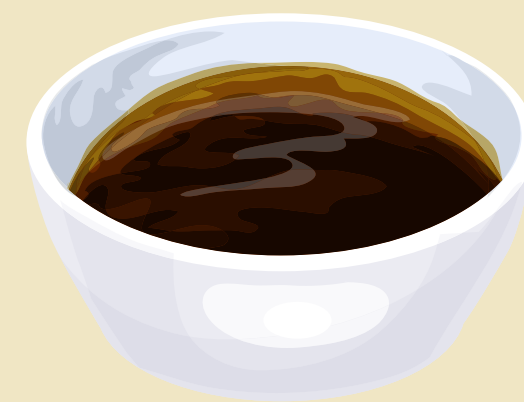




# Soy Protein

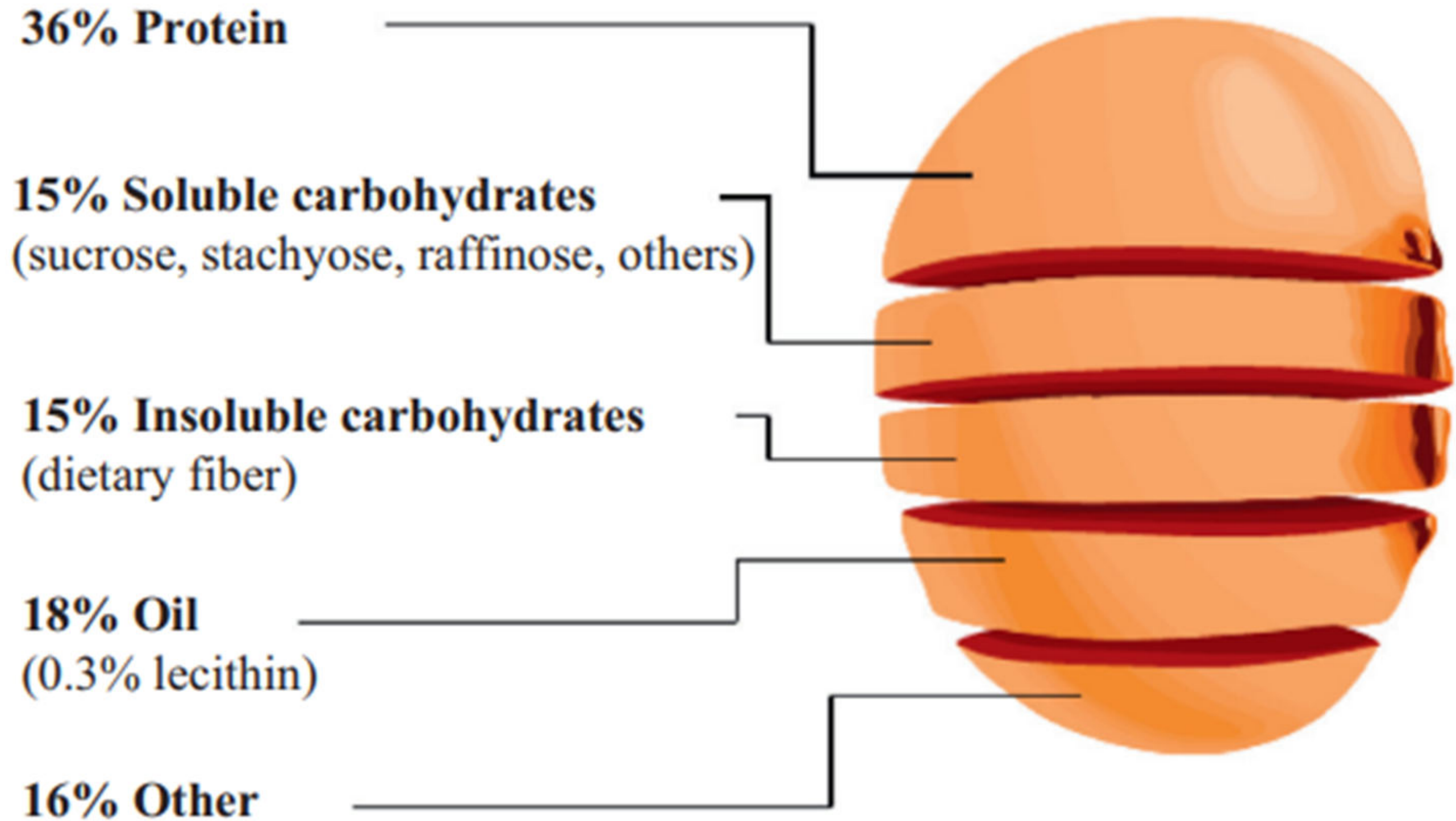
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- Soybean (*Glycine max*) is a species of legume rich in both high-quality protein and edible oil.
- Depending on the context, the plant is classified as either an oilseed (a crop grown primarily for its oil) or a pulse (an annual leguminous crop with seeds in pods)
- Soy is a complete protein with all nine essential amino acids, more than other plant proteins. It is good for Cardiovascular health as well as gastrointestinal health.





