

**List of Tables**

<b>Sr. No.</b>	<b>Table</b>	<b>Page No.</b>
Table 2.3.1	Micropropagation of <i>Alpinia</i> species.	21
Table 5.1.1.4.1	Physicochemical parameters of <i>A. galanga</i> .	75
Table 5.1.1.4.2	Extractive values of <i>A. galanga</i> rhizome.	75
Table 5.1.1.5	Phytochemical analysis of <i>A. galanga</i> rhizome.	76
Table 5.1.1.6	Morphological characterization of <i>A. galanga</i> .	77
Table 5.1.1.7	Fluorescence analysis <i>A. galanga</i>	77
Table 5.1.2.1	Acute toxicity test of <i>A. galanga</i>	78
Table 5.1.2.2.1	Effect of oral administration of four extract of <i>A. galanga</i> on carrageenan induced inflammation in rats	79
Table 5.1.2.2.2	Effect of oral administration of four extract of <i>A. galanga</i> on cotton pallet granuloma in rats	80
Table 5.1.2.3.1	Effect of oral administration of acetone extract of <i>A. galanga</i> on body weight in arthritic rat	81
Table 5.1.2.3.2	Effect of oral administration of (AEAG) on right hind paw volume in arthritic rats	82
Table 5.1.2.3.3	Effect of oral administration (AEAG) on right hind joint diameter in arthritic rats	83
Table 5.1.2.3.4	Effect of oral administration (AEAG) on right hind paw mechanical withdrawal threshold in arthritic rats	84
Table 5.1.2.3.5	Effect of oral administration of (AEAG) on right hind paw withdrawal latency in arthritic rats	85
Table 5.1.2.4.1.1	Effect of 6 Fractions from <i>A. galanga</i> on carrageenan induced inflammation in rats.	89
Table 5.1.2.4.1.2	Effect of 4 pools from 10% acetone Fraction from <i>A. galanga</i> on carrageenan induced inflammation in rats.	90
Table 5.1.2.4.2.2	Effect of oral administration of Fraction (B2) from AEAG on carrageenan induced inflammation in rats.	91

Table 5.1.2.4.2.3	Effect of oral administration of Fraction (B2) from AEAG on cotton pellet granuloma in rats.	92
Table 5.1.2.4.3.1	Effect of oral administration of isolated bioactive Fraction (B2) on body weights in arthritic rats.	93
Table 5.1.2.4.3.2	Effect of oral administration of isolated bioactive Fraction (B2) on right hind paws volume in arthritic rats.	94
Table 5.1.2.4.3.3	Effect of oral administration of isolated bioactive Fraction (B2) on right hind joint diameter in arthritic rats.	95
Table 5.1.2.4.3.4	Effect of oral administration of isolated bioactive Fraction (B2) on mechanical hyperalgesia.	96
Table 5.1.2.4.3.5	Effect of oral administration of isolated bioactive Fraction (B2) on thermal hyperalgesia.	97
Table 5.1.2.4.3.6	Effect of oral administration of Fraction (B2) on blood haematological parameters in arthritic rats.	99
Table 5.1.2.4.3.7	Effect of oral administration of Fraction (B2) on serum biochemical parameters in arthritic rats.	101
Table 5.1.2.4.3.8	Effect of oral administration of Fraction (B2) on liver antioxidant parameters level in arthritic rats.	102
Table 5.2.1.4.1	Physicochemical parameters of <i>A. officinarum</i> rhizome.	110
Table 5.2.1.4.2	Extractive values of <i>A. officinarum</i> rhizome	110
Table 5.2.1.5	Phytochemical analysis of <i>A. officinarum</i> rhizome	111
Table 5.2.1.6	Morphological characterization of <i>A. officinarum</i> .	112
Table 5.2.1.7	Fluorescence analysis of <i>A. officinarum</i> rhizome.	112
Table 5.2.2.1	Acute toxicity test of <i>A. officinarum</i>	113
Table 5.2.2.2.1	Effect of oral administration of four extract of <i>A. officinarum</i> on carrageenan induced inflammation in rats.	114
Table 5.2.2.2.2	Effect of oral administration of four extract of <i>A. officinarum</i> on cotton pellet granuloma in rats	115
Table 5.2.2.3.1	Effect of oral administration of methanolic extract of <i>A. officinarum</i> Hance (MEAO) on body weights.	116

