# A New Approach in Dewaxing and Refining Rice Bran Oil

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Crude rice bran oil is hard to refine because it contains large amounts of free fatty acids (FFA), waxes, unsaponifiable substances, monoglycerides, etc. This paper describes an attempt to improve on the refining process.

Crude rice bran oil with 10% FFA, 4.8% wax and 5.8% unsaponifiables was degummed with 0.1% $H_3PO_4$ at 65 C. The washed degummed oil was then treated with 2% "solubilizer" and 15% water with stirring for 10 min. The oil recovered by centrifuging had lower FFA and wax contents, as shown in Table I.

Separation of wax from the oil is attributed to the emulsification and hydration of wax in presence of aqueous solution of solubilizers.

Oils treated with Triton X-100, sorbitan monooleate, and Tri-*n*-butyl phosphate were then refined at room temperature and with calculated amounts plus 0.5% excess of 20° Be' NaOH. Similarly, the untreated crude oil was alkali refined as a control. The refining losses were calculated using the standard method and are shown in Table II.

The treated refined oil not only had lower refining loss but also was much clearer than the crude oil directly refined.

It was observed that the following factors further enhanced the separation of wax and free fatty acid from crude oil:

- Addition of even 0.10% of electrolytes such as sodium chloride, potassium chloride, sodium phosphate etc.
- Two or three different solubilizers in various combinations further enhanced this process.
- Mixture of an ionic and nonionic solubilizers were found to be more effective.

**TABLE I**

**FFA and Wax Contents of Oil Recovered**

| Solubilizer used (2% of oil wt) | Reduction of free fatty acid in treated oil (%) | Reduction of wax content in treated oil (%) |
|---|---|---|
| Sodium dodecyl benzene sulfonate | 3.0 | 15.5 |
| Tween-60 | 6.4 | 16.8 |
| Triton X-100 | 8.9 | 20.5 |
| Sorbitan monooleate | 5.0 | 26.4 |
| Tri-*n*-butyl phosphate | 5.5 | 27.0 |
| Sodium lauryl sulphate | 3.6 | 8.0 |
| Sodium stearate | 4.5 | 9.5 |

**TABLE II**

**Refining Losses**

| Solubilizers used from Table I treatment | Refining loss (%) |
|---|---|
| None | 48.0 |
| Triton X-100 | 28.5 |
| Tri-*n*-butyl phosphate | 25.5 |
| Sorbitan monooleate | 25.0 |