Composition of typical soybean. *From DuPont Nutrition and Health Internal Data.*



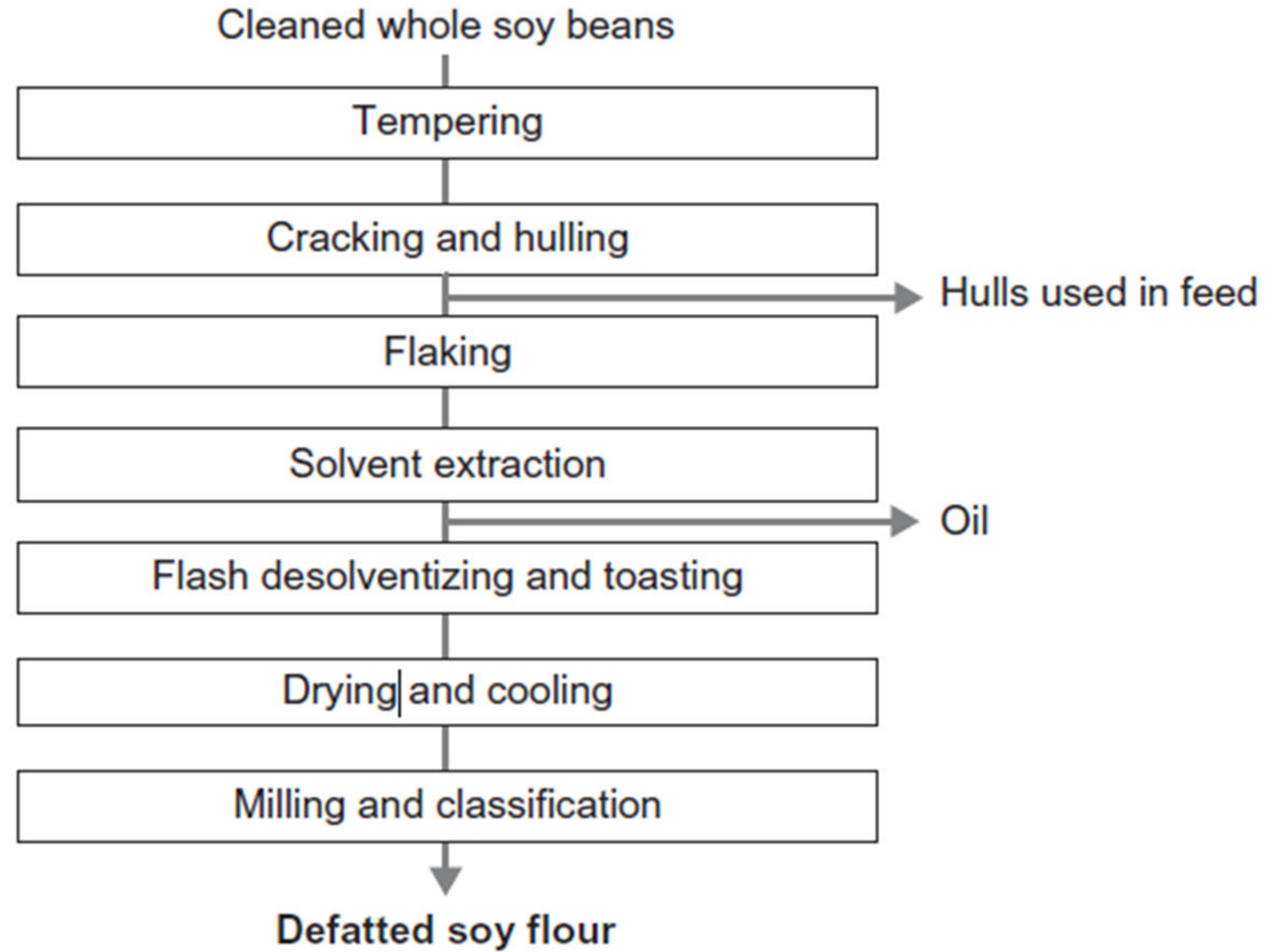
- Soybean contains two main types of storage proteins,  $\beta$ -conglycinin and glycinin (65–89% of the total seed proteins) and are classified as globulin proteins.
- In addition, the seed contains other proteins such as lectins, trypsin inhibitors, and lipoxygenases.
- **Glycinin** is the largest single fraction of total soybean seed protein (25–35%). Glycinin has a high molecular weight (350 kDa). This protein's properties are low viscosity and high thermal stability.
- **$\beta$ -Conglycinin** is a trimer protein with about half the molecular size of glycinin (175 kDa). The properties of  $\beta$ -conglycinin are high viscosity and low thermal stability.

