

CHAPTER 5
RESEARCH METHODOLOGY



5.1 APPARATUS

Schematic diagram of the experimental set-up is shown in fig. 5.1 . The fluidizing column(1) is a steel tube 10.8 cm in diameter and 70 cm in height. The top of the column is fitted with a 20 cm diameter steel ring(2) to reducing air velocity. A stainless steel screen(3) is used as a distributor. Visual slips(4) for observation of the fluidizing characteristics were also installed.

5.2 MATERIALS AND METHODS

MATERIALS

One lot of fresh rice bran was obtained from a local rice mill and used throughout the work.

EXPERIMENTS CONDUCTED

1. A series of cold run experiments were conducted to find the minimum fluidizing velocity of rice bran.
2. Hot air with an approximate velocity of about 2 times the minimum fluidizing velocity was passed through the column until the desired temperature was attained.
3. 700 grams of rice bran was introduced in the column for each set of runs.
4. Hot air velocity was maintained constant at the above determined value.
5. After heating for a given period of time the rice bran was removed from the column and stored in containers ((a) cloth bag, (b) polyethylene bag).
6. The procedure was repeated at different bed temperatures for different heating periods.

All experimental data and conditions are shown in table 5.1

TABLE 5.1 EXPERIMENTAL DATA AND TREATMENT CONDITIONS

Run No.	wt. of rice bran, (gm)	fluidizing vel. (cm/sec) at STP	air temp. ($^{\circ}$ C)	attempted bed temp.	treatment time(min)
1	700	48.65	140	70	5
2	700	48.65	140	70	15
3	700	48.65	140	70	35
4	700	48.65	140	70	60
5	700	48.65	140	70	90
6	700	45.97	160	90	5
7	700	45.97	160	90	15
8	700	45.97	160	90	35
9	700	45.97	160	90	60
10	700	45.97	160	90	90
11	700	44.15	180	105	5
12	700	44.15	180	105	15
13	700	44.15	180	105	35
14	700	44.15	180	105	60
15	700	44.15	180	105	90
16	700	43.01	200	115	5
17	700	43.01	200	115	15
18	700	43.01	200	115	35
19	700	43.01	200	115	60
20	700	43.01	200	115	90
21	700	41.93	220	125	5
22	700	41.93	220	125	15
23	700	41.93	220	125	35
24	700	41.93	220	125	60
25	700	41.93	220	125	90

ANALYSIS

After storage for a specified period of time, rice bran samples were drawn out and the following properties were measured: moisture content, oil content and free fatty acid content used as the index of deterioration of the oil in rice bran using AOAC method⁽⁴⁰⁾ as shown in appendix A. The extraction apparatuses are shown in fig. 5.2 .