Table 5.2.2.3.2	Effect of oral administration of (MEAO) on right hind paw volume in arthritic rats	117
Table 5.2.2.3.3	Effect of oral administration of (MEAO) on right hind joint diameter in arthritic rats	118
Table 5.2.2.3.4	Effect of oral administration of (MEAO) on mechanical hyperalgesia in arthritic rats (Tactile allodynia)	119
Table 5.2.2.3.5	Effect of oral administration of (MEAO) thermal hyperalgesia.	120
Table 5.2.2.4.1.1	Effect of 6 Fractions from <i>A. officinarum</i> on carrageenan induced inflammation in rats.	123
Table 5.2.2.4.1.2	Effect of 4 Fraction from 100% ethyl acetate fraction from <i>A. officinarum</i> on carrageenan induced inflammation in rats.	124
Table 5.2.2.4.2.2	Effect of oral administration of Fraction (III) from MEAO on carrageenan induced inflammation in rats.	125
Table 5.2.2.4.2.3	Effect of oral administration of Fraction (III) from MEAO on cotton pellet granuloma in rat.	126
Table 5.2.2.4.3.1	Effect of oral administration of isolated bioactive Fraction (III) on body weights in arthritic rats.	127
Table 5.2.2.4.3.2	Effect of oral administration of isolated bioactive Fraction (III) on right hind paws volume in arthritic rats.	128
Table 5.2.2.4.3.3	Effect of oral administration of isolated bioactive Fraction (III) on right hind joint diameter in arthritic rats	129
Table 5.2.2.4.3.4	Effect of oral administration of isolated bioactive Fraction (III) on mechanical hyperalgesia.	130
Table 5.2.2.4.3.5	Effect of oral administration of isolated bioactive Fraction (III) on thermal hyperalgesia.	131
Table 5.2.2.4.3.6	Effect of oral administration of Fraction (III) on blood haematological parameters in arthritic rats	133

Table 5.2.2.4.3.7	Effect of oral administration of Fraction (III) on serum biochemical parameters in arthritic rats	135
Table 5.2.2.4.3.8	Effect of oral administration of Fraction (III) on liver antioxidant parameters level in arthritic rats	136
Table 5.3.1	Effect of phyto hormones on callus growth	141
Table 5.3.2.1	Effect of NAA and BA on shoot proliferation of <i>A. purpurata</i> .	142
Table 5.3.3	Effect of IAA on rooting in MS solid medium.	144
Table 5.3.5	Rutin and phenolic compound (quercetin) content analysis by HPTLC at callus level of <i>in vitro</i> grown plants of <i>A. purpurata</i> .	145
Table 5.3.6a	Quantification of rutin in the leaves of natural grown plant of <i>A. purpurata</i>	146
Table 5.3.6b	Quantification of rutin in conventional MS medium and modified medium	146
Table 5.4.4	Intraday and interday precision of galangin	150
Table 5.4.5	Robustness of galangin	150
Table 5.4.7	Accuracy of galangin	151
Table 5.4.8	Method validation parameters for the quantitation of galangin by proposed HPTLC method.	152
Table 5.4.11a:	Intraday and interday precision of rutin	154
Table 5.4.11b	Intraday and interday precision of quercetin	154
Table 5.4.12a	Robustness for rutin	155
Table 5.4.12b	Robustness for quercetin	155
Table 5.4.14a	Accuracy study of rutin by HPTLC method.	156
Table 5.4.14b	Accuracy study of quercetin by HPTLC method.	156