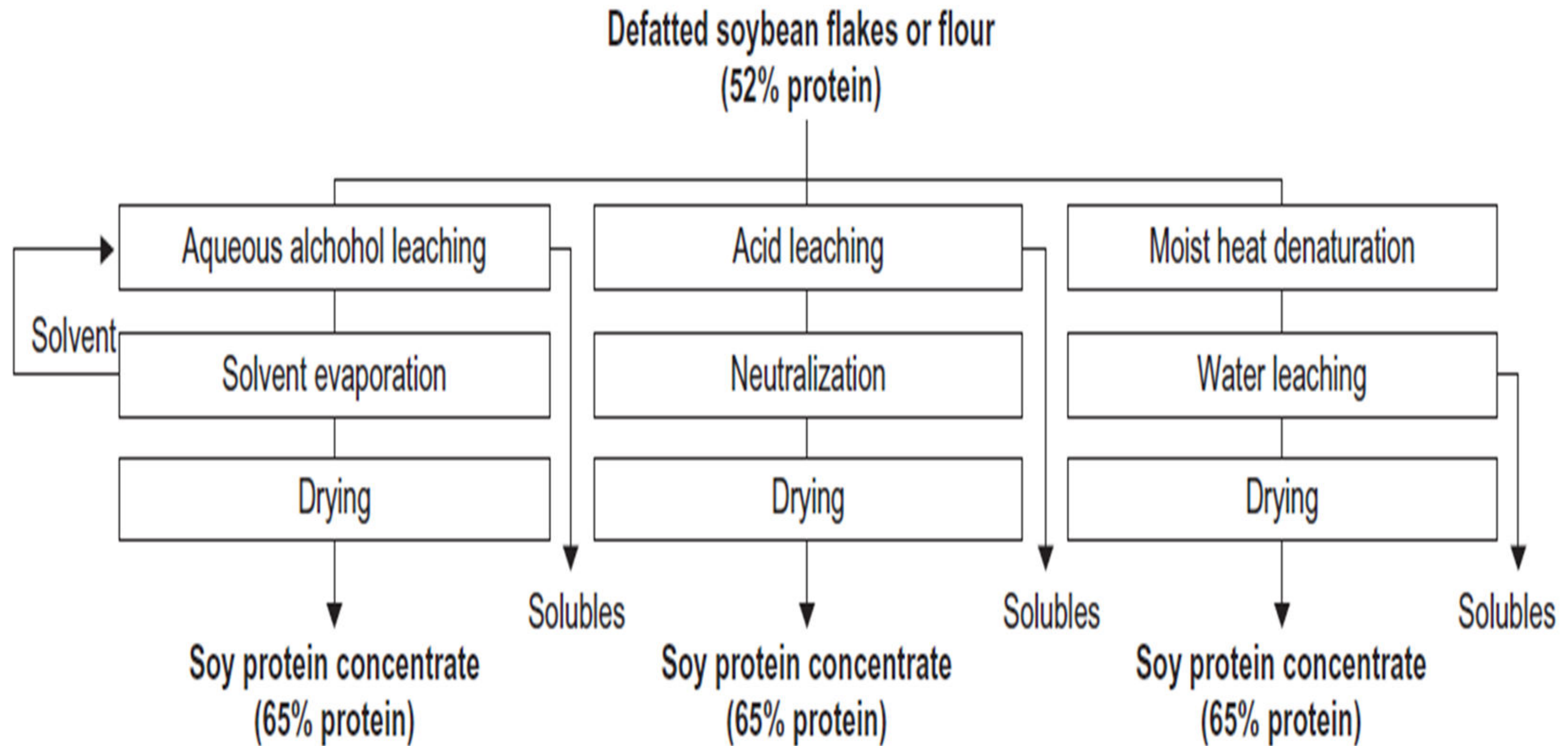




## Forms of Soy Proteins-

- Soy protein is often used to replace animal proteins in an individual's diet.
- Soy protein products are utilized in food systems as whole beans, flours and grits, Soy protein concentrates and isolates, and textured products.
- Soy protein ingredients are used in compounded foods for their functional properties, solubility, water absorption, viscosity, emulsification, texture.
- Increase total protein content and improves the essential amino acids profile upon addition