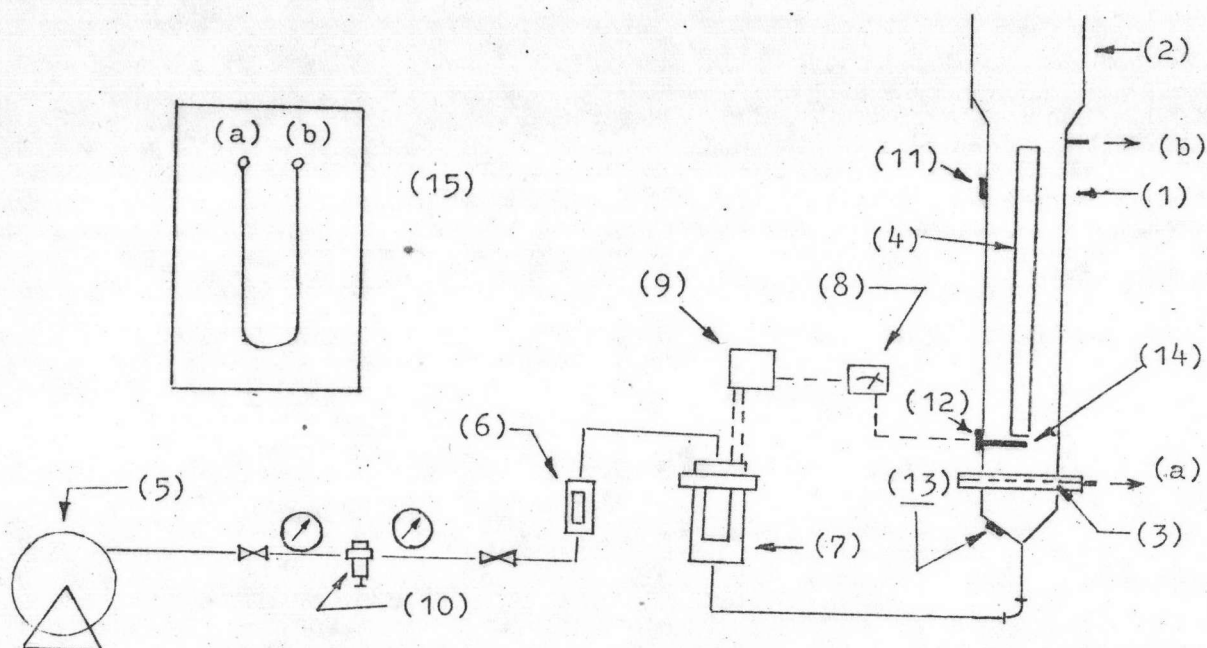
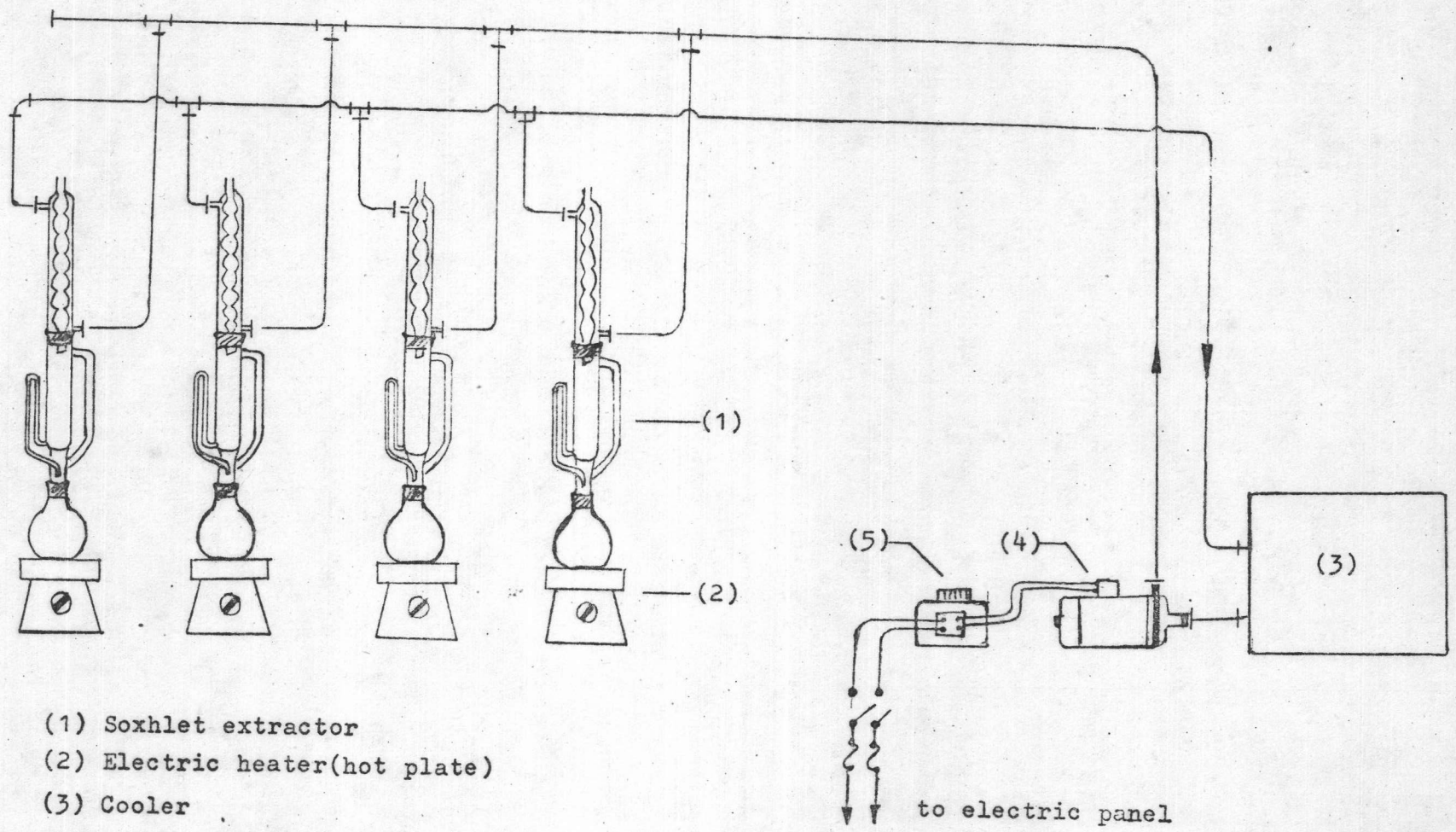


Fig. 5.1 Schematic diagram of experimental set-up

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|-------------------------------------|----------------------------|
| (1) Fluidized Bed Column | (2) Velocity Reducer |
| (3) Distributor Grid | (4) Visual Slip |
| (5) Air Compressor | (6) Rotameter |
| (7) Electric Heater | (8) Temperature Controller |
| (9) Electric Cutout | (10) Pressure Regulator |
| (11), (12), (13) Thermocouple Probe | (14) Thermocouple |
| (15) Manometer Panel Board | |



- (1) Soxhlet extractor
- (2) Electric heater(hot plate)
- (3) Cooler
- (4) Centrifugal pump
- (5) Variator for controlling the flowrate of coolant

Fig. 5.2 Extraction Apparatus