**List of Figures**

<b>Sr. No.</b>	<b>Figure</b>	<b>Page No.</b>
Figure 1.1.2a	Morphological features of plant and rhizome of <i>A. galanga</i>	02
Figure 1.1.2b	Rhizomes of (a) <i>A. galanga</i>	03
Figure 1.2.2	Rhizomes of <i>A. officinarum</i>	05
Figure 1.3.2	Morphological features of <i>A. purpurata</i>	07
Figure 5.1.1.2.1	T. S. of rhizome of <i>A. galanga</i> .	73
Figure 5.1.1.3	Powder microscopy of <i>A. galanga</i> .	74
Figure 5.1.2.3	Effect of AEAG on [A] Body weight, [B] Paw volume, [C] Joint diameter, [D] Mechanical hyperalgesia, [E] Thermal hyperalgesia.	86
Figure 5.1.2.4.1	Effect of Fraction (B2) on cotton pallet granuloma.	92
Figure 5.1.2.4.3	Effects of Fraction (B2) on [A] Body weight [B] Paw volume [C] Joint diameter [D] Thermal hyperalgesia [E] Mechanical hyperalgesia.	98
Figure 5.1.2.4.3.6	Effect of oral administration of Fraction (B2) on blood haematological parameters in arthritic rats.	100
Figure 5.1.2.4.3.7	Effect of oral administration of Fraction (B2) on serum biochemical parameters in arthritic rats.	101
Figure 5.1.2.4.3.8	Effect of oral administration of Fraction (B2) on liver antioxidant parameters level in arthritic rats	103
Figure 5.1.2.4.3.9	Radiological analysis of synovial joint.	104
Figure 5.1.2.4.3.10	Effect of AEAG and Fraction (B2) on histopathology of synovial joint.	105
Figure 5.1.2.4.4 (A)	<sup>1</sup> H-NMR spectrum of isolated compound (B2).	106
Figure 5.1.2.4.4 (B)	Infra-Red spectrum of isolated compound (B2).	106
Figure 5.1.2.4.4 (C)	<sup>13</sup> C-NMR spectrum of isolated compound (B2).	106
Figure 5.1.2.4.4 (D)	DEPT spectrum of isolated compound (B2).	107
Figure 5.1.2.4.5	Structure of isolated molecule from <i>A. galanga</i> .	107

Figure 5.2.1.2.1	T. S. of rhizome of <i>A. officinarum</i> .	108
Figure 5.2.1.3	Powder microscopy of <i>A. officinarum</i> .	109
Figure 5.1.2.3	Effect of MEAO on (A) Body weight, (B) Paw volume, (C) Joint diameter, (D) Mechanical hyperalgesia, (E) Thermal hyperalgesia	121
Figure 5.2.2.4.2.4	Effect of Fraction (III) on cotton pallet granuloma.	126
Figure 5.1.2.4.3	Effects of Fraction (III) [A] Body weight [B] Paw volume [C] Joint diameter [D] Thermal hyperalgesia [E] Mechanical hyperalgesia	132
Figure 5.2.2.4.3.6	Effect of oral administration of Fraction (B2) on blood haematological parameters in arthritic rats	133
Figure 5.2.2.4.3.7	Effect of oral administration of Fraction (III) on serum biochemical parameters in arthritic rats	135
Figure 5.2.2.4.3.8	Effect of oral administration of Fraction (III) on liver antioxidant parameters level in arthritic rats	137
Figure 5.2.2.4.3.9	Effect of MEAO and Fraction (III) on histopathology of synovial joint.	138
Figure 5.2.2.4.4 (A)	<sup>1</sup> H-NMR spectrum of isolated compound P3 (III).	139
Figure 5.2.2.4.4 (B)	<sup>13</sup> C-NMR spectrum of isolated compound P3 (III).	139
Figure 5.2.2.4.4 (C)	IR spectrum of isolated compound P3 (III).	139
Figure 5.2.2.4.4 (D)	Chromatogram of isolated compound P3 (III).	140
Figure 5.2.2.4.4.1	Structure of isolated compound [13, 5, 7-Trihydroxy flavones (galangin)]	140
Figure 5.3.1	Initiation of callus on MS media supplemented with 2, 4-D +kinetin (2:2).	142
Figure 5.3.2.1	Effect of NAA and BA on shoot proliferation of <i>A. purpurata</i> .	143
Figure 5.4.3	Effect of IAA on rooting in MS solid medium.	144
Figure 5.3.7	Concentration of rutin in natural grown and tissue	147

	culture grown plant of <i>A. purpurata</i>	
Figure 5.4.1a	HPTLC chromatogram of galangin in <i>A. galanga</i> and <i>A. officinarum</i>	148
Figure 5.4.1b	HPTLC chromatogram of galangin in <i>A. officinarum</i>	148
Figure 5.4.2a	Linearity of galangin	149
Figure 5.4.2b	Densitogram of galangin	149
Figure 5.4.7	Accuracy of galangin	151
Figure 5.4.9a	linearity of rutin	152
Figure 5.4.9b	linearity of quercetin	153
Figure 5.4.9c	Densitogram of rutin and quercetin	153
Figure 5.4.15	HPTLC profile of rutin and quercetin in hexane, ethyl acetate and methanolic extracts of <i>A. purpurata</i>	157