## Defatted soybean flakes or flour

- Aqueous extraction and dilute alkali solution

Spent flake

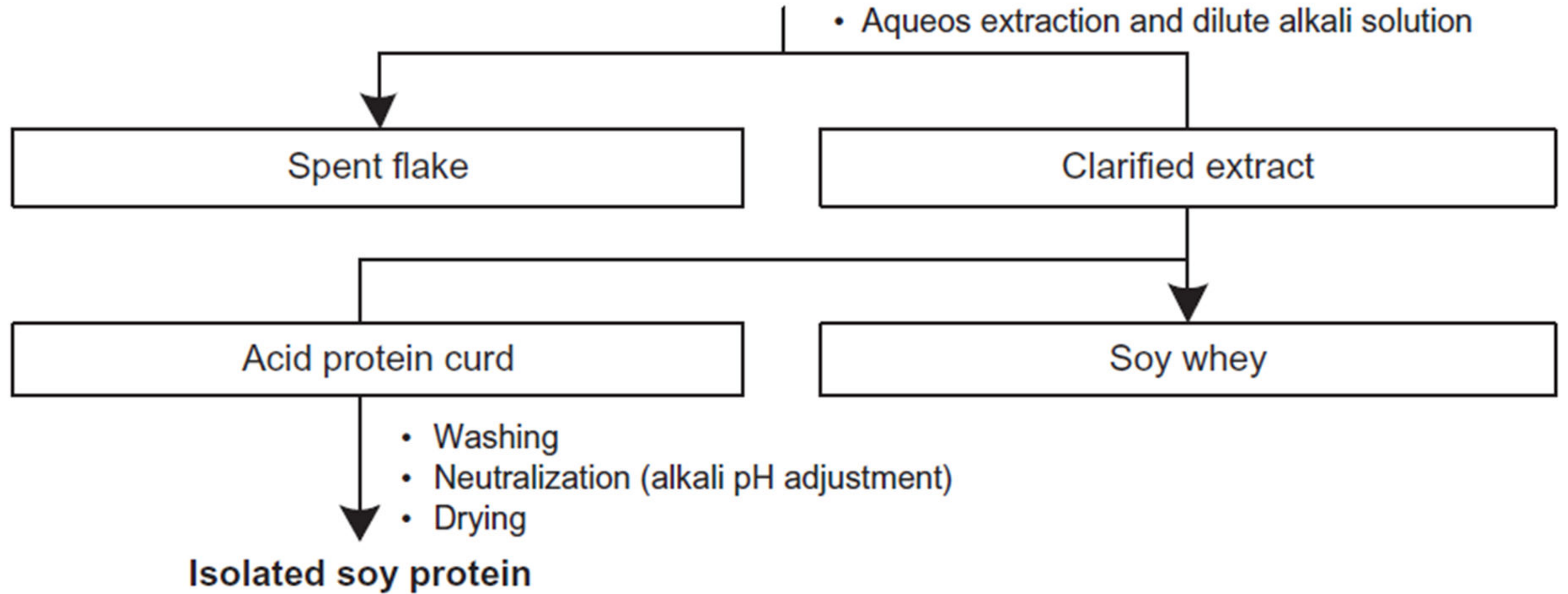
Clarified extract

Acid protein curd

Soy whey

- Washing
- Neutralization (alkali pH adjustment)
- Drying

Isolated soy protein

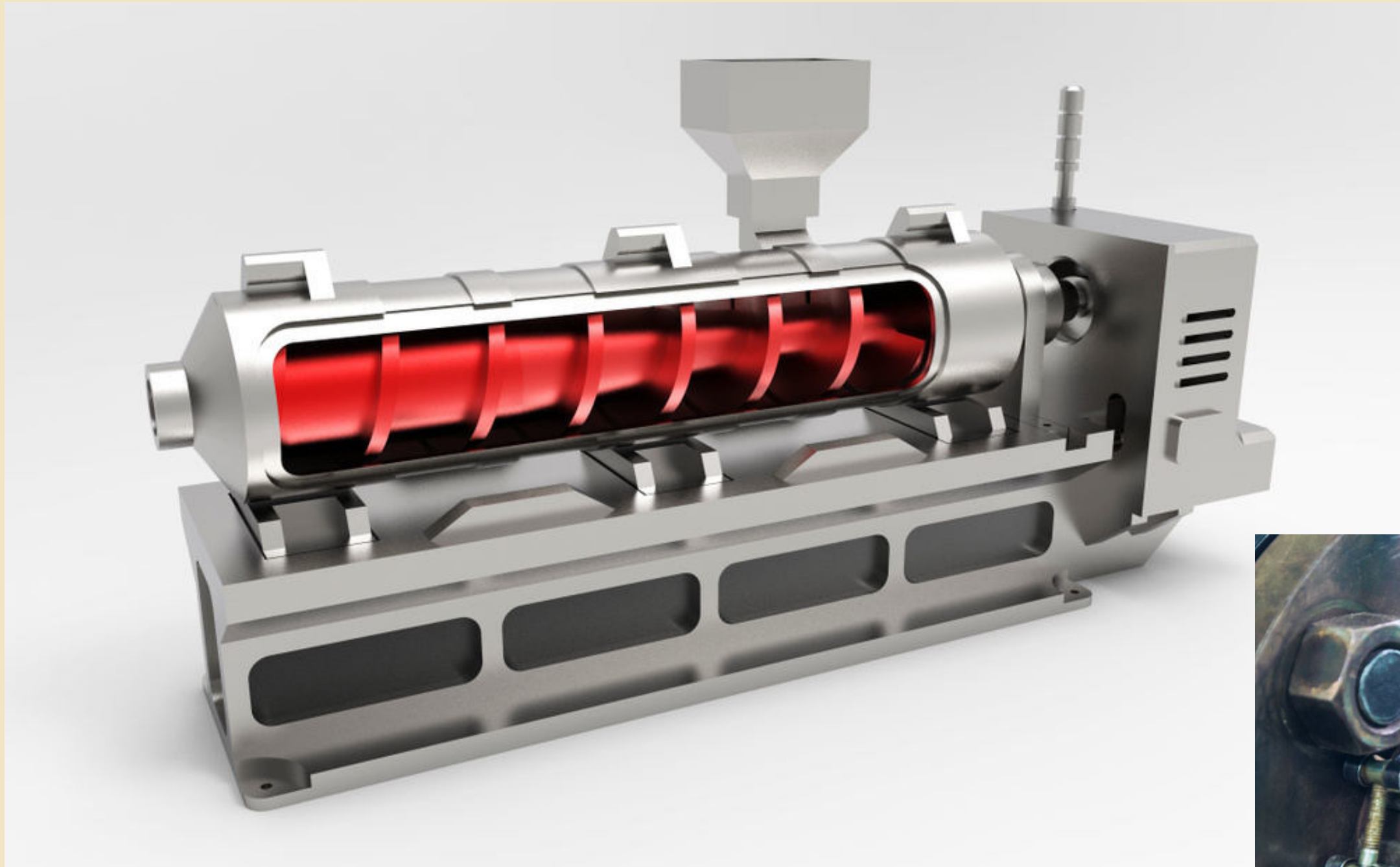




- Soy protein concentrates are prepared by removing soluble carbohydrate fraction as well as some flavor compounds from defatted meal. Removal of soluble carbohydrates (primarily sucrose, stachyose, and raffinose) increases the protein content to >65%, on a dry basis.
- Soy protein isolates- Prepared from defatted, dehulled soy flakes by removing the majority of the non protein components. It contains > 90% protein and has all the essential amino acids.
- Soy flour, concentrates, and isolates are also converted into products with defined appearances and textures through the utilization of a single or double screw extruder.















- **Improve the emulsification properties of ice cream**
- **Delay the crystallization of lactose**
- **Prevents sanding**





- Increases the strength of gluten
- Improve the water absorption of the dough during processing
- Improve the flavor and nutritional content of the product.





# Meat Analogues-

- Soy-based protein product is cholesterol-free, with low concentrations of saturated fat and high concentrations of essential amino acids.
- It has been reported that when soy protein is used, the final product could mimic the texture, appearance, taste, smell, and functionality of red meat.





- With the increase in awareness of protein, soy protein is becoming very popular.
- Products like soybean wadi, granules, and soy flour etc are cheaper sources of protein and also readily available in the market.
- There are many vegetarians who consume only pulses and grains for the protein, but that is not enough.





- Various health benefits of soy protein- It can reduce the breakdown of lean muscles and boost the growth of healthy muscle, it lowers the LDL cholesterol level without impacting the level of good cholesterol, rich in essential amino acids, help in reducing the risk of cancer, especially breast cancer in women, makes your skin look good, reduces post-menopausal symptoms, controls obesity & diabetes etc

- Can be incorporated consuming tofu, soy flour, soy milk, soybeans, soy granules, and also any soy meat substitutes.







