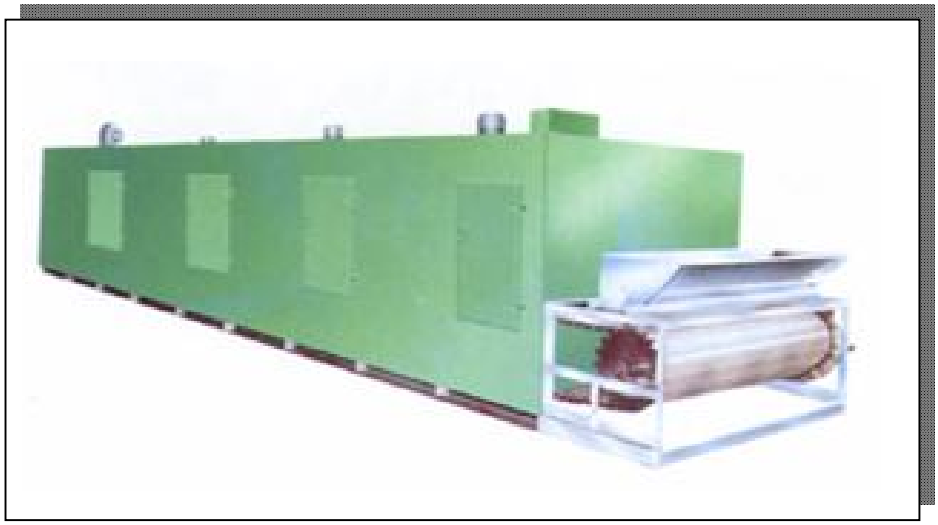
1) Pneumatic Conveyors which will mix the raw-materials (wheat, soy and turmeric) in required proportions and then transfer the mix to the Batch mixer with pneumatic slide gates. For a 1 ton/hour line, batch mixer can be upto 300 Kgs capacity batch. After Batch mixing the material gets dumped into Rotary Siever to maintain constant grain size of feed. The feed then moves over through Cyclone and falls into Loading bin of the Twin screw Extruder. The entire Pneumatic conveying equipment is programmed to work automatically to provide desired feed material to the Extruder.
2) Twin screw Extruder for wet output around 1250 Kgs/hour capacity (Final output after Drier will reduce owing to drying leading to moisture loss from wet product). Here, the Twin Screw Extruder combines function of cooking and forming in a single barrel- the extension of feed/knead/cooking section being followed by a forming zone which prevents expansion of product as it emerges out of die openings.
3) Wet Dal Analogue product gets transported pneumatically (negative pressure or Vacuum lifting is usually employed) to the Multi Deck Belt Drier where excess moisture is rremoved from the product.
4) Vibratory Drier to remove moisture in 1st stage to avoid product sticking and forming lumps in subsequent processing, can also be employed before product is shifted to the Belt Drier. If the product is free flowing from the Extruder, this step is usually eliminated.
5) Main Belt Drier will remove maximum moisture from extruded product and bring down to approx. 10% mcb, after drying.
6) Cooling belt to cool down the hot product after drying- for safe packing. It is usually extended portion of the Main Belt Drier.



Above: Example of Batching & Mixing & Conveying System in Dal Analogue Plant



Above: Twin screw Extruder METS-125(DAP) for Dal Analogue



Above: 5 layered Belt Drier Steam heated for Dal Analogue product

For more information and financial asepcts ofproject, contact:

Malik Engineers,

Unit-1, Shailesh Ind. Estate-1, Navghar,

Vasai Road (East)-401 210, Maharashtra, India.

Tel: +912502390839, +912228830751, Mobile: +919821676012

Email: sales@malikengg.com