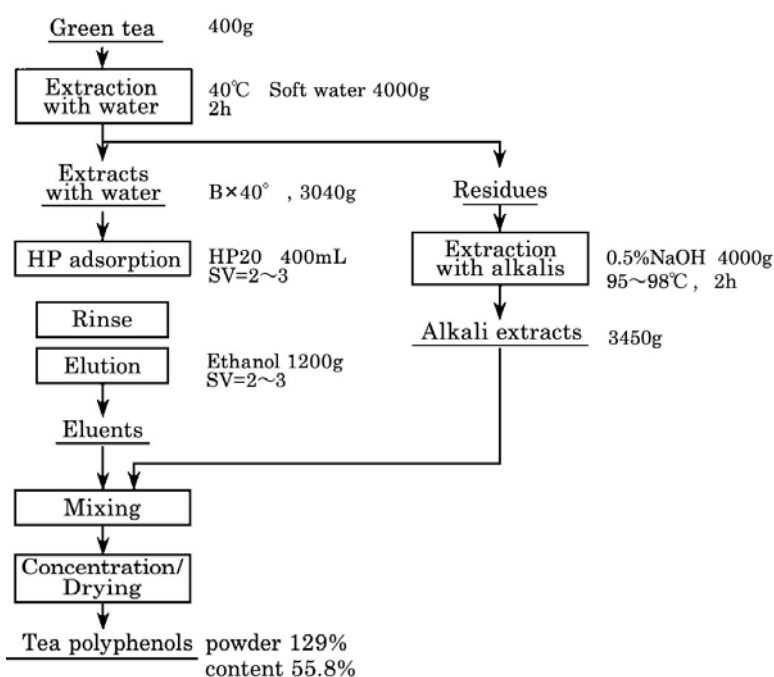


### Refining of other natural extracts: polyphenols, isoflavone

The plant compounds that have more than one phenolic hydroxyl groups in the aromatic ring, e.g. benzene and naphthalene, are generally called as “polyphenol”. Typical compounds in this group are flavonol synthesized through photosynthesis, isoflavone, tannin, catechin, quercetin and anthocyanin as colorants and bitter ingredients in plants. They exist in plant leaves, flowers and barks, and they play roles to support the growth and the activation of plant cells.

Polyphenols, with function to prevent oxidation of accumulated LDL-cholesterols, seem to have preventive effects for hypertension, arterial sclerosis and cerebrovascular and heart diseases caused from arterial sclerosis. Those in tea leaves, in particular, are certified to have suppression effect against stomach cancers. Fig.VIII-11-1 shows a process flow to extract polyphenol from green tea leaves. <sup>(107)</sup>

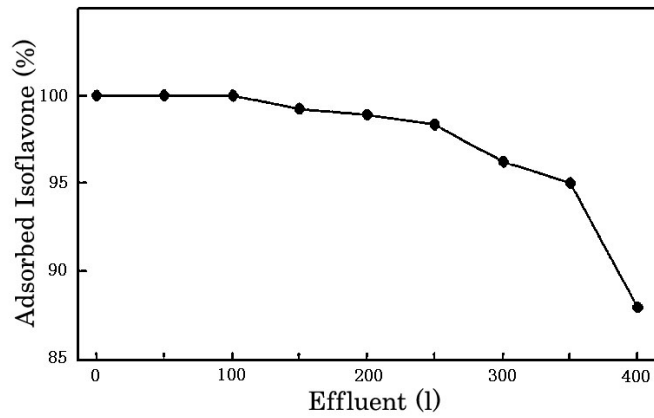


[Fig.VIII-11-1] Extraction flow of Polyphenol from Green tea leaves <sup>(107)</sup>

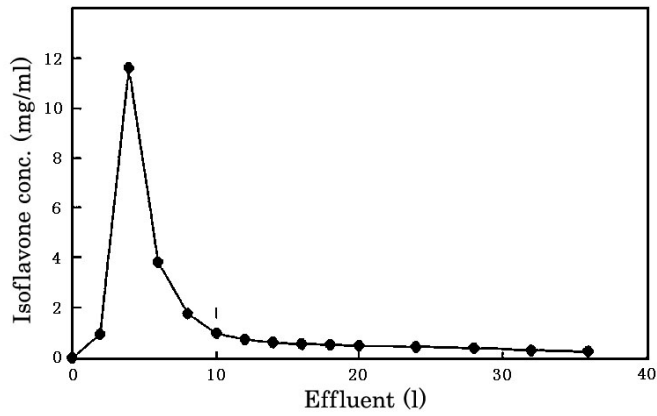
Isoflavone is a kind of flavonoids that are contained in soybean germ particularly. Fifteen compounds, e.g. daidzein and genistin, belong to this isoflavone group. Isoflavone from soybeans seem to be effective to female diseases, e.g. osteoporosis, menopause and breast cancer.

Figures VIII-11-2 and Fig.VIII-11-3 are examples to collect isoflavone, including daidzin, genistin, malonyldaidzin and malonylgenistin, from waste liquor of boiled soybeans with synthetic adsorbent SP207. <sup>(108)</sup>

The purity of isoflavone is exceeding 99% till 200L of the feed and gradually declines, but it keeps 85% at 400L-feed. SP207 is fully eluted with 60% ethanol at SV 3 of 20L (4BV).



[Fig.VIII-11-2] Adsorption of Isoflavone <sup>(108)</sup>  
 Resin: Sepabeads SP207 5L  
 Flow rate: SV 10 Temp.: 70°C



[Fig.VIII-11-3] Elution of Isoflavone <sup>(108)</sup>

**References:**

- (107) T. Hasegawa Co., Ltd., Manufacturing method of polyphenols, JPA2000256345
- (108) Fujicco Co.,Ltd., and Mitsubishi Chemical Engineering Corp., Separation and reuse of valuables in waste waters from boiled soybeans, Report of Eco-process Research Union of Food Industries,139 – 166