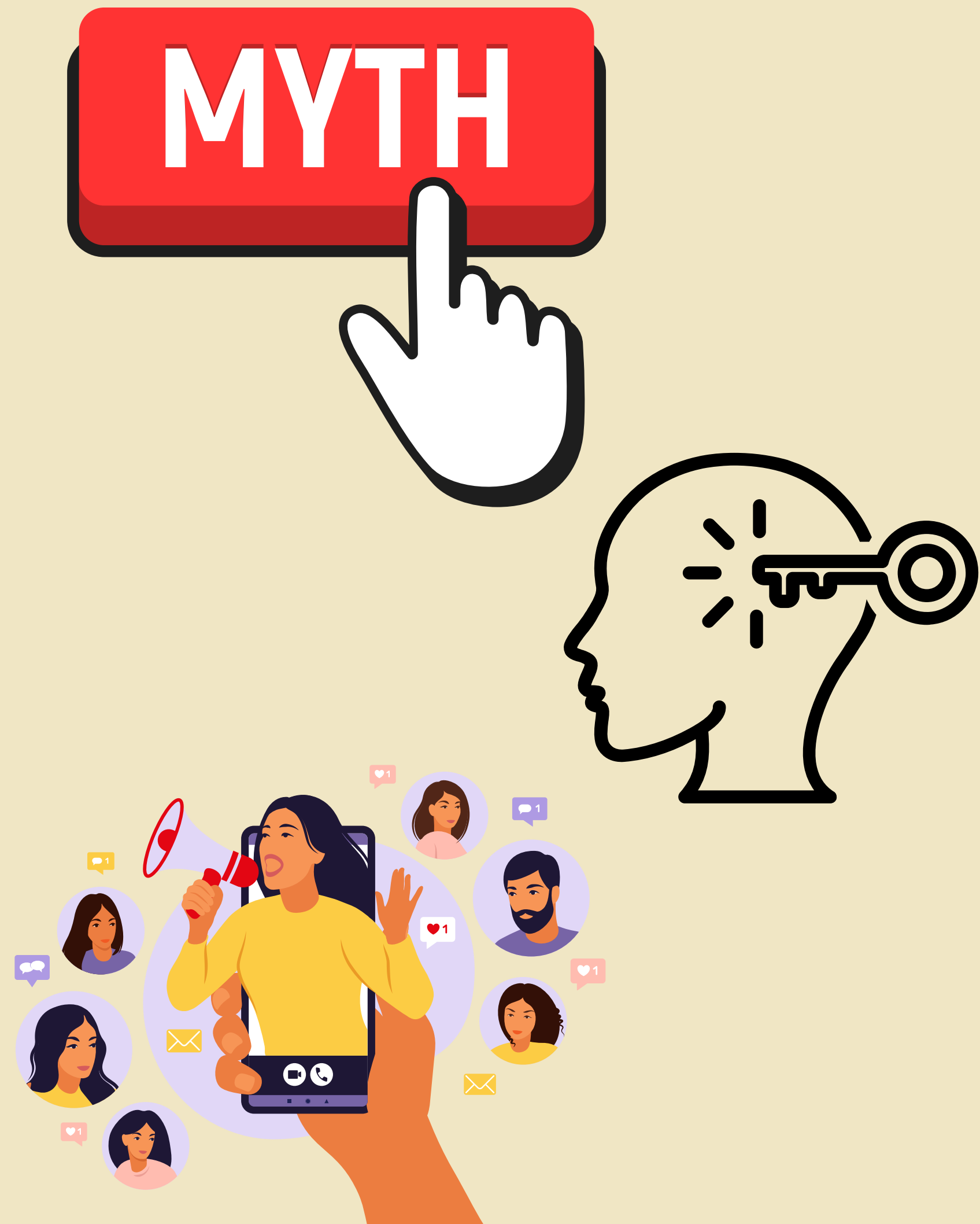


- Many dishes can be made by using soy products and added in your day-to-day meals.
- For e.g. soy milk, roasted soybeans, soy protein bars, soya pancakes etc for breakfast.
- Soya kebabs, soya cutlet, soya burgers and soya Manchurian as starters.
- Soya chunk curry, soya chap curry, soya pulao, soya bhurji as main course and soy yogurt as desert.





- Soy has several myths.
- How can we debunk such myths?
- Like reaching to the public through proper channels like various print media, news media, electronic media
- Even training of health care professionals will be helpful to eradicate such myths.
- Today's generation believe and trust their favorite influencers and try to follow what they promote.





- Organizing webinars and also nutrition awareness activities in colleges
- Creating a lot of buzz on social media
- Advertising, creating social media ads, organising contests, taking up blogs from experts, distributing free samples, creating different contents, partnering with different companies and associations for awareness, offline campaigns like posters, brochures, billboards, etc are the best options to create the awareness of soy and soy products.
- The problem of protein deficiency is going around for a long time now.
- To reach out to people with the problem and solution, creating the buzz about the deficiency, solutions, availability, usage, consumption is really going